Washington State
Department of Transportation

Traffic Manual

M 51-02.10

May 2021

Engineering and Regional Operations
Traffic Operations

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Foreword

The *Traffic Manual* is intended to provide instruction and guidance to department personnel who conduct traffic operations and design activities. This manual identifies state and federal laws and departmental directives, policies and publications that are used to aid in decision making for traffic operations and design issues. It also provides standards to assure uniform application of operational methods and traffic control devices statewide.

Updating the *Traffic Manual* is a continuing process and revisions are issued periodically. Questions, observations and recommendations are invited. The next page is provided to encourage comments.

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Chapter 1 General Information

1-1 Overview

The Washington State Department of Transportation (WSDOT) publishes the *Traffic Manual* to provide guidance on applicable policies, establish uniform methods and procedures, and communicate vital information about traffic operations on state highways. The intended audience is the department's employees and others who develop traffic projects or conduct traffic engineering studies on state highways. The information, guidelines, and references herein are intended to support and complement sound engineering judgment and reflect the agency's commitment to zero fatal and serious injuries and a sustainable, integrated multimodal transportation system.

The *Traffic Manual* is available on the Internet and in print. It can be accessed electronically at www.wsdot.wa.gov/publications/manuals/m51-02.htm.

The online version allows you to do a word search of the entire manual.

1-2 Subject Matter

The *Traffic Manual* is composed of twelve additional chapters:

Chapter 2 Signs

Chapter 3 Delineation & Markings

Chapter 4 Multimodal Planning and Design/Operational Considerations

Chapter 5 Work Zone Traffic Control

Chapter 6 Traffic Regulations

Chapter 7 Specialized Highway Uses

Chapter 8 Highway Advertising Control and MIS

Chapter 9 Traffic Planning, Safety, Operations, and Design

Chapter 10 Intersection Control Evaluation

Chapter 11 Traffic Engineering Records Management

Chapter 12 Multimodal Traffic Impact Analysis Guidelines

Each chapter provides information, guidelines, and references relating to a specialized area of traffic operations. Because traffic control device systems and their application are dynamic, the *Traffic Manual* is updated periodically to reflect state-of-the-art traffic engineering practices.

The *Traffic Manual* does not attempt to address all the possible traffic operations situations or questions. Contact the Headquarters Traffic Office for discussion and guidance on unique traffic operations matters.

1-3 WSDOT Traffic Coordination

Most traffic activities within WSDOT are administered by the Headquarters Traffic Operations Division and the Regional Traffic Offices. The Maintenance Operations, Active Transportation, Transportation Data, GIS & Modeling Office, Transportation Safety & Systems Analysis, Local Programs, Multimodal Planning, Risk Management & Legal Services, Public Transportation, Development, Ferries, Urban Mobility and Access, Capital Program Development and Management, and Rail, Freight & Ports Divisions provide specialized support.

The following subsections briefly describe how each of these work groups contributes to the goals of the department's Traffic program.

A. **Headquarters Traffic Operations Division (Headquarters).** Under the Director of Traffic Operations, the Headquarters Traffic Operations Division is responsible for traffic engineering and related safety functions in four fundamental areas:

1. **Statewide Traffic Expertise –** Headquarters provides expertise to the regions and other agencies, focusing on traffic design, traffic operations, ITS operations, work zone traffic control, traffic impact analysis, Practical Solutions, traffic engineering training, and highway advertising control. The Traffic Operations Division also coordinates statewide traffic activities including consulting with Attorney General's Office on matters of traffic law, offering advice or guidance when requested by the regions or other WSDOT offices, and facilitating statewide meetings with regional traffic personnel.

2. **Statewide Policy Development –** Headquarters develops policy and responds to issues and questions on traffic engineering to provide for statewide consistency and uniformity. These tasks often require efforts to research, coordinate, and summarize issues for executive level decision-making. Policies include injury minimization speed management, traffic design, and traffic operations standards and procedures.

3. **Statewide Resource Development and Deployment –** Headquarters identifies the resources required to fund traffic operations for the state highway system, and for statewide traffic and lower cost investments that reduce crash potential. Decision packages are developed and submitted to the legislature for approval each biennium and once approved, the funds are allocated. Traffic operations activities are accomplished primarily under Program Q.

4. **Traffic Systems Management and Operations (TSMO) Program –** Headquarters serves as an agency TSMO champion, focusing on how to operate our existing facilities most efficiently. In coordination with other divisions and regions, the Traffic Operations Division leads the development, implementation and maintenance of the statewide TSMO Program Plan. This effort requires evaluating, planning and addressing areas like business processes, workforce development, culture, and technology and performance management. See the TSMO website (TSMOWA.org).

B. **Regional Traffic Offices –** The six Regional Traffic Engineers report to one of the regional senior managers, typically the regional Maintenance and Operations Engineer. Regionally administered traffic engineering services include:

1. Traffic engineering investigations and studies.
2. Crash analyses.
3. Operational analyses.
4. Multimodal analyses and assessments.
5. Compliance with Rules and regulations.
6. Regional traffic expertise.
7. Freeway and arterial management.
8. Traffic related design support to the I and P subprograms.
9. Traffic control device inventories.
10. Public and media relations.
11. Administration of Program Q allocations.
12. Practical Solutions development and implementation.

C. **Maintenance Operations –** Washington State Maintenance Operations personnel work through many challenges in maintaining the state highway system, including; increasing growth in population and vehicles, and extreme weather patterns that can bring wind, rain, snow, and ice. Providing for movement on our highway system during each season while performing a variety of maintenance activities that remove the potential for crashes involving our maintenance workers is a priority for our Maintenance Operations family. Through the use of tools, technology, techniques and talent; you, the maintenance professional take on these challenges and deliver through it all.

D. **Active Transportation Division –** The Active Transportation Division provides leadership and expertise to guide policy, practice, and problem solving to increase walk, bike and roll safety, mobility and accessibility. Their work supports the agency's mission of enabling Washingtonians of all ages and abilities to get where they want to go using the modes that work best for them. This includes an emphasis on active transportation network connectivity and quality, systematic safety, multimodal access, pedestrian crossing permeability, and injury minimization speed management on roadways where people walking or biking may be present. The division provides technical assistance within WSDOT and to local partners, coordinates with active transportation coordinators housed in region offices, and oversees the Safe Routes to School and Pedestrian and Bicycle funding programs.

E. **Transportation Data, GIS & Modeling Office –** The Transportation Data, GIS and Modeling Office (TDGMO) is part of Headquarters Multimodal Planning Division. The TDGMO collects, analyzes, reports, and stores much of the data the department uses to identify and address operational deficiencies on our state highways. Data includes information about the type of roadway surface, width of the travel lanes and shoulders, number and types of vehicles using the highway each day, and the location and severity of crashes. The TDGMO also provides technical support for planning functions, maintains video and digital imaging of state highways, and maintains the milepost system. www.wsdot.wa.gov/mapsdata/tdgo_home.htm

F. **Transportation Safety & Systems Analysis Division –** WSDOT's Transportation Safety & Systems Analysis division (TSSA) includes Transportation Safety & Enterprise Risk, Research & Library Services, Knowledge Management, Strategic Management and Performance Management.

TSSA supports Practical Solutions by working with programs across the agency to help WSDOT achieve its strategic plan. TSSA provides actionable information through research, data analysis and coordination with other programs to helps agency leaders make decisions. We strive to be WSDOT's resource of choice for information and expertise for better decisions. TSSA supports Practical Solutions by working with programs across the agency to help WSDOT achieve its strategic plan. TSSA provides actionable information through research, data analysis and coordination with other programs to helps agency leaders make decisions. We strive to be WSDOT's resource of choice for information and expertise for better decisions.

G. **Local Programs Division –** The Local Agency Traffic and Safety Services program provides traffic engineering assistance to cities, counties, tribal governments, transit and other agencies, as well as other organizations. They assist with traffic safety, operations, and design issues, help advance projects, and promote information sharing. Traffic and Safety Services also operates as a contact point between local agencies, tribal governments, WSDOT, Federal Highway Administration, and other state agencies. Traffic and Safety Services answers general questions about state highways, but directs questions about specific locations to the appropriate WSDOT region.

Examples of the services offered are available at www.wsdot.wa.gov/LocalPrograms/Traffic/default.htm.

Traffic and Safety Services also hosts the Washington Transportation Professionals peer exchange, a group of Washington State city and county traffic, transportation, and public works engineers and technicians, public works directors, managers, planners, and related professionals. This peer exchange provides a forum for local agencies to share ideas and information about traffic issues affecting local agencies through email, website, and regular meetings. Meeting dates and topics are listed at www.wsdot.wa.gov/LocalPrograms/Traffic/WTPF.htm.

For more information about these services, contact the City Safety and Traffic Programs Manager at www.wsdot.wa.gov/LocalPrograms/staff.htm.

H. **Multimodal Planning Division –** The Multimodal Planning Division informs decisions through expertise and innovation in planning, policy and data and analysis services to support a sustainable and integrated statewide multimodal transportation system.

The Multimodal Planning Division:

1. Plans transportation improvements for a variety of travel modes including transit, carpools, freight, general-purpose highway use and active transportation.
2. Coordinates with local agencies, sub-area transportation management forums, the Puget Sound Regional Council (PSRC), and other transportation providers to determine cost-effective investments for the state transportation system that meet the mobility needs of people and goods while systematically working to meet greenhouse gas reduction goals set in state law.
3. Improves the performance of the existing highway system by implementing new technology, and developing congestion pricing and tolling strategies.
4. Coordinates state transportation facility planning between WSDOT's Olympic and Northwest Regions, Tolling Organization, Washington State Ferries, and with local jurisdictions and the Puget Sound Regional Council.
5. Collects, processes, analyzes and reports data on over 80,000 miles of public roadway, including over 7,000 miles of state highway. Provides specialized GIS products and services in support of business operations throughout WSDOT.

I. **Risk Management & Legal Services Division –** The Risk Management & Legal Services Division (RMLS) is responsible for the agency's risk management function, including managing agency litigation, investigating tort claims, pursuing financial recovery for damage to agency property and resources, records and information management, public disclosure, and agency rules, policies, and forms. RMLS provides consultation and support on legal compliance issues, including the state public records laws. RMLS manages the agency's records management and public disclosure programs and assists regions, divisions and offices with records retention schedules and disposition of records, and responding to public records requests. See *Records and Information Management Manual* M 3124.

J. **Public Transportation Division –** The Public Transportation Division's goal is to develop and deliver innovative, distinctive programs, services and approaches that support an integrated, multimodal, sustainable, transportation system, to consistently exceed our customers' and partners' expectations; and to be recognized as a great place to work. The Public Transportation Division strives to create and support integrated transportation solutions that connect people statewide through partnerships with local and regional services and organizations.

K. **Development Division –** The Development Division consists of 318 employees working in six distinctive areas actively supporting the agency's goals and mission by providing responsive, reliable and progressive professional products and services to our customers. The division is committed to employee development and recognizing accomplishments, while fostering a productive and modern work environment. The Design Office in the Development Division maintains and updates the WSDOT *Design Manual* (DM). Staff across the agency engaged in highway design use the DM, along with other guidance resources, in the course of that work. Assistant State Design Engineers, who work in the division, are a primary staff resource when interpreting guidance and in addressing conflicts between manuals, providing information about the procedures and documentation that may be required.

L. **Ferries –** Information Pending.

M. **Urban Mobility and Access –** The Urban Mobility and Access (UMA) Office is focused on transportation needs in the central Puget Sound (King, Kitsap, Pierce, and Snohomish counties). The UMA Office has three divisions: Management of Mobility, Regional Transit Coordination, and the Toll Division.

The Management of Mobility Division coordinates plans for state facilities with regional, local and modal partners; develops system strategies, corridor plans and investment proposals to improve multimodal mobility and access on state routes. In addition, the division coordinates closely with regions and local agencies to coordinate future construction impacts as well as develop strategies to manage major system changes and congestion caused by major incidents.

Regional Transit Coordination Division supports and liaisons with Sound Transit, King County Metro, Community Transit, Everett Transit, and Pierce Transit. This includes collaborating and coordinating with transit and other agencies as well as with WSDOT divisions and offices if there is a potential for impacts to transit or opportunities for enhanced transit in the central Puget Sound Region.

The Toll Division implements and operates the statewide toll program. The Toll Division works closely with the Northwest Region Traffic office and other offices statewide on key Transportation System Management & Operations (TSMO) concepts like express toll lanes and variable tolling rates, and provides revenue to fund transportation improvements, maintenance and operations.

N. **Capital Program Development and Management Division (CPDM) –** CPDM is responsible in varying degrees for development and management of the capital construction programs for highways, ferries, and rail, as well as for traffic operations and capital facilities. CPDM develops the highway construction program working with Region program management and project development, and oversees development of construction programs for all other modes and functional areas, working with their respective staffs. CPDM is also responsible to ensure that construction programs meet the cost, scope and schedule of Legislative intent. CPDM seeks the most efficient means of utilizing available funding and workforce resources provided by the Legislature to construct projects that preserve and improve the state transportation system. As projects are scheduled for construction, CPDM allocates funding, monitors progress, and reports results to the Legislature, Governor's Office,

WSDOT executives and the public. CPDM works with many others both within and outside the department to ensure the successful delivery of the department's Construction Program.

O. **Rail, Freight and Ports Division –** Rail, Freight, and Ports Division is responsible for:

- Managing the Amtrak Cascades passenger rail system in conjunction with ODOT
- Planning for the future of Washington's rail, freight and ports programs and projects
- Funding freight rail projects across the state through both grant and loan programs
- Coordinating with ports, regional planning organizations and other freight stakeholders across the state to align priorities
- Overseeing the WSDOT-owned short line railroad in eastern Washington– the Palouse River & Coulee City Rail System

1-4 Key Reference Material

The following reference materials are essential to personnel involved with traffic operations and traffic design duties.

- ***Manual on Uniform Traffic Control Devices for Streets and Highways*** **(MUTCD) and** ***Washington State Modifications to the MUTCD*** **M 24-01.** RCW 47.36.030 directs WSDOT to adopt a uniform standard for the application and location of traffic control devices installed along public roadways in the state of Washington. The MUTCD, published by FHWA, has been adopted into Chapter 468-95 of the Washington Administrative Code (WAC). To comply with state law, modifications to specific MUTCD sections have also been adopted into WAC 468-95.

  Amendments to the MUTCD are developed by the FHWA through the Federal Register process. The amendments become effective in our state after the department receives notification of the approved changes from the FHWA and adopts them into WAC 468-95.

  WSDOT *Design Manual* M 22-01. The *Design Manual* (DM) is maintained by the Design Office in the Development Division, and is the agency's primary reference for highway design policy and guidance. In addition, it provides a uniform approach to methods and procedures for development of multimodal highway designs. Besides policy, methods, and guidance for designers, the DM provides the basic framework for documenting and approving designs. The DM also provides guidance for developing traffic components included in design reports and contract plans. Many of the components may also apply to traffic operations. Where possible, the *Traffic Manual* avoids duplication of *Design Manual* materials, but provides appropriate cross-references.
- WSDOT *Sign Fabrication Manual* M 55 05. The *Sign Fabrication Manual* provides sign fabricators and designers with detailed layout information for official traffic signs used in Washington State.
- WSDOT *Standard Plans for Road, Bridge, and Municipal Construction* M 21-01. The "Standard Plans" provide plans for traffic-related items.
- WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction* M 41-10. The *Standard Specifications* provide detailed requirements and techniques for construction and installation of traffic-related items.

1-4.1 Other Documents

The following reference documents may also be helpful in conducting traffic related designs and analyses:

WSDOT Manuals *www.wsdot.wa.gov/publications/manuals*

- *Plans Preparation Manual* M 22-31
- *Construction Manual* M 41-01
- *Maintenance Manual* M 51-01
- *Highway Advertising Control Act* M 22-95
- *Developer Services Manual* M 3007

FHWA (Federal Highway Administration) *www.fhwa.dot.gov*, *www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks*

- *Traffic Monitoring Guide*

AASHTO (American Association of State Highway and Transportation Officials) www.transportation.org

- *A Policy on Geometric Design of Highways and Streets*
- *Guidelines for Traffic Data Programs*
- *Highway Safety Manual*

NACTO (National Association of City Transportation Officials) https://nacto.org/publications, https://nacto.org/safespeeds

- Urban Street Design Guide
- Urban Bikeway Design Guide

TRB (Transportation Research Board) www.trb.org/main/public/home.aspx

- *Highway Capacity Manual*

ITE (Institute of Transportation Engineers) www.ite.org

- *Traffic Control Devices Handbook*
- *ITE Trip Generation Manual Traffic Engineering Handbook*
- *Manual of Transportation Engineering Studies*

1-4.2 Other Reference Sources

The following internal reference sources may also be helpful in conducting traffic engineering investigations and analyses:

- Safety Analysis Guide
- Traffic Electrical Design Webpage
- Multimodal Traffic Impact Analysis Guidelines
- SR View
- Interchange Viewer
- Washington State Highway Log
- TRIPS — WSDOT corporate mainframe database for transportation data
- NCHRP Human Factor Guides

1-5 Abbreviations

Common abbreviations used in the *Traffic Manual* and other traffic engineering related publications are:

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ARM	Accumulated Route Mileage
VMS	Variable Message Sign
CVISN	Commercial Vehicle Information Systems Network
DMI/LRS	Distance Measuring Instrument/Linear Referencing System
FHWA	Federal Highway Administration
GPS/LRS	Global Positioning System/Linear Referencing System
HAR	Highway Advisory Radio
HOV	High Occupancy Vehicle
HOT	High Occupancy Toll
HPMS	Highway Performance Monitoring System
HSIS	Highway Safety Information System
ITE	Institute of Traffic Engineers
ITS	Intelligent Transportation Systems
MPO	Metropolitan Planning Organization
MUTCD	*Manual on Uniform Traffic Control Devices for Streets and Highways*
NHS	National Highway System
PSRC	Puget Sound Regional Council
PTR	Permanent Traffic Recorder
RCW	Revised Code of Washington
SRMP	State Route Milepost
MAP-21	Moving Ahead for Progress in the 21st Century Act
TDGMO	Transportation Data, GIS & Modeling Office
TMC	Traffic Management Center
TRAC	Transportation Research Center (University of Washington)
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WSP	Washington State Patrol
WTSC	Washington Traffic Safety Commission

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Chapter 2 Signs

2-1 General

Effective signing is the primary method to provide regulatory, warning, and guidance information to transportation system users (motorized vehicles, pedestrians, and bicyclists). Signing that is clear, concise, and accurate supports safe behaviors and safe operation, legal, and orderly travel on public roadways and transportation facilities. Sign use must be limited and conservative since signs can lose their effectiveness when used to excess. Signs are not typically used to confirm Rules of the Road.

This chapter contains information about signing on the state highway system and is intended for persons involved in traffic operations or traffic design. Specific policies and guidelines are included that clarify the *Manual on Uniform Traffic Control Devices* (MUTCD) information. Situations not addressed in this chapter or the MUTCD may need to be determined on a case-by-case basis using engineering judgment.

Where a change to the current sign installation is indicated by information in this chapter, replace as the current sign's service life is reached. For MUTCD Target Compliance Dates, see page I-4, Table I-2 for required sign replacements.

State law requires the department to adopt uniform standards for traffic control devices, including signs, along public roadways. WAC 468-95 adopts the MUTCD and Washington State Modifications to the MUTCD as these standards. The MUTCD and WSDOT modifications provide guidance on the intended use and placement of regulatory, warning, guide, and motorist information signs, as well as specific information on sizes and installation.

This chapter supplements the MUTCD and WSDOT modifications with specific interpretations and unique applications for signs on the state highway system.

Guidelines for the use of traffic control signs are discussed in the following MUTCD chapters:

MUTCD Chapter	Sign Type
Chapter 2B	Regulatory Signs, Barricades, and Gates
Chapter 2C	Warning Signs and Object Markers
Chapter 2D	Guide Signs – Conventional Roads
Chapter 2E	Guide Signs – Freeways and Expressways
Chapter 2F	Toll Road Signs
Chapter 2G	Preferential and Managed Lane Signs
Chapter 2H	General Information Signs
Chapter 2I	General Service Signs
Chapter 2J	Specific Service Signs
Chapter 2L	Changeable Message Signs
Chapter 2M	Recreational and Cultural Interest Signs
Chapter 2N	Emergency Management Signs
Part 6	Work Zone Signs
Part 7	School Area Signs

MUTCD Chapter	Sign Type
Part 8	Railroad and Light Rail Signs
Part 9	Bicycle Facility Signs

2-2 Sign Design

The WSDOT *Sign Fabrication Manual* M 55-05 contains geometric layout details for most signs used by the department.

The sign number codes indicated in the *Sign Fabrication Manual* and other departmental publications are exclusive to WSDOT and may not correspond to MUTCD number codes for similar signs.

Any modification to a symbol regulatory or warning sign requires FHWA experimentation approval, contact HQ's Traffic.

Any non-standard sign design shall be submitted to the State Sign Engineer for the State Traffic Engineer's approval.

2-2.1 Designing a Sign Message

This section contains information about layout and fabrication of signs that are not addressed in the *Sign Fabrication Manual*.

A. Message Content – A sign message must convey the necessary information in a simple, direct manner using clear and concise wording. English language is used on signs on the state transportation system. Historical names (including non-English) may be used for place names such as for a town or natural or cultural feature. Native Tribal language may be used on jurisdictional boundary and geographic features signs.

B. Letter Sizing – Letter sizes for primary and supplemental guide signs are determined by roadway type and operating speed. A sign message must be large enough to give the viewer adequate time to read and comprehend the information, and to respond with a driving task or other action as required. MUTCD Tables 2E-2 through 2E-5 show the appropriate standard letter sizes to be used. Signs on non-roadway portions of the transportation system (i.e., bicycle or pedestrian paths, transit stations) are sized to reflect the specific conditions of use.

Studies indicate the average driver comprehends three words per second, after a message perception time of up to two seconds. Unique messages require more perception time than messages that are commonly used. Determine the needed letter height for a particular sign by using the following formula that combines the comprehension rate and the perception time with the operational speed of the roadway.

$$\text{LETTER HEIGHT} = (N/3 + 2)\, f$$

Where:

N = Number of words in the message.

f = Legibility factor (see Exhibit 2-1).
(Found by dividing vehicle speed in feet per second (fps) by 30, the legibility distance per inch of letter height.)

Exhibit 2-1 'f' Values by Speed

*MPH	(fps)	f
25	37	1.2
30	44	1.5
35	51	1.7
40	59	2.0
45	66	2.2
50	73	2.4
55	81	2.7
60	88	2.9
65	95	3.2
70	103	3.4

*Speed (legal speed limit or 85th percentile speed).

The following example applies the formula and calculates desirable letter height:

Example message: "SNOQUALMIE PASS RADIO TRAFFIC INFO 1 MILE"

Roadway Posted Speed Limit = 65 mph
N = 7
f = 3.2
Height = (7/3 + 2) 3.2 = 14 inches
LETTER HEIGHT = Use 14-inch letters

C. Message Layout and Spacing – Sign message layout and spacing requirements are specified in the *Sign Fabrication Manual*.

D. Abbreviations – Abbreviations must be immediately recognizable by the viewer and are only used to avoid excessively long sign messages. Do not use abbreviations if the controlling (longest) message line is long enough to allow use of the complete word. Do not abbreviate place names except for those approved in the list below.

To maintain statewide uniformity, the Headquarters Traffic Office must approve abbreviations other than those listed below. Periods are not used in sign abbreviations, except for British Columbia (B.C.) and United States (U.S. Customs).

The following are the only pre-approved abbreviations:

AFB	Air Force Base
Alt	Alternate
Ave	Avenue
B.C.	British Columbia
Bch	Beach
Blvd	Boulevard
Coll	College
Comm	Community
Co	County
Cr	Creek

Ct	Court
Ctr	Center
DNR	Department of Natural Resources (campground, etc.)
Dr	Drive
E	East
Elev	Elevation
FS	Forest Service
Ft	Fort
Fwy	Freeway
Fy	Ferry
Hist	Historic (as in “Nat’l Hist District”)
HOV	High Occupancy Vehicle
Hts	Heights
Hwy	Highway and State Route
Info	Information
Int’l	International
Jct	Junction
km	Kilometers
Lab	Laboratory
Lk	Lake
Ln	Lane
Lp	Loop
Lt	Left
M	Meters
Max	Maximum
Med	Medical
Mi	Mile(s)
Min	Minimum
MPH	Miles Per Hour
Mt	Mount (Rainier)
Mtn	Mountain
N	North
NE	North East
NW	North West
NAS	Naval Air Station
Nat’l	National
Ore	Oregon
ORV	Off Road Vehicle
Pk	Park
Ped	Pedestrian
Pkwy	Parkway

Pl	Place
Pop	Population
Pt	Port or Point
Rd	Road
Rec Area	Recreational Area
Res	Reservation
RR	Railroad
Rt	Right
RV	Recreational Vehicle
S	South
SE	South East
SW	South West
Sea-Tac Airport	Seattle-Tacoma Airport
Spdwy	Speedway
St	Street
Temp	Temporary
Thru	Through
Univ	University
U.S.	U.S. (Customs, etc.)
USA	United States of America
USFS	U.S. Forest Service
W	West
Wy	Way
WSDOT	Washington State Department of Transportation
State Patrol	Washington State Patrol
Xing	Crossing

2-2.2 Reflective Sign Sheeting Material Requirements

Traffic control signs are fabricated using various types of reflective sheeting material. Each sheeting type has different retroreflective properties and different practical applications. The sign type and its location determine the specific sheeting to be used. The following sheeting types are designated in ASTM Specification D 4956:

- **Type I** – Medium-intensity retroreflective sheeting, referred to as “Engineer Grade.” Warranty life of 7 years.
- **Type II** – Medium-high-intensity retroreflective sheeting referred to as “Super Engineer Grade.” Warranty life of 10 to 12 years.
- **Type III** – High-intensity retroreflective sheeting referred to as “High Intensity.” Warranty life of 10 years.
- **Type IV** – High-intensity prismatic retroreflective sheeting, referred to as “High Performance.” Warranty life of 10 years.

- **Type VIII** – Super high-intensity prismatic retroreflective sheeting, referred to as "Super High Performance." Warranty life of 10 years.
- **Type IX** – Very high-intensity prismatic retroreflective sheeting, referred to as "VIP Diamond Grade" or "Omni-View." Warranty life of 12 years.
- **Type X** – Super-high-intensity prismatic retroreflective sheeting, referred to as "Fluorescent Orange Prismatic." Warranty life of 3 years.
- **Type XI** – Very high-intensity prismatic retroreflective sheeting, referred to as "Diamond Grade Cube" or "Omni-Cube." Warranty life of 12 years.

The following table shows the specific sheeting type to use, based on the sign type, location, and lighting environment. When ordering a sign from the WSDOT Yakima sign shop, specify the sheeting type.

Exhibit 2-2

Sign Type	Sheeting Type (Background)	Sheeting Type (Legend, Symbols, Border)
Regulatory		
• Ground Mounted	IV	N/A[1]
• Overhead	IV	N/A
Warning		
• Ground Mounted	IV	N/A
• Overhead	XI	N/A
Guide Signs		
• Ground Mounted	IV	IV
• Overhead Exit Only	IV or XI[2]	XI
• Overhead Left Side Exits	IV	XI
• Other Overhead Guide	IV	XI
• Overhead Street Name	IV	XI
• **Route Markers** (M-Series Signs)	IV	IV[3]
General Information (I-Series Signs)	IV	IV
School (S-Series Signs)[4] (S1-1, S4-3, "School" portion of S5-1, and S5-101)	XI	N/A
Milepost Markers	IV	IV
Blue and Brown Background Signs	IV	IV
Fluorescent Orange (Work Zone Signs)	X	N/A

[1] Red is Type IV, black is non-reflective.

[2] For Yellow Background sheeting, use Type XI Fluorescent sheeting.

[3] Black is non-reflective.

[4] Fluorescent Yellow Green (FYG) sheeting.

2-3 Sign Location, Installation, and Storage

2-3.1 Sign Location

Signs shall be located and positioned according to standards outlined in the MUTCD Section 2A.16–2A.21, *Design Manual* Chapter 1020, and Standard Plan G-20.10-00. These standards address sign mounting height and lateral and longitudinal placement.

- Place signs in a manner that provides a clear view for the roadway user and to not obstruct other signs.
- Space signs to allow the roadway user time for making required decisions and to safely execute any necessary maneuver.
- Overloading roadway users with too much information may cause confusion; use engineering judgment based on Perception Reaction Time (PRT) and posted speed limit.
- Signs should be individually installed on separate posts or mountings except where one sign supplements another or where route or directional signs must be grouped. An exception is an Adopt A Highway sign with a Milepost marker.
- Signs should be located as far from the traveled way as possible, while remaining visually effective (road user's cone of vision). They should be placed on the backslope of a ditch, rather than the inslope or bottom.
- Sign spacing on Freeways and Expressways:
  - Minimum mainline spacing between all primary and supplemental guide signs shall be 800 feet.
  - Minimum sign spacing between all other signs except Milepost (MP) and Object Marker signs shall be 500 feet. This shall include spacing to primary and supplemental guide signs, and Highway Advisory Radio (HAR and Variable Message Signs (VMS).
  - Minimum spacing on ramps shall be 100 feet.
- Sign spacing on Conventional Highways:
  - Minimum spacing between all signs except Milepost (MP) Markers and Object Marker signs is 500 feet desirable and a minimum of 350 feet for posted limit of 40 mph or greater.
  - Minimum spacing between all signs except Milepost (MP) Markers and Object Marker signs is 300 feet desirable and a minimum of 100 feet for posted limit of 35 mph or less.

2-3.2 Sign Installation

Signs shall be installed according to standards contained in *Design Manual* Chapter 1020, Standard Plans Section G, and MUTCD Section 2A.16–2A.21. Refer to these documents for installation standards for:

- Ground mounted signs on steel, wood, and box beam posts.
- Overhead sign installations, including service walkways.
- Height of sign (vertical clearance or "v" dimension).
- Horizontal location of sign ("w" dimension).
- Sign post break-away safety features.
- Windload information, see Standard Plans Section G or contact HQ's Traffic.

2-3.3 Temporary and Permanent Attention Devices

Attention getting devices, such as flags, may be used temporarily with newly installed warning or regulatory signs. They can draw attention to a traffic revision such as a speed limit change or the addition of a traffic signal. Temporary attention devices are fluorescent yellow in color. They are generally displayed for a minimum of two weeks and a maximum of one month. Devices may be displayed up to two months when greater conspicuity is needed.

Attention devices may be permanently placed when a high impact continues to be needed to improve compliance with a specific traffic regulation or other traffic control. Permanent attention devices have been used on Interstate or other major roadways where there is a speed limit reduction of 10 mph or greater.

Permanent attention devices shall be fluorescent yellow prismatic sheeting and must be approved by the region traffic engineer following an engineering investigation, which includes a review of crash and speed data. The unnecessary use of attention devices erodes their effectiveness and must be avoided. Therefore, permanent attention devices must be re-evaluated every 12 to 24 months for continued effectiveness and re-approved by the Region Traffic Engineer.

2-3.4 Controlling Vegetation Around Signs

The department's maintenance crews are responsible for maintaining visibility to signs by clearing vegetation that obscures the full view of a sign face. Thoughtful sign placement can reduce the need for vegetation control.

The following guidance will generally provide sign visibility. Greater clearing may be necessary in some situations to achieve full visibility to the sign.

Exhibit 2-3

Area Description	Distance* From Vegetation	Width**
Low Speed Urban	200 feet	Varies
Rural	500 feet	Varies
Freeways and All Guide Signs	800 feet	Varies

*Distance is measured in the direction that the sign faces, along the edge of the traveled way.

**Width varies. Clear vegetation from edge of pavement to 5 feet beyond the sign edge that is farthest from the roadway, or to the edge of the right of way.

For vegetation control at grade intersections with county roads, the department is only responsible for vegetation within state highway right of way. The county is responsible for the vegetation on their legs of the intersection outside of state highway right of way. For vegetation on private property, the department has no authority to remove or cut back. Maintenance should try working with the property owner on these vegetation issues.

2-3.5 Sign Storage

Store signs to prevent damage to the sign face. Sign sheeting is damaged by exposure to dirt and water during storage, which can reduce its retroreflectivity. **Never store signs lying flat. Moisture accumulation between signs will cause sheeting failure.**

Store all packaged signs on edge and indoors. If packaged signs become wet, unpack them immediately and separate the signs to dry (clothespins work well). Provide ample space between signs to allow free air circulation and moisture evaporation from each sign face.

If outdoor storage is required for short periods, remove all packing materials so nothing is against the sign face. Store signs on edge, separated with clothespins, and set above the ground in a clean area.

2-4 Sign Installation and Maintenance Jurisdiction

Jurisdictional responsibility for traffic control signs (and other traffic control devices) on public highways is assigned through several state statutes.

- The department is responsible for erecting and maintaining traffic control signs upon every state highway (RCW 47.36.050) and (WAC 468-18-040). Local jurisdictions are assigned the responsibility to erect and maintain traffic control signs on roadways within their jurisdiction (RCW 47.36.060).

These responsibilities are further defined:

- On limited access roadways, including any interchange cross-streets, the department is responsible for signing (RCW 47.52.020 and RCW 47.24.020(2)). This can be superseded by an agreement with a local agency that designates other responsibility arrangements (RCW 47.52.090).
- Responsibility for signing along city streets that are part of the state highway system is assigned based on the population of the city (RCW 47.24.020(12) and (13)) and is shown in Exhibit 2-4. Population is determined by the Washington State Office of Fiscal Management and can be found at www.ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/ofm_april1_population_final.pdf.

It is important to work with each city to ensure that city signs are not installed on department sign posts and that adequate sign spacing is maintained. The only exception is for STREET NAME signs above a STOP sign. Cities are to obtain approval from the department prior to installing their signs on a state highway (RCW 46.61.085).

Exhibit 2-4 Sign Installation and Maintenance Responsibility Non-Limited Access Highways

Sign Type	Responsibility Based on City Population	
	Over 27,500[1]	Under 27,500[1]
Regulatory	City	State
Parking	City	City
Warning	City	State
Route Markers	State	State
Primary Guide Signs	State	State
Street Name	City	City
School	City	State
MIS Logo	City	City*
Informational	City	City
DUI Victim Memorial	City	City*

[1] Thirty thousand **(30,000) on July 1, 2023**; Thirty-two thousand five hundred **(32,500) on July 1, 2028**; and Thirty-five thousand **(35,000) on July 1, 2033**

*The department may install these signs, if authorized through a specific agreement with a city or town.

2-5 Traffic Sign Management System (TSMS)

TSMS is a statewide sign inventory computer program that provides both a complete inventory and a history of maintenance actions for each sign on the state highway system.

The Headquarters and Region Traffic Offices use TSMS to provide accurate records regarding:

- Sign location.
- Original installation and replacement dates.
- Sign message.
- Sign size.
- Letter height.
- Direction of sign face.
- Sheeting type and color.
- Program Code (What Program – M, Q, or Other paid for the last Maintenance Action).
- Maintenance history.

The Region Traffic Offices are the data stewards and are responsible for keeping the TSMS up to date including:

- Entering new sign data.
- Conducting periodic field inventories.
- Inventorying all signs installed by contract.
- Updating inventory after construction projects are completed.
- Night reflectivity review.

Maintenance personnel in Eastern, Olympic, and South Central regions are responsible for filling out a Sign Activity Report (SAR) that details each activity performed. This provides important history and identifies needed maintenance actions. The SAR is sent to the region Traffic Office for input into the TSMS. In some regions, maintenance personnel input SAR data directly into TSMS.NET in cooperation with the region Traffic Office.

Regions also provide TSMS reports to Traffic, Maintenance, or other offices as requested.

The Headquarters Traffic Operations Office is responsible for maintaining and updating the TSMS program to meet the department's business needs, including data storage and selective retrieval of sign inventory and maintenance activity data.

2-6 State Traffic Laws and Regulations Requiring a Sign for Enforcement

Some Rules of the Road (RCW 46.61) are not enforceable unless appropriate signs are posted. The following signs must be installed to enforce a regulation (RCW). Place these signs at the point of regulation or where the prohibition begins and ends.

Exhibit 2-5 Signs Needed for Enforcement

Sign Message	Sign Number	RCW
STOP & YIELD	R1-1 & R1-2	47.36.110
SPEED LIMIT	R2-1	46.61.405 46.61.480
SPEED LIMIT, TRUCKS	R2-2	46.61.410
MINIMUM SPEED LIMIT	R2-4	46.61.425
HOV FACILITIES	R3-10, 11, 12, 13	46.61.165
BICYCLES MUST EXIT	R5-601	46.61.160
TRUCKS USE RIGHT LANE	R4-5	46.61.100 47.36.260
TRUCK LANE 500 FEET	R4-6	47.36.260
NO MOTORIZED FOOT SCOOTERS	R5-1003 & R5-1004	46.61.710
PARKING RESTRICTIONS, TOW AWAY ZONES	R7 SERIES	46.61.575
RESERVED PARKING FOR DISABLED PERSONS	R7-801	46.61.581
NO STOPPING RESTRICTIONS	R8 SERIES	46.61.570
NO HITCHHIKING	R9-4 & R9-4A	46.61.255
PEDESTRIAN PROHIBITION	R5 SERIES	WAC 468-58-030 WAC 468-58-050
WEIGHT RESTRICTIONS, etc.	R12 SERIES	46.61.450
SCHOOL SPEED LIMIT	S5-1	46.61.440
RANGE AREA	I2-401 & I2-501	16.24.060
LIMITED ACCESS	I2-601 & I2-701	47.52.110
SLOW VEHICLES MAY USE SHOULDER	I8-501	46.61.428
TRACTION DEVICE REQUIREMENTS	R16-2100 SERIES	47.36.250

2-7 Regulatory Signs

Regulatory signs alert transportation system users to applicable traffic laws or regulations, and provide information and instructions required for compliance. Regulatory signs, whose installation is required for enforcement of a law, are listed in Section 2-6.

All Regulatory sign sizes are per Table 2B-1 in the MUTCD, unless specifically stated otherwise in the Regulatory sign section.

2-7.1 Stop Signs

The department shall install and maintain all STOP (R1-1) signs at the intersections of county roads with state highways (RCW 47.36.100).

The department shall install and maintain all STOP signs at the intersections of city streets with state highways within the corporate limits of cities having populations less than 27,500 (RCW 47.24.020(13)).

STOP signs shall be a minimum 36 × 36 inches on all roadways. A 48 × 48 inch sign may be used on divided highways with at-grade intersections, at ramp terminals, or where otherwise indicated by engineering judgment. On low-volume roads (under 400 ADT), that intersect with a state highway a 30 × 30 inch STOP sign may be used in lieu of 36 × 36 inch STOP sign.

Existing STOP signs with smaller sign sizes, as described above, may remain in place until they need to be replaced.

2-7.2 Yield Signs

YIELD (R1-2) signs are installed to assign right of way to traffic on certain approaches to an intersection. In addition to guidance in the MUTCD, YIELD signs are installed as follows:

- They shall be installed to assign right of way at the entrance to a roundabout intersection per the MUTCD.
- They should be installed along freeway or expressway on-ramps where acceleration ramp geometry and/or sight distance do not meet Design Manual minimum standards. Install the Yield sign so that it is primarily visible only to ramp traffic.
- They may be installed at entrances to ramp and at-grade intersections with right turn islands.

Use the tables in *Design Manual* Chapter 1360, Exhibit 1360-9 to determine the appropriate minimum length for the acceleration lane portion of an on-ramp.

2-7.3 Speed Limit Signs

SPEED LIMIT (R2-1) signs are installed to display the maximum allowable vehicle speed as established by law or regulation. Install a TRUCKS XX (R2-2) sign below the standard speed limit sign where a special speed limit is mandated for trucks over 10,000 pounds gross weight, or vehicles in combination, or where the maximum speed limit for cars and trucks is different.

Speed limit signs are prominently located for maximum awareness at the following locations:

- At the location where a speed limit changes to another.
- On the far side of major interchanges or intersections, including between state highways.
- At entrances to Washington State and at boundaries of cities and towns.
- In rural areas, at 10- to 20-mile intervals.

On **conventional roadways**, locate a sign for each direction of travel, opposite one another at the speed zone boundary. If existing features prohibit opposite installation, the signs may be offset up to 150 feet in either direction from the speed zone boundary and located a maximum of 300 feet apart. If the signs cannot be installed within these parameters, the speed zone boundary may be changed by the State Traffic Engineer to accommodate sign installation.

On **multilane divided highways**, install signs on both the right and left sides of the roadway at speed zone boundaries. Confirmation speed limit signs may be installed on the right side only.

On **freeways**, install signs a minimum of 1,500 feet beyond on-ramp acceleration lanes (MUTCD Section 2E-38). Where interchange ramps are closely spaced, use engineering judgment to determine the most effective intervals for posting speed limit signs. On freeways with three or more lanes in one direction consider installing signs on both the right and left sides of the roadway. **Do not place a speed limit sign between a CURVE or TURN warning sign and the roadway curve or turn itself. Adjust the speed limit boundary location if necessary, to avoid this placement.**

See Appendix 2-1 for typical Speed Limit sign layout. See Section 2-8.4 for use of the SPEED REDUCTION (W3-5) warning sign.

See Chapter 6 for information on setting permanent speed limits and Chapter 5 for guidelines on temporary construction zone speed limits.

2-7.4 U-Turn Prohibition & U-Turns Allowed

The MUTCD states that TURN PROHIBITION signs (R3-1 through R3-4, R3-18) shall be installed where U-turns are prohibited. U-turns are allowed where the maneuver can be made safely, without interfering with other traffic, and at least 500 feet from a horizontal or vertical curve (RCW 46.61.295).

On limited access roadways, with median sections, restricted U-turn locations are installed for use by law enforcement, maintenance, and emergency vehicles only (RCW 47.52.120). Sign these median locations with a NO U-TURN (R3-4) sign.

U-Turns are allowed at some roadway intersections, both inside and outside of cities and towns. Signing may be installed to designate where U-turns are allowed and that the side street must yield to the U-turn movement. Appendix 2-2 shows typical U-turn signing associated with left turn lanes at signalized intersections.

2-7.5 Two-Way Left Turn Lane

TWO-WAY LEFT TURN ONLY signs may be installed where a lane in the center of a highway is reserved for the use of left-turning vehicles (in either direction) and is not used for passing or overtaking. The post-mounted (R3-9a or R3-9b) or the overhead mounted (R3-9) sign may be used to supplement two-way left turn lane pavement markings. A plaque indicating BEGIN or END may be mounted above either sign to identify the limits of the two-way left turn area.

Additional WSDOT criteria apply to the use of two-way left turn lane signs:

- Install the initial sign near the beginning of the two-way left turn lane and repeat installation as necessary, based on engineering judgment.
- BEGIN or END plaques are not installed where a two-way left turn lane is interrupted by left turn channelization on either one or both intersection approaches.

2-7.6 Auxiliary Climbing and Passing Lanes

For sections of state highway that include auxiliary climbing lanes:

- Install a TRUCK LANE XXX FEET (R4-6) sign in advance of the climbing lane.
- Install a SLOWER TRAFFIC KEEP RIGHT (R4-3) sign near the beginning of the climbing lane.
- Install a RIGHT LANE ENDS (W9-1R) in advance of the climbing lane terminus, where spacing allows.
- Install a LANE ENDS (W4-2L) sign in advance of the climbing lane terminus. A distance plaque may be installed as a supplement to this sign.

See Appendix 2-3 for signing layout.

For sections of state highway that include auxiliary passing lanes:

- Install a PASSING LANE XXX MILES (R4-601) sign ¼ to ½ mile in advance of the passing lane. Show the approximate distance to the passing lane, measured to the nearest ¼ mile.
- Install a KEEP RIGHT EXCEPT TO PASS (R4-301) sign at the beginning of the passing lane.
- Install a RIGHT LANE ENDS (W9-1R) sign in advance of the passing lane terminus, where spacing allows.
- Install a LANE ENDS (W4-2L) sign in advance of the passing lane terminus. A distance plaque may be installed as a supplement to this sign.
- An optional NEXT PASSING LANE XXX MILES (R4-602) sign may be installed up to 500 feet beyond the passing lane terminus to show the approximate distance to the next passing lane.

See Appendix 2-4 for signing layout.

2-7.7 Keep Right Except to Pass

The KEEP RIGHT EXCEPT TO PASS sign (R4-301) may be used on multi-lane roadways to remind motorists of state law RCW 46.61.100 which requires vehicles to stay in the right lane of multilane roadways, except to pass. The sign has also been installed at the request of law enforcement agencies to aid their enforcement efforts at specific locations.

Use the following criteria when determining sign locations:

- The preferred sign location is in the median.
- Signs are not to be placed within ½ mile in advance of an interchange.
- Signs are not to be placed through an interchange area.
- Signs are not to be placed within 5 miles of each other in the same direction of travel.

2-7.8 Vehicles Over 10,000 lbs. Prohibited in Left Lane

VEHICLES OVER 10,000 LBS. PROHIBITED IN LEFT LANE (R4-302) signs shall be installed on multilane roadways with three or more lanes in one travel direction to remind drivers of large vehicles that they are prohibited from travelling in the left lane per RCW 46.61.100(3) and WAC 468-510-020.

2-7.9 Do Not Enter and Wrong Way Signing

DO NOT ENTER (R5-1) signs shall be installed at every location where traffic is prohibited from entering a restricted roadway. ONE WAY (R6-1) signs are to be installed above DO NOT ENTER signs. Install WRONG WAY (R5-1a) signs as a supplement to the DO NOT ENTER signs at each location. WRONG WAY signs are placed further from the crossroad than DO NOT ENTER sign.

Complete WRONG WAY signing for freeway at-grade intersections, interchange ramps, and roundabouts shall be installed as shown in Appendices 2-5, 2-6 and 2-7.

2-7.10 Bicycle and Motorized Foot Scooters Prohibition

As part of vehicular traffic, bicycles are permitted on all state highways except where restricted by regulation (RCW 46.61.160 and WAC 468-58-050).

Additionally, “motorized foot scooters may have access to highways of the state to the same extent as bicycles” (RCW 46.61.710(5)); thus, they are also restricted in the same areas as bicycles. Restrictions are located primarily on limited access freeways, but may be determined for other locations based on an engineering investigation. They are noted at www.wsdot.wa.gov/bike/closed.htm.

Install advance signing to inform bicyclists and motorized foot scooter riders of the upcoming restricted section, and to give alternate route directions.

- On the mainline, install a BICYCLES AND MOTORIZED FOOT SCOOTERS MUST EXIT ¼ MILE (R5-602) sign in advance of the prohibited area.
- Install a BICYCLE AND MOTORIZED FOOT SCOOTERS MUST EXIT (R5- 601 with arrow) sign at the closest off-ramp or intersection in advance of the restricted segment.

- Install a BICYCLES AND MOTORIZED FOOT SCOOTERS PROHIBITED (R5-1003) sign at a prohibition point such as an on-ramp to a prohibited freeway segment.
- Install PEDESTRIANS, HITCHHIKERS, BICYCLES, AND MOTORIZED FOOT SCOOTERS PROHIBITED (R5-1004) sign at on-ramp entrances to prohibited areas.

2-7.11 Roundabout Directional Arrow

Install ROUNDABOUT DIRECTIONAL ARROW signing (R6-4 series) at the central island of the roundabout.

Exhibit 2-6

Roundabout Type	Approach Posted Speed Limit	Sign Number	Sign Size
Single	35 MPH or less	R6-4a	48” x 24”
Single	40 MPH or greater	R6-4b	60” x 24”
Multi-Lane	All Speeds	R6-4b	60” x 24”

2-7.12 No Pedestrian Crossing

NO PEDESTRIAN CROSSING signing (R9-3 or R9-3A) may be installed at a signalized intersection or other locations, based on engineering judgment, where pedestrian crossing is prohibited. Locate the sign so that it is visible to all pedestrians who may consider crossing, normally on the opposite side of the roadway in line with the travel path of the pedestrian. Additional signage may be needed to direct pedestrians to alternative crossings. Prohibiting pedestrian crossings may be considered on a case by case basis but should not be used systematically to limit pedestrian crossing opportunities. The supplemental sign USE CROSSWALK (R9-3B R or L) may be installed below.

For More information on closed pedestrian crossings, see *Design Manual* Chapter 1510, Section 1510.10(20(c).

2-7.13 Pedestrian Prohibition

Install a PEDESTRIANS PROHIBITED sign (R5-10 series) at access points to limited access highways where pedestrians are prohibited by a department regulation (WAC 468-58-050).

2-7.14 No Turn On Red

When a turn is prohibited, based on engineering judgment, at a signalized intersection install a NO TURN ON RED BALL (R10-11) sign on the signal mast arm or signal pole.

When existing NO TURN ON RED (R10-11a or R10-11b) signs need to be replace use NO TURN ON RED BALL (R10-11) sign.

2-7.15 Shoulder Driving

Shoulder driving is permitted on selected portions of two-lane highways (RCW 46.61.428). Section 7-14, of this manual defines the roadway characteristics required to designate a shoulder driving area. Identify designated shoulder driving areas by installing signs to inform roadway users of the permitted action.

- Install a SLOW VEHICLES MAY USE SHOULDER (I8-501) sign at the beginning of the shoulder driving zone.
- Supplement with a NEXT XXX MILES (I7-702) advisory distance plaque and a DAYLIGHT HOURS ONLY (I8-701) sign.
- Repeat this signing as appropriate at a maximum interval of 5 miles.
- Install an END SHOULDER DRIVING (I8-601) sign at the end of the designated shoulder driving zone.
- Consider bicycle traffic that may be using shoulder, see Section 2-8.19.B, BIKES ON SHOULDERS when there is less than minimum stopping sight distance along the driving section.

See Appendix 2-8.

2-7.16 Specialized Haul Vehicle Weight Restrictions

Specialized Hauling Vehicles (SHV's) are closely spaced multi-axle single unit trucks introduced by the trucking industry in the last decade. SHV's exhibit concentrated loads in short wheel lengths, resulting in greater stress in certain bridge members.

The Bridge Preservation Office (BPO) will identify the bridge location, and what specific message is to be used. Install SPECIALIZED HAUL VEHICLE WEIGHT RESTRICTION (R12-5B, R12-5C, or R12-5D) signs.

2-7.17 Emergency Vehicle Weight Restrictions

The Fixing America's Surface Transportation (FAST) Act revised the weight limits of emergency vehicles. For bridges on the Interstate System and bridges within one-road- mile of the Interstate System with a load rating that results in operating factor less than 1.0 for emergency vehicles, weight limit restrictions signs shall be posted. More information is available at: FHWA Load Rating for EV's.

The Bridge Preservation Office (BPO) will identify the bridge location, and what specific message is to be used. Install EMERGENCY VEHICLE WEIGHT RESTRICTION (R12-701 or R12-702) signs at bridge approaches and additional advance posting signs in advance of the nearest intersecting roads, ramps or a wide point in the road where a first responder's can detour or turn around.

2-7.18 Slow Vehicle Turnouts

Slow vehicle turnouts provide passing opportunities along state roadways and are identified by specific signing to inform motorists of the turnout location:

- Install a SLOW VEHICLES USE TURNOUTS NEXT XXX MILES (I8-101) sign where turn-outs occur at several consecutive locations. Place in advance of the initial turnout.
- Install the DELAY OF 5 VEHICLES ILLEGAL (I8-201) sign in advance of each turnout.
- Install the SLOW VEHICLE TURNOUT XXX FT/MILE (I8-401) sign in advance of each turnout.
- Install a SLOW VEHICLE TURNOUT "arrow" (I8-301) sign at the beginning of each turnout.
- NO PARKING (R8-3) or NO PARKING SYMBOL (R8-3A) signs may be installed within the turnout area.

See Appendix 2-9.

2-7.19 Range Area

A RANGE AREA sign (I2-401) shall be installed wherever a state highway enters an open range area, as determined by the local county government (RCW 16.24.060). Repeat signing at points designated by the governing county commissioners and install signs at county boundaries if the range area spans adjoining counties. Some county websites list the designated range areas within their county.

Install the LEAVING RANGE AREA (I2-501) sign where a state highway leaves an open range area.

2-7.20 Unmuffled Compression Brakes

It is against the law to use **unmuffled** compression brakes (RCW 46.37.395). The department installs signs (R4-605) near border crossings used by trucks, a few miles inside state boundaries and along the ramps to or from weigh stations to inform drivers of this regulation.

When installing a R4-605 use these guidelines to determine spacing between a R4-605 sign and other roadway signing:

- On freeway installations, use a minimum spacing of 500 feet.
- On multilane high speed roadways with at grade intersections, use a minimum spacing of 400 feet.
- On two-lane, high-speed roadways, use a minimum spacing of 300 feet.
- On multilane and two-lane, low speed facilities within incorporated areas, use a minimum spacing of 150 feet.

The department will not install these signs on non-access controlled highways within incorporated areas. The local agency may install and maintain such signing.

2-7.21 Compression Brake Prohibition

Signs prohibiting compression brake use may be installed only where a local agency ordinance prohibiting their use has been adopted (RCW 70A.20.060(3)) and where sign spacing is available. The local agency must agree to pay the fabrication, installation, and subsequent maintenance costs.

Install signs (R4-604) before the restricted area as follows:

- On limited access routes, install signs beyond major interchanges. Locate between the route marker assembly and the speed limit signs. Where sign space is limited, install below the city entrance marker.
- Along non-access controlled routes outside corporate limits, install signs upon leaving corporate limits, and beyond the junction of major intersections, not to exceed one sign every 5 miles.
- Along non-access controlled city streets that are also state highways, the local agency may work with the department to install signs about the prohibition.

When installing a R4-604 use these guidelines to determine spacing between a R4-604 sign and other roadway signing:

- On freeway installations, use a minimum spacing of 500 feet.
- On multilane high speed roadways with at grade intersections, use a minimum spacing of 400 feet.
- On two-lane, high-speed roadways, use a minimum spacing of 300 feet.
- On multilane and two-lane, low speed facilities within incorporated areas, use a minimum spacing of 150 feet.

Note: Compression brake regulations are noise regulations rather than traffic regulations. The department does not regulate compression brake use.

2-7.22 Traction Device Requirements for Snow Prone Areas

Install TRACTION DEVICE REQUIREMNTS (R16-2100 Series) signs per RCW 47.36.250 for snow prone areas approaching mountain passes and other areas where snow and ice are prevalent during winter months.

These signs should be turned away from traffic during non-winter months. See Appendix 2-28.

2-8 Warning Signs

Warning signs are installed to alert roadway users to unexpected conditions on or adjacent to the roadway that require special attention and that may require a reduction in speed or other action desired from the road users while operating on the roadway. These conditions may include expected presence of pedestrians and/or bicyclists.

Determine the appropriate placement of warning signs based on the MUTCD Guidelines for Advanced Placement of Warning Signs, Table 2C-4, and on an engineering judgment. The guidelines provide minimum advance placement distances, based on vehicle speeds and location specific conditions.

Warning signs are installed on both sides of the road on multilane divided roadways that have two or more lanes in one direction. Speed limit signs should not be located between any warning sign and the condition warned for, when the warning sign indicates a need to reduce speed.

Warning signs may be supplemented with a warning beacon(s) when additional warning is needed for vehicles approaching a crossing or other locations. Some examples are: mid-block crossings; narrow shoulders with bicyclists and/or pedestrians and less than adequate stopping sight distance per MUTCD Section 4L.03.

Yellow is the standard background color for warning signs. Fluorescent yellow/green (FYG) may be used for bicycle, pedestrian, or playground signs where there are an unusual number of conflicts or where greater attention is needed for the sign because of distracting surroundings.

Exhibit 2-7 Warning (Diamond Shape) Sign Sizes

Roadway Type	Minimum Sign Size
Freeways and Expressways – Mainline & Ramps	48″ × 48″
Multilane and Conventional Roadways	36″ × 36″

2-8.1 Turn and Curve (Horizontal Alignment) Signs and Advisory Speed Plaques

TURN and CURVE signs are installed to alert motorists to horizontal curvature in the roadway alignment. Advisory speed plaques supplement the signs as determined by a traffic engineering study (generally using a ball banking instrument to provide readings as the study vehicle traverses each curve).

WSDOT has adopted the following application when determining curve and advisory speed signing installations:

Exhibit 2-8

Advisory Speed (mph)	Maximum Ball Bank Reading
20 mph or less	14
25 and 30 mph	12
35 mph and greater	10

The TURN (W1-1) sign is used where the engineering and traffic investigation indicates the advisory speed for a horizontal turn to be 30 mph or less.

The CURVE (W1-2) sign is used where the engineering and traffic investigation indicates the advisory speed for a horizontal curve to be from 35 mph to 65 mph.

Install the appropriate TURN or CURVE sign where the recommended curve speed is **5 MPH or more below** the posted speed limit.

Install a supplemental ADVISORY SPEED PLAQUE (W13-1) below the TURN or CURVE sign if the advisory speed is 5 mph or more below the posted speed limit, or if engineering judgment indicates the need for the sign.

If a supplemental DISTANCE PLAQUE is used, such as beneath a WINDING ROAD (W1-5L/R) sign, show the distance as a fraction of a mile rather than a decimal (**½ mile** rather than **.5 mile**). The fraction is more quickly read and easily understood by the motorists.

The placement of the horizontal alignment signs should be located per MUTCD Table 2C-4.

2-8.2 Hairpin Curve

Install a HAIRPIN CURVE sign (W1-901L/R) where the change in the roadway horizontal alignment is 135 degrees or more, and:

- A traffic engineering analysis of roadway, geometric, and operating conditions shows the recommended curve speed to be 30 mph or less.
- The recommended curve speed is equal to or less than the posted speed limit.

Install a supplemental advisory speed plaque (W13-1) below the HAIRPIN CURVE sign if an engineering and traffic investigation indicates the need for the sign. Large arrow sign(s) (W1-6) or chevron alignment signs (W1-8) should be used in conjunction with the hairpin curve sign.

2-8.3 Large Arrow

LARGE ARROW (W1-6) signs are used at curves with a curve speed advisory is 15 mph or more below the speed limit, or when a curve is 1200 feet radius or less, or when there is not space to install three chevrons in sequence, or where run off the road crashes have demonstrated an operational deficiency.

2-8.4 Chevron Alignment

CHEVRON ALIGNMENT (W1-8) signs are used to provide emphasis and guidance for a change in horizontal road alignment. When the curve advisory speed is 15 mph or more below the speed limit, CHEVRONS shall be installed.

If used, CHEVRONS shall be installed on the outside of a turn or curve, in line with and at approximately a right angle to approaching traffic. Install a minimum of three signs in a series, with at least two signs visible to the motorist at all times throughout the curve.

They should be installed on circular interchange ramps, or on other curving alignments where run off the road crashes have demonstrated an operational deficiency.

2-8.5 Truck Tipping

The TRUCK ROLLOVER (W1-13) sign may be installed in advance of a horizontal curve where there is a history of truck tipping crashes, a ball bank indication of 12 degrees or more, or a side friction factor of f=>0.21*. Display the recommended speed on an ADVISORY SPEED PLAQUE (W13-1) below the TRUCK ROLLOVER sign. Install the TRUCK ROLLOVER sign in addition to standard CURVE, TURN, LARGE ARROW, and/or CHEVRON warning signs.

* Use the following formula for a third method to determine the truck speed of a curve:

$$V^2 = 15\ R\ (e + f)$$

Where:

V = Speed in miles per hour

R = Radius curve in feet

e = Rate of super-elevation in feet per foot

f = > 0.21 (Safe coefficient of side friction)

2-8.6 Stop Ahead/Signal Ahead

Install a STOP AHEAD (W3-1A) sign if the stop sign is not visible for at least the minimum distance indicated in MUTCD Table 2C-4 (Advanced Placement of Warning Signs). Install a SIGNAL AHEAD (W3-3) sign if the traffic signal is not visible for at least the minimum distance indicated in MUTCD Table 4D-2 (Minimum Sight Distance for Signal Visibility). On county or city road approaches to state highways, the county or city is responsible for installation and maintenance of these signs.

2-8.7 Signal Ahead Sign With Flashing Beacons

Install a SIGNALIZED INTERSECTION WARNING (SIW) sign assembly to warn motorists of the signal installation when:

- The posted speed limit is 55 mph or above; and
- The intersection is more than 2 miles away from the adjacent signalized intersection; or
- The visibility requirements to the signal in Table 4D-2 of the MUTCD cannot be met.

The recommended SIW sign assembly consists of:

- A modified 48″ × 48″ W3-3 sign on an optional black back plate for added target value.
- Two 8-inch LED yellow beacons.
- A flasher circuit activated continuously by a separate circuit from the service.
- A lighting circuit.

Locate the sign per the MUTCD Table 2C-4.

The use of a PREPARE TO STOP WHEN FLASHING (PTSWF) system may also be considered. For more information on Advance Warning Systems (i.e. Flashing Beacons) are available at: www.wsdot.wa.gov/sites/default/files/2006/02/02/PTSWF.pdf

2-8.8 Speed Limit Reduction Ahead

The SPEED LIMIT REDUCTION AHEAD (W3-5) warning sign has replaced the black on white "SPEED LIMIT AHEAD XX" regulatory sign. The SPEED LIMIT REDUCTION AHEAD sign is installed at locations where the speed limit reduces by 10 mph or greater. On multilane divided roadways, install a SPEED LIMIT REDUCTION AHEAD sign on both the left and right sides. Locate the sign to allow sufficient distance to slow the vehicle to the reduced speed as shown in Exhibit 2-9.

Exhibit 2-9 Speed Reduction Signs Advance Location

Reduced Speed Limit (mph) \ Approach Speed Limit (mph)	70	65	60	55	50	45	40	35	30
65	430								
60	720	390							
55	1000	660	350						
50	1250	910	600	310					
45	1470	1140	820	540	270				
40	1670	1340	1030	740	470	230			
35	1850	1520	1200	920	650	410	200		
30	2000	1670	1360	1070	810	570	350	160	
25	2140	1800	1490	1200	940	700	480	290	120
20	2240	1910	1600	1310	1040	800	590	390	230

2-8.9 Low Vertical Clearance

For the installation of new low vertical clearance warning signs or the replacement of existing low vertical clearance warning signs shall be as follows:

The maximum legal vehicle height permitted on state highways is 14 feet (RCW 46.44.020). At the direction of the MUTCD, and through operational experience, a 15-inch buffer (which includes 3 inches for frost heave) has been added to the 14-foot maximum legal height, setting the minimum LOW CLEARANCE signing threshold at 15′3″.

The advance posting of a low vertical clearance is to be consistent with (RCW 46.61.450).

The MUTCD defines "Traveled Way" as the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes. The MUTCD defines "Roadway" a portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used in this manual shall refer to any such roadway separately, but not to all such roadways collectively. RCW 46.04.500 defines "Roadway" a portion of a highway improved, designed, or ordinarily used for vehicular travel, exclusive of the sidewalk or shoulder.

The Bridge Office periodically measures vertical clearance heights for bridges and tunnels during inspections. The actual clearance height is to the nearest inch rounded down (*actual measurement of 15' 1-3/4" equals 15'1"*). Bridge clearance data is available through the Bridge Engineering Information System (BEIST) at: http://beist/InventoryAndRepair/Inventory/BRIDGE.

Criteria for new or replacement of existing LOW CLEARANCE (W12-2; W12-301 or W12-302L/R) warning signs:

- A bridge or a tunnel is signed for a low vertical clearance of 15'-3" or less, the height on the low vertical warning signs shall be the actual measured opening minus three inches.

Criteria for replacing existing LOW CLEARANCE (W12-2; W12-301 or W12-302L/R) warning signs:

- If the actual measured opening for a bridge or tunnel increases by 2" or less the existing signing may remain. (*e.g. a bridge clearance changes from 15'-0" to 15'-2", the existing warning sign of 14'-9" may remain.*)
- If the actual measured opening for a bridge or tunnel increases by more than 2" the signs shall be replaced. (*e.g. a bridge clearance changes from 14'-9" to 15'-0", the existing warning sign of 14'-6" shall be corrected.*)
- If the actual measured opening for a bridge or tunnel decreases by 1" or less the existing signs may remain. (*e.g. a bridge clearance changes from 15'-0" to 14'-11", the existing warning sign of 14'-9" may remain.*)
- If the actual measured opening for a bridge or tunnel decreases by more than 1" the existing signs shall be replaced. (*e.g. a bridge clearance changes from 14'-10" to 14'-8", the existing warning sign of 14'-7" shall be corrected.*)

Through Truss Bridges:

There are two key conditions with Through Truss Bridges – minimum vertical clearance over the bridge deck (***includes traveled lanes and shoulders***), and shoulder width between right side of the edge stripe and curb or barrier. When there is no edge line present the height is measured from the face of the curb or barrier to the bottom of the portal. See Exhibit 2-10 for Conditions and Signing requirements.

Exhibit 2-10 Through Truss Bridges

Condition	See Appendix	Shoulder Width (Ft.)	Required Low Vertical Clearance Signs		
			W12-2	W12-302L	W12-302R
Clearance on any portion of the structure is between **14′3″ and 15′3″**	2-10-1	< 2	X[1,2]	X[3]	X[3]
Clearance above traveled lanes is between **14′3″ and 15′3″**	2-10-2	> 2	X[1]	X[3]	X[3]
Clearance above shoulders is **15′3″ or less**	2-10-3			X[3]	X[3]

[1] Install a W12-2 before the vertical restriction, in accordance with MUTCD Table 2C-4 (Advanced Placement of Warning Signs).

[2] Install a second W12-2 in advance of the closest intersecting road that provides a vehicle a turnaround or detour. Supplement the W12-2 with an ADVISORY DISTANCE (W13-501) plaque, showing the distance to the vertical restriction.

[3] Install the appropriate sign(s) to fit the vertical restriction (i.e. arch structure, etc.).

[4] On divided highways where the lowest vertical clearance is over the traveled lane nearest the median install an additional W12-2 sign in the median.

Non-Truss Bridges:

The key condition with Non-Truss Bridges is the minimum vertical clearance over traveled roadway to the bridge above, see Exhibit 2-11 for Condition's and Signing requirements.

Exhibit 2-11 Non-Truss Bridges

Condition (*See Footnotes*)	See Appendix	Required Low Vertical Clearance Signs			
		W12-2	W12-301	W12-302L	W12-302R
Clearance on any portion of the structure is **14′3″ or less** over the traveled lanes	2-10-4	X[1,2,4]	X[3]	X[3]	X[3]
Clearance is greater than **14′3″and to 15′3″** over the traveled lanes	2-10-5, 2-10-6, or 2-10-7	X[4]	X[3]	X[3]	X[3]

[1] Install a W12-2 before the vertical restriction, in accordance with MUTCD Table 2C-4 (Advanced Placement of Warning Signs).

[2] Install a second W12-2 in advance of the closest intersecting road that provides a vehicle a turnaround or detour. Supplement the W12-2 with an ADVISORY DISTANCE (W13-501) plaque, showing the distance to the vertical restriction.

[3] Install the appropriate sign(s) to fit the vertical restriction (i.e. arch structure, etc.).

[4] On divided highways where the lowest vertical clearance is over the traveled lane nearest the median install an additional W12-2 sign in the median.

Tunnels:

The key condition with Tunnels is the minimum vertical clearance over traveled roadway to the tunnel above, see Exhibit 2-12 for Condition's and Signing requirements.

Exhibit 2-12 Tunnels

Condition	Required Low Vertical Clearance Signs			
	W12-2	W12-301	W12-302L	W12-302R
Where any portion of the structure is **15′3″ or less** over the traveled lanes (See Appendix 2-10-8)	X		X	X

Other Vertical Clearance Restrictions:

- At locations with a divided highway where the minimum clearance is between **14′3″ and 15′3″** over the traveled lane at the median side, (See Appendix 2-10-7).
- At locations where a mounted sign, utilities, or lights extend below the structure, the appurtenance is at **15′3″**or less:
  - Region Traffic and Maintenance coordinate to relocate/remove the appurtenance. If that is not possible, sign for appurtenance (actual measurement minus 3-inches), sign in advance of the structure with a W12-2 and on the structure with either a W12-301 or W12-302.
- At locations with Parking Lots and Private Roads under Bridges:
  - Case by case; Region Maintenance work with a parking lot owner or request the private road owner to lower the grade underneath the bridge.
  - When low vertical clearance signing is requested at bridge locations with a minimum vertical clearance greater than **15′3″** over the traveled lane; the bridge has a history of being hit by over height vehicles and work with the local entities to determine why the bridge is being struck. The signing shall be approved by the Region Traffic Engineer.
  - At locations (gore areas, or tapers to exit ramps) where shoulder running is common due to traffic backups with an actual lower vertical clearance of **15′3″ or less** over any portion over the shoulder lanes. Consider partnering with enforcement. If these items are not successful and signing is still recommended, the signing shall be approved by the Region Traffic Engineer. Vertical clearance for all overhead signs shall be in accordance with *Design Manual* Chapter 1020.

2-8.10 Merge

Install the MERGE (W4-1) sign to warn mainline motorists of upcoming merging movements, where sight distance to the merge point is less than MUTCD Table 2C-4 (Advanced Placement of Warning Signs) Condition A. Locate the sign on the major alignment in advance of the point where two roads converge. An additional MERGE sign may be placed on the entering roadway, particularly where acceleration ramp geometry and/or sight distance do not meet *Design Manual* Chapter 1360 minimum standards, see Exhibit 1360-9. Do not use this sign where roads converge with added lanes and no merging movement is required.

See Appendix 2-20.

2-8.11 Added Lane

An ADDED LANE (W4-3) sign is used in advance of a point where two roadways converge, but merging movements are not required. The sign should be used at all added lane conditions that are greater than 700 feet in length to eliminate unnecessary mainline lane changes. Install the sign so it is visible from both roadways, if possible. Otherwise, install an ADDED LANE sign on each roadway.

See Appendix 2-22.

2-8.12 Lane Ends

Install a LANE ENDS (W4-2) sign:

- To warn of a reduction in the number of same direction traffic lanes on a
- Multi-lane highway.
- To emphasize that a parallel on-connection is ending, as shown in Standard Plan M-1.80-02.
- In advance of the downstream end of an extra lane provided for slower vehicles.
- A RIGHT LANE ENDS (W9-1) or a LANE ENDS MERGE LEFT (W9-2) sign may be used, if sign space is available to supplement the LANE ENDS (W4-2) sign.
- The LANE ENDS sign shall not be used in drop-lane situations.

See Appendix 2-21.

2-8.13 Exit Advisory Speed

Install the EXIT ADVISORY SPEED (W13-2) sign at freeway/expressway exit ramps to inform motorists of the recommended exit speed. Locate the sign along the right shoulder of the deceleration lane prior to the exit gore, at a point that allows time for the motorist to make a safe slowing and exiting maneuver. Exit speed is determined by an engineering and traffic study.

In some locations, a CURVE sign is warranted beyond the exit gore. Install standard curve advisory signs in accordance with MUTCD Table 2C-4 as space allows. Otherwise, consider the advisory speeds for the entire ramp when determining the speed to put on the exit speed sign.

2-8.14 Ramp Advisory Speed

Install a RAMP ADVISORY SPEED (W13-3) sign to inform motorists of the recommended speed for traversing a ramp alignment with curvature or other unexpected conditions. Use this sign where needed on freeway/expressway entrance ramps, and freeway/expressway to freeway/expressway connection ramps. Locate signs in accordance with MUTCD Table 2C-4. Ramp speed is determined by an engineering and traffic study.

In addition, if an advisory speed condition is located well beyond the gore or ramp entrance from surface streets, install a standard TURN or CURVE sign with an advisory speed plaque (W13-1) in accordance with MUTCD Table 2C-4 as space allows. Otherwise, consider the advisory speeds for the entire ramp when determining the speed to put on the ramp advisory sign.

2-8.15 Intersection Warning

The INTERSECTION WARNING (W2 Series) sign indicates the presence of an intersection with the possibility of turning or entering traffic and the possibility of pedestrian/bicyclist crossing at the intersection. Consider installing this sign where the side road approach is not continuously visible to mainline traffic for a minimum distance as shown in MUTCD Table 2C-4, use engineering judgment to place the sign for distance greater than the MUTCD minimums and where any of the following conditions exist:

- The intersection is not channelized.
- Left-turning vehicles may queue in the traveled lane.
- Approach to the intersection does not provide adequate stopping sight distance.
- Un-signalized channelized intersections.

Do not use INTERSECTION WARNING signs on approaches controlled by STOP or YIELD signs, or at signalized intersections.

INTERSECTION WARNING signs may be modified to show offset intersection geometrics or approach curves. The relative importance of the roadways may be shown by varying the line widths used.

As guidance to motorists, the INTERSECTION WARNING sign shall be supplemented with the black on yellow ROAD NAME (D3-201) sign. The road name should be upper/lower case letters. Refer to the MUTCD Section 8B.06, for installation criteria for railroad/intersection signs, W10-2, W10-3, and W10-4.

2-8.16 Roundabout Ahead

ROUNDABOUT AHEAD (W2-6) signs shall be installed in advance of any roundabout established on a state highway and may be supplemented with the ROUNDABOUT plaque (W2-6P), and SPEED ADVISORY (W13-1) plaque may be installed based on engineering judgment.

2-8.17 Slippery When Wet

The HQ's Materials Lab is responsible for the testing of skid resistance on the state highway system pavement on a two-year cycle, any newly or overlaid pavement, and retest locations with skid numbers at or below 30, see *Pavement Manual*.

For locations with an average skid number is at or below 30, and when a surface treatment to increase the skid resistance number is not feasible install a SLIPPERY WHEN WET SYMBOL (W8-5) sign in advance of the location. The SLIPPERY WHEN WET sign may be supplemented with a SPEED ADVISORY (W13-1) plaque and/or a DISTANCE (W13-501) plaque.

2-8.18 Tunnel Ahead

A TUNNEL AHEAD (W14-501) sign should be installed in advance of any tunnel that has an obscured entrance, is not illuminated, or has a shoulder width of less than four feet.

A TUNNELS AHEAD sign may be used to address a series of tunnels.

2-8.19 Vehicular Traffic Signs

Vehicular traffic signs may be used to alert roadway users to locations where entering traffic would be unexpected; where road users may encounter other modes of transportation in the traveled lanes or on the shoulder; or where sight distance for the road user ahead is restricted. The vehicular traffic signs may be supplemented with an activated flashing beacon(s) when there is sight distance restrictions and/or when there is narrow or no shoulders.

A. Bicycle – A BICYCLE SYMBOL (W11-1) may be used to alert road users to locations where there is restricted stopping sight distance or where unexpected entries into the roadway by bicyclists may occur, such as at bicycle path crossings. It may also be considered where there are conflicts between users of different modes. Use Fluorescent yellow green sheeting as the background color in areas where extra attention must be drawn to the crossing, such as urban areas with many distractions.

B. Bikes on Road – The BICYCLE SYMBOL sign (W11-1) may be used with the BIKES ON ROAD plaque (W11-101) to alert motorists to narrow shouldered roadway sections where bicyclists may be in the lanes. Use a mileage plaque to inform motorists of the distance they can expect to encounter people biking in the traveled lane. Do not install these signs on highways that have designated bicycle lanes. Consider using these signs on sections of state highway where the paved shoulder width is less than 4 feet and one or more of the following conditions are met:

- Average Daily Traffic volume is greater than 1,700 vehicles, based on the WSDOT's Traffic Geoportal: www.wsdot.wa.gov/data/tools/geoportal/?config=traffic.
- The state highway is part of a recreational or commuter bicycle route that is officially recognized by the department, or a county or regional transportation organization, such as a Regional Transportation Planning Organization or Municipal Planning Organization.
- When there is a history of public complaints, or ongoing operational issues observed by law enforcement and/or department staff.
- Install the BICYCLE sign with BIKES ON ROAD plaque in advance of or within the first 300 feet of the narrow shoulder area. If the narrow shoulder distance is between 3 and 8 miles, a reminder sign should be placed at mid-point. If the mileage distance exceeds eight miles, reminder signs should be placed at 5-mile spacing.
- This sign can be modified to read "BIKES ON BRIDGE" and installed at bridge locations where there is inadequate shoulder (less than 4 feet) for bicyclists.
- This sign can be modified to say "BIKES ON SHOULDER" and should be installed at the beginning of highway sections where shoulder driving is allowed and there is less than minimum stopping sight distance for vehicles approaching bicyclists on the shoulder.

C. **Share the Road** – WSDOT does not use the supplemental SHARE THE ROAD (W16-1) plaque. Instead, use a BIKES ON ROAD plaque (W11-101) to supplement a warning sign that indicates the specific roadway condition, such as NO SHOULDERS (W8-1801) or NARROW SHOULDERS.

D. **Fire Station/Emergency Vehicle** – FIRE STATION/EMERGENCY VEHICLE (W11-8) signs with the EMERGENCY SIGNAL AHEAD (W11-12P) supplemental plaque shall be placed in advance of all emergency vehicle traffic control signals. The signs may also be installed at locations where there is limited sight distance to the fire station road approach or where the approach is in an area where a motorist would not normally expect to see a fire truck or emergency vehicle enter the roadway. Fire station/ emergency vehicle warning signs are not generally used at intersections, unless an emergency vehicle traffic control signal is present.

E. **Snowmobile** – A snowmobile crossing which is located at least 100 feet from any public roadway intersection (RCW 46.10.460) may be signed with SNOWMOBILE (W11-6) signs. This sign is seasonal and should be removed, folded, or covered when the condition does not exist.

F. **Farm Machinery** – FARM MACHINERY signs (W11-5, W11-5A) may be installed at locations where farm machinery or equipment enters, crosses, or travels along a roadway and where there is limited sight distance or an operational concern. If the farm machinery will be on the roadway for more than ¼ mile, a supplemental DISTANCE PLAQUE (W13-401) may be added. Consider sign installation where:

- There is limited stopping sight distance to the farm machinery crossing or entrance onto the roadway.
- The road user would not normally expect to see a farm vehicle, such as where a farm is operating in an area that has or is being developed for residential or commercial use.
- There is less than minimum stopping sight distance to a slow moving vehicle along the roadway.
- There is a history of police, farmer, or public complaints, or operational conflicts.

To reduce operational conflicts, work with the farmer to restrict highway driving to daylight hours and non-peak periods, to drive on the shoulder if possible, and to use alternate routes if available.

Farm equipment used on the roadway must be equipped with a reflective hazard triangle sign and a flashing beacon (RCW 46.37.160).

G. **Wheeled All Terrain Vehicle (WATV) -**

Cities and Counties shall submit an application to Local Programs requesting WATV warning signs on WSDOT right of way for WATV's to travel on the state highway (inside cities only) and/or cross a state highway. Local Programs will forwarded the applications to Region Traffic for review and consideration.

WATV's Traveling Along State Highways –

Install WHEELED ALL TERRIAN VEHICLES (W11-1601) on state highways that are part of a city street with a posted speed limit of 35 mph or less, and the city has passed an ordinance to allow WATV's on city streets within their jurisdiction in accordance with RCW 46.09.455(1) and (1)(d)(i). The WATV sign shall be supplemented with an ON ROAD NEXT X MILES (W13-1601) plaque.

WATV's Crossing State Highways –

Install WHEELED ALL TERRIAN VEHICLES (W11-1601) signs on state highways in advance of an at grade intersection in accordance with RCW 46.09.455(1)(b)(i). The WATV sign should be located in advance of the intersection per MUTCD Table 2C-4. The WATV sign shall be supplemented with CROSSING AHEAD (W16-1601) plaque. Only when all of the following conditions are met:

- WATV may cross state highways only at controlled intersections;
- The intersection should be approximately 90 degree angle (30 degrees +/-);
- The state highway intended for crossing has a posted speed limit between 35-60 MPH;
- County/City road, crossing the state highway must be approved for WATV use (Posted Speed Limit of 35 MPH or less on the local agency roadway with an approved city or county ordinance allowing the use of WATV's.)
- Part of the approval process is for the local agency to secure grant money from Local Programs to pay for fabrication and installation of the WATV signs.

2-8.20 Pedestrian Signs

Pedestrian signs may be used to alert road users to general locations (e.g. narrow shoulders, mid-block crossings, ramps) where unexpected entries into the roadway or shared use of the roadway may occur.

A PEDESTRIAN CROSSING sign (W11-2) may be installed where attention needs to be drawn to the pedestrian presence, as evidenced by a traffic engineering analysis, operational issues reported by individuals, or Level of Traffic Stress analysis and other information provided from the Active Transportation Division. Fluorescent yellow green may be used as a background sign color where extra attention needs to be drawn to a crossing, such as in urban areas with many distractions. When used at a specific crossing, the sign shall be supplemented with a diagonal downward pointing arrow plaque (W16-7P) showing the crossing location.

For additional information on pedestrian crossings: Guidance – Uncontrolled Pedestrian Crossings for enhancement criteria and interim guidance for supplemental treatments for marked pedestrian crossings. https://wsdot.wa.gov/Design/Standards/PlanSheet/IS-22.htm

2-8.21 Non-Vehicular Traffic Signs

NON-VEHICULAR TRAFFIC signs may be used to alert road users to general locations where unexpected entries into the roadway or shared use of the roadway may occur.

A. Deer Crossing – Install DEER CROSSING (W11-3) signs to alert motorists when approaching an area where deer or elk may unexpectedly enter the roadway.

Gather information from the following sources when considering sign installation:

- Region Maintenance personnel.
- WSDOT Headquarters Environmental Services Office, Fish and Wildlife program. They compile a Wildlife Carcass Removal data base which notes deer and other wildlife killed on state highways.
- Records of crashes with wildlife, maintained by the WSDOT Travel and Collision Data Office.
- The Department of Fish and Wildlife's regional biologists have additional information on concentrations and migratory routes of deer.

Consider the following criteria before installing DEER CROSSING (W11-3) signs:

- Minimum of five documented deer/vehicle collisions per mile per year for at least two of the past 10 years. The crash data is available through Cognos.
- Minimum of 10 carcass counts per one mile per year for at least three of the past 10 years. The carcass information can be found in HATS, for Choose Type: select Roadkill from pull down menu, for Activity: select 1671 – Roadkill/Animal Disposal, fill in the begin date and end date, select SR, and fill in Start SRMP and End SRMP.
- Concurrence from region maintenance personnel.

Existing DEER CROSSING sign locations should be reviewed every five years.

B. Cattle Crossing (Livestock) – The CATTLE CROSSING (W11-4) or HORSE CROSSING (W11-7) sign may be used where there are frequent cattle, horse, or other livestock crossings at a specific site. Consider each request based on roadway type, traffic volumes, and number of crossings. A crossing site used once a day would warrant a sign, whereas one used once a month would not.

Cattle signs are not used for the movement of livestock along a highway such as a sheep or cattle drive. Requests for temporary traffic control to accommodate livestock movement are handled by the region on a case by case basis.

2-8.22 Congested Area

CONGESTED AREA (W14-2202) signs may be installed at locations where traffic congestion occasionally occurs. Examples include rural areas where businesses or other community development periodically generate traffic volumes greater than normally would be expected at that location.

2-8.23 Congestion Ahead

The CONGESTION AHEAD (W14-2203) sign is only used where sight distance to the congested area is restricted.

2-8.24 Grated Bridge Deck

The GRATED BRIDGE DECK sign (W8-2101) shall be installed in advance of all bridges with grated decks on any portion of the roadway. Because deck grates may affect the handling characteristics of some vehicles, particularly motorcycles and bicycles, it is important to alert these road users to the road surface condition.

2-8.25 Pavement Ruts

The PAVEMENT RUTS sign (W8-2201) may be installed on roadway sections where there are longitudinal wheel track ruts. Such ruts may cause vehicle vibration or other unexpected movements when a vehicle crosses them to change lanes or exit the roadway. The region Traffic Office should determine appropriate placement of these signs, based on an engineering judgment.

On multilane divided roadways, post signs on both sides of the roadway.

2-8.26 Rocks

The ROCKS sign (W8-1701) may be installed to alert roadway users to roadway sections that are known to have or are subject to frequent rockfall occurrences.

Maintenance crew's track and input "Roadway Rock Removal" activities into Highway Activities Tracking System (HATS) https://hats.wsdot.wa.gov/OtherActivityRecords/Records. The department Material Lab developed a numerical rating system for identifying and ranking unstable slopes and is available at: Unstable Slope information.

When a potential rockfall location has a numerical rating of 200 points or greater, a ROCK sign should be installed. A separate sign is not required at each location if adjacent locations can be combined using a FOR NEXT XX MILES sign.

Exhibit 2-13 Rating Criteria

Category	3 Points	9 Points	27 Points	81 Points
Problem Type: Soil	Cut or Fill Slope Erosion	Settlement or Piping	Slow Moving Landslides	Rapid Landslides or Debris Flow
Problem Type: Rock	Minor Rockfall Good Catchment	Moderate Rockfall Fair Catchment	Major Rockfall Limited Catchment	Major Rockfall No Catchment
Average Daily Traffic	< 5,000	5,000 to 20,000	20,000 to 40,000	> 40,000
Decision Sight Distance	Adequate	Moderate	Limited	Very Limited
Impact of Failure on Roadway	< 50 Feet	50 to 200 Feet	200 to 500 Feet	> 500 Feet
Roadway Impedance	Shoulder Only	½ of Roadway	¾ of Roadway	Full Roadway
Average Vehicle Risk	< 25% of the Time	25% to 50% of the Time	50% to 75% of the Time	> 75% of the Time
Pavement Damage	Minor – Not Noticeable	Moderate – Driver Must Slow	Severe – Driver Must Stop	Extreme – Not Traversable
Failure Frequency	No Failures in Last 5 Years	One Failure in Last 5 Years	One Failure Each Year	More Than One Failure per Year
Annual Maintenance Costs	< $5,000 per Year	$5,000 to $10,000 per Year	$10,000 to $50,000 per Year	> $50,000 per Year
Economic Factor	No Detours Required	Short Detours < 3 Miles	Long Detours > 3 Miles	Sole Access No Detours
Accidents in Last 10 Years	0 or 1	2 or 3	4 or 5	> 5

2-8.27 *Transit Stop Ahead*

Install the TRANSIT STOP AHEAD (W14-1101) symbol sign in advance of a Region Traffic office approved transit stop in the travel lane of a state highway when:

- The transit stop is located in an unincorporated area; and
- There is less than 500 feet of sight distance to the transit stop.

Install the sign in accordance with MUTCD Table 2C-4 (Advance Placement of Warning Signs). Refer to WAC 468-46 and Section 7-9 of this manual, for further information about the transit stop approval process.

For pedestrian crossings at or near a transit stop follow the Guidance – Uncontrolled Pedestrian Crossings. www.wsdot.wa.gov/publications/fulltext/Standards/psl/IS-22/Uncontrolled_Ped_Crossing_Guidance.pdf

2-8.28 Left Turning Vehicles Ahead

The LEFT TURNS AHEAD (W2-601) sign may be used in advance of intersections to alert to possible left turning movement conflicts, as determined by an engineering judgment. Consider installing this sign at locations where any of the following conditions exist:

- The intersection is not channelized.
- Left-turning road users with a history of rear-end crashes.
- Approach to the intersection does not provide less than minimum stopping sight distance.

2-8.29 Lateral Clearance Markers (Object Markers)

The department installs Type 3 OBJECT/LATERAL CLEARANCE MARKERS (W12-401 L/R) to identify objects or conditions within or adjacent to the roadway such as:

- narrow bridges with reduced width shoulders
- drop-offs
- small traffic islands
- underpass piers
- bridge abutments
- barriers
- handrails
- culvert headwalls

IMPACT ATTENUATOR MARKERS (W12-501 and W12-502) are used to identify the nose section of an impact attenuator. Install a W12-501 when traffic approaching an attenuator passes only one side of the attenuator. Install a W12-502 when approaching traffic passes on both sides of the attenuator.

MUTCD Section 2C.64 and 2C.65 addresses appropriate use and installation requirements of lateral clearance markers. See Appendix 2-11 and 2-11A.

2-8.30 Water Over Roadway

The WATER OVER ROADWAY (W8-501) sign may be installed where water periodically and consistently accumulates. Hinge the sign to allow crews to open and close it as needed based on field personnel observations in the vicinity of the sign.

2-8.31 Severe Side Winds Ahead

The SEVERE SIDE WINDS AHEAD (W14-801) sign may be installed where geologic or geographic features or other unique situations create unexpected and severe windy conditions that can impact the handling of a vehicle based on engineering judgment.

2-8.32 Watch for Ice

The department no longer routinely uses WATCH FOR ICE (W8-1601) signs. They may be considered in unique conditions such as where a natural or manmade feature causes consistent roadway wetness and where ice is likely to form during cold temperatures. Examples may include, but are not limited to locations where:

- A waterfall causes roadway moisture.
- An industrial facility consistently causes spray on the roadway.
- There is wetness from short or long-term drainage problems.
- Pavement sensors connected to the WATCH FOR ICE sign discern the outside temperature and flash an alert to motorists about the potential of ice on the roadway.
- Moisture vapor forms on the highway.

Any decision to post a WATCH FOR ICE sign must be based on a traffic engineering analysis and approved by the State Traffic Engineer, in consultation with the appropriate Region Traffic Engineer.

2-8.33 Grooved Pavement

Install the GROOVED PAVEMENT sign (W8-2001) where the roadway surface features closely spaced longitudinal grooves. Do not use this sign in areas of rutted pavement. RCW 47.36.200 notes that where a GROOVED PAVEMENT sign is used, a MOTORCYCLES USE EXTREME CAUTION (W21-1701) sign must also be used.

2-8.34 School Areas

School related signing is installed to alert motorists to an upcoming school bus stop or school crossing, and the possible presence of children standing near, walking along, or crossing the roadway. Fluorescent yellow-green (FYG) is the standard background color for school signs.

The department is responsible for school bus stop and crossing related signing. Additional signs (such as an overhead School Crossing sign) are generally the responsibility of the school district requesting them.

2-8.35 School Bus Stops

Install a SCHOOL BUS STOP AHEAD (S3-1) sign where there is less than minimum stopping sight distance to the bus stop, or when engineering judgment indicate the need for a warning sign. Where there is less minimum stopping sight distance to the bus stop, it should be relocated if possible to provide ample visibility. All school bus stops requiring an advance school bus stop sign must be reviewed and approved by the Region Traffic Operations staff. Because of the frequent changes to bus stop locations, they should be reviewed before the start of each school year for possible sign removal or relocation.

The Region Traffic Engineer must approve any school bus stops on limited access facilities (WAC 468-58-030) and provide this information to the State Traffic Engineer who maintains an inventory of the locations.

2-8.36 School Bus Turnaround

The SCHOOL BUS TURNAROUND sign (S3-201) may be installed to alert motorists to an upcoming school bus turnaround location, where minimum sight distance to the turnaround is less than that shown in MUTCD Table 2C-4, or when other operational factors indicate the need for a warning sign. Department policy is to not use the SCHOOL BUS TURN AHEAD sign as shown in the MUTCD.

2-8.37 Signing for Reduced School Zone Speed Limit

Reduced speed limits in school zones are established in compliance with RCW 46.61.440(1) which establishes a 20 mph speed zone **at a marked school or playground crosswalk** when the crosswalk is posted with standard school or playground speed limit signing, or on a roadway bordering a school or playground when posted. See Section 6-4 for additional information on reduced school speed zones.

Standard reduced school zone speed limit signing at a marked school or playground crosswalk is shown in Appendix 2-12 and includes:

- The SCHOOL (S1-1) sign with AHEAD plaque (W16-9P).
- The SCHOOL SPEED LIMIT (S5-101) sign assembly.
- The SCHOOL (S1-1) sign with ARROW plaque (W16-7P).
- The END SCHOOL ZONE (S5-2) sign with the subsequent SPEED LIMIT (R2-1) sign below.

The SCHOOL SPEED LIMIT (S5-501) sign assembly consists of three sections:

- SCHOOL legend (S4-3) with black letters on a fluorescent yellow green background.
- 20 MPH SPEED LIMIT sign (R1-1).
- WINDOW OF ENFORCEMENT legend.

The enforcement legend is determined by the school district and can be any of the following:

- WHEN FLASHING (S5-1) used in conjunction with a flashing beacon above the sign, as described in MUTCD Section 4L.04.
- WHEN CHILDREN ARE PRESENT (S5-101) used in conjunction with definitions provided in WAC 392-151-035 and WAC 468-95-350.
- WHEN FLAGGED (S5-102) used in conjunction with warning flags that are installed on the sign during the window of enforcement. The school is responsible for installation and removal of the flags.
- X:00 A.M. TO X:00 A.M./P.M. (S4-5) used to display the specific hours of the school speed limit.

2-8.38 Flashing Beacons or Flags

The SCHOOL SPEED ZONE sign assembly may be supplemented with flashing beacons or flags to draw attention and increase compliance with the reduced speed zone. A Washington State Traffic Safety Commission study noted that WHEN FLASHING school zone signs were more effective in slowing vehicles than either WHEN CHILDREN ARE PRESENT or WHEN FLAGGED signs. The study notes that where the approach speed to a school speed zone is 35 mph or above, schools with WHEN FLASHING signs had significantly fewer vehicles travelling in excess of 35 mph (only 3 percent) than WHEN CHILDREN ARE PRESENT signs (30 percent) and WHEN FLAGGED signs (23 percent).

On highways where the approach speed to a school speed zone is 35 mph or more, or where a wide roadway increases children's exposure, consider the use of flashing beacons above the SCHOOL SPEED ZONE assembly. Beacons are generally paid for by the school district requesting the speed zone.

2-8.39 School Crossings

School crossings may be established either adjacent to the school or as part of a school pedestrian route. Install a SCHOOL sign (S1-1) with a Diagonal Arrow plaque (W16-PL) at or near the crossing, and a SCHOOL sign (S1-1) with an AHEAD plaque (W16-9P) in accordance with MUTCD Table 2C-4.

- The SCHOOL (S1-1) sign may be installed at a crossing controlled by a traffic signal.
- Do not install a SCHOOL (S1-1) sign at an intersection crossing controlled by a STOP or YIELD sign.

2-8.40 Overhead School Crosswalk Sign

The OVERHEAD CROSSWALK (W11A-301) sign is used only at marked school crosswalks where a traffic engineering study has determined that conventional traffic control measures are not adequate. The sign is installed in addition to the standard school crosswalk signing. The OVERHEAD CROSSWALK sign must include pedestrian or school activated flashing lights. The MUTCD allows the option to use the STOP FOR PEDESTRIANS overhead sign (R1-9a) instead. Consider these factors when determining installation of this sign:

- Approach speed of traffic.
- Width of crossing.
- Number of lanes.

Costs associated with installing and maintaining this traffic control device generally are the responsibility of the requesting school district.

2-9 Guide Signs

Guide signs direct roadway users along roads and highways by providing information about:

- Route designation.
- Directional and distance information (includes multimodal connections: air, rail, ferries, or transit stations.
- Geographical, recreational, or cultural points of interest.
- Motorist services.

The department receives frequent requests for guide signs. The quantity and spacing of guide signs is controlled so that the roadway user has adequate time to read, understand, and respond to the sign messages.

The *Design Manual* notes that guide sign plans are needed for Interstate highways and require Headquarters Traffic approval. Where a highway passes through a national forest or national park, there may be agreements in place that designate which agency is responsible for each sign type, as well as design requirements for signs. Sign design must consider these requirements.

Review sign requests by considering both the MUTCD sign purpose and the sign spacing criteria. Work with local groups to review conflicting requests, and to determine the most essential and effective signing. It may be necessary to remove or relocate existing signs to accommodate the addition of a more important sign, while avoiding sign proliferation.

Guide signs shall not include advertising.

2-9.1 Types of Guide Signs

Guide signs are grouped by their purpose. Their use is determined according to standards and guidance in the MUTCD.

- **Route Markers** display the official highway number or US Bicycle Route number and direction of travel.
- **Primary Guide Signs** include advance directional signs, exit directional signs, diagrammatic signs and pull-through signs. They direct roadway users to exit points for principal destinations served by intersections or interchanges, and to cities located on intersecting state routes.
- **Distance Signs** display distances to destinations and junctions along state routes.
- **Supplemental Guide Signs** provide direction to major traffic generators or other points of interest, or to destinations preempted from the primary guide sign.
- **Follow-Through Signs** provide continued direction, beginning at the point of exit from the state highway, and following through to the destination displayed on the guide sign.
- **General Motorist Service Signs (MSS)** provide information for the unfamiliar traveler about services available at or accessed from upcoming intersections and interchanges.
- **Motorist Information Signs (MIS)** provide information about specific businesses that meet certain service criteria. The MIS program is regulated by RCW 47.36.310, RCW 47.36.320, and WAC 468-70.

Where sign space is available, guide signs on expressways or freeways generally include:

- One or two advance directional signs where interchange spacing allows.
- An exit directional sign.
- One supplemental guide sign, installed approximately halfway between the advance directional and exit directional sign. It is only installed if spacing requirements can be met.

MUTCD minimum spacing requirements between directional guide signs are:

- 800 feet for freeway and expressways.
- 500 feet for two-lane, high-speed roadways.
- 300 feet for high speed multilane with at-grade intersections
- 200 feet for two-lane and multilane low speed highways within incorporated areas.

2-9.2 Guide Sign Color

Guide signs are generally white letters on a green background. However, some types of signs use other background colors to distinguish the type of destination to which they are signing.

Following are standard guide sign background colors:

- **Brown** – Heritage Markers, State Parks, National parks, U.S. Forest Service facilities, Department of Natural Resources campgrounds, Recreation Activity signs with symbols, Watchable Wildlife, State Public fishing areas.
- **Blue** – Motorist Service signs (MSS), Motorist Information signs (MIS), Washington State Patrol, fire district boundary, fish related signs.
- **Green** – All other guide signs.

2-9.3 Guide Signs On Conventional Roads

Install guide signs in accordance with guidelines in MUTCD Chapter 2D. Guide sign installation for route intersections is shown in Appendix 2-13 for:

- Junctions of state highways.
- Junctions of county roads or city streets that lead to significant destinations.

2-9.4 Guide Signs On Expressways and Freeways

Install guide signs in accordance with guidelines in MUTCD Chapter 2E. Guide sign installation illustrations are shown in Appendices 2-14 through 2-22 for:

- Crossroad Interchange Approach (Appendix 2-14)
- Expressway Intersection Approach (Appendix 2-15)
- Expressway Interchange Approach (Appendix 2-16)
- Freeway Interchange Approach (Appendix 2-17)
- Freeway Exit Ramp (Appendix 2-18)
- Freeway Post Interchange (Appendix 2-19)
- Auxiliary Freeway Lane – Less than ¼ mile long (Appendix 2-20)
- Parallel On Connection – More than ¼ mile long (Appendix 2-21)
- Auxiliary Freeway Lane – More than ¼ mile long (Appendix 2-22)

2-10 Route Signs

A route sign assembly consists of a route sign and auxiliary signs that further identify the route and indicate direction of travel. For conventional roadways, MUTCD Section 2D.29 through 2D.32 provide guidance for the various types of route sign assemblies.

For expressways and freeways, route sign assemblies are typically used for route confirmation and trailblazing purposes. In addition to the guidance provided in MUTCD Section 2E.25, install route confirmation sign assemblies at these locations:

- Entrances to Washington State.
- Beyond interchanges.
- On the far side of intersections with other numbered routes or major local roads.
- Beyond city limits.

In urban and residential areas, install route confirmation sign assemblies at intervals that will keep an unfamiliar motorist informed of the route. Note that where interchanges and intersections are closely spaced and available sign space is limited, speed limit signs are a higher priority than route confirmation sign assemblies.

2-11 Primary Guide Signs

2-11.1 General

Advance directional, exit directional, diagrammatic, and pull-through signs are all considered primary guide signs that provide guidance to the motorist about destinations served by upcoming exits or intersections. The MUTCD defines the required and allowable numbers of guide signs for the various roadway types and interchange classifications. Information is also provided about installation, location, and letter/legend criteria for these signs.

On Conventional roads, a maximum of three lines of destinations may be displayed on a primary guide sign (MUTCD Section 2D.07). On Freeways/ Expressways, a maximum of two destinations may be displayed on a primary guide sign (MUTCD Section 2E.10). A sign support having two or more signs may display a maximum of three destinations. Display the same message on all advance and exit directional signs installed in a series. This provides consistent and effective information to the roadway user, especially the unfamiliar traveler.

Department guidelines require that any freeway exit that is a left-hand rather than right-hand exit must be signed with a yellow LEFT EXIT plaque on both the advance directional and the exit directional sign.

2-11.2 Destination Selection

Display the primary destination(s) served by the upcoming exit or intersection and a second destination using the prioritized list below.

Consider:

- The control city along the intersecting route.
- A junction with another numbered highway.
- The name of a city or town (when multiple cities are requesting to be added; choose a city with the largest population).
- A tribal reservation.
- A street name or roadway name.
- Other major destination such as mountain passes, National Parks, or major airports.

Apply the same destination selection criteria for signs on all conventional roads, expressways, and freeways. As development occurs, it may be necessary to replace existing destinations with ones that have become more essential.

Ventures operated by private entities for profit, and to other ventures not of general interest to the traveling public are not signed on guide signs on state highways. These entities may instead qualify for Motorist Service Signs (MIS), Tourist Activity signs, or Recreation signing. Current ventures must be signed under the new criteria when the current sign service life is over. Shopping malls that qualify for signing under RCW 47.36.270 are an exception and may be signed on primary or supplemental guide signs.

2-11.3 Control City on Destination Signing

A control city is used on guide signs at junctions with other highways (MUTCD Chapter 2D). The designated control city for selected state routes is shown as follows:

US 2	
EB from Everett	Wenatchee
EB from Wenatchee	Spokane
EB from Spokane	Newport
WB from Idaho State Line	Spokane
WB from Spokane	Davenport
WB from Davenport	Wenatchee
WB from Wenatchee	Everett

I-5	
NB from Vancouver, WA	Seattle
NB from Seattle	Vancouver, B.C.
SB from Vancouver, B.C.	Seattle
SB from Seattle	Portland

US 12	
EB from Aberdeen	Olympia
EB from Elma	Centralia
EB from I-5	Yakima
EB from Yakima	Richland
EB from Pasco	Walla Walla
EB from Walla Walla	Lewiston
WB from Idaho State Line	Walla Walla
WB from Walla Walla	Pasco
WB from Richland	Yakima
WB from Yakima	Interstate 5
WB from I-5	Aberdeen

SR 14	
EB from Vancouver	I-82
WB from I-82	Vancouver

SR 20	
EB from Keystone	Anacortes
EB from Anacortes	Burlington
EB from Burlington	Okanogan
EB from Okanogan	Colville
EB from Colville	Newport
WB from Idaho State Line	Colville
WB from Colville	Okanogan
WB from Okanogan	Burlington
WB from Burlington	Anacortes
WB from Anacortes	Coupeville

I-82	
EB from Ellensburg	Yakima
EB from Yakima	Richland
EB from Richland	Hermiston
WB from Oregon State Line	Kennewick
WB from Kennewick	Yakima
WB from Yakima	Ellensburg

I-90	
EB from Seattle	Spokane
EB from Spokane	Coeur d'Alene
WB from Idaho State Line	Spokane
WB from Spokane	Seattle

US 97	
NB from Oregon State Line	Yakima
NB from Ellensburg	Wenatchee
NB from Wenatchee	Okanogan
NB from Okanogan	Penticton, B.C.
SB from Canadian Border	Wenatchee
SB from Wenatchee	Ellensburg
SB from Yakima	Goldendale

US 101	
NB from Oregon State Line	Aberdeen
NB from Aberdeen	Port Angeles
NB from Olympia	Port Angeles
SB from Port Angeles (East Leg)	Olympia
SB from Port Angeles (West Leg)	Aberdeen
SB from Aberdeen	Astoria

I-182	
EB from I-82	Richland
EB from Richland	Pasco
WB from Pasco	Richland
WB from Richland	I-82/Yakima

US 195	
NB from Idaho State Line	Spokane
SB from Spokane	Lewiston

I-205	
NB from Oregon State Line	Seattle
SB from Jct. I-5	Salem

US 395	
NB from Oregon State Line	Kennewick
NB from Pasco	Spokane
NB from Spokane	Colville
NB from Colville	Grand Forks, B.C.
SB from Canadian Border	Spokane
SB from Ritzville	Pasco

I-405	
NB from Jct. I-5 (Southcenter)	Renton
NB from Renton	Bellevue
NB from Bellevue	Lynnwood
SB from Jct. I-5 (Lynnwood)	Bellevue
SB from Bellevue	Renton

2-12 Distance Signs

2-12.1 General

A distance sign can display up to three destinations (MUTCD Chapter 2D). Apply the same destination selection criteria for signs on all conventional roads, expressways, and freeways.

- On the first line, identify the next city with services available, or the next intersected numbered route.
- On the second line, if used, identify communities of general interest along the route. Vary the named community on successive distance signs to provide maximum information to the traveler.
- On the third or bottom line, display the next control city along the route or terminal destination.

Install distance signs at the following locations:

- Beyond intersections and interchanges of numbered state highway routes.
- Beyond city limits or urban boundaries.
- In rural areas at 10- to 15-mile intervals.
- At entrances to Washington State.

Where two or more of these locations occur within 10 miles, sign the most effective location.

2-12.2 Determining Mileage Displayed on Distance Signs

A. **Freeways and Expressways** – Display the distance (in miles) from the sign to either the first interchange/intersection within the destination city limits, or to the city center. Regions must work with city administration to determine the preferred city center reference location.

B. **Conventional Highways** – Display the distance in miles from the sign to the destination city limits. For destinations such as Mt. Rainier National Park, display the distance to the park boundary.

2-13 Supplemental Guide Signs

2-13.1 General

Supplemental guide signs direct unfamiliar motorists to additional destinations or points of interest that are not displayed on the primary guide signs. ***The MUTCD allows only one supplemental guide sign to be installed for each interchange approach and it shall display a maximum of two destinations. Supplemental guide signs shall be installed only when MUTCD minimum spacing requirements can be met.***

Supplemental guide signs should not be installed for a traffic generator that would require a motorist to travel on the interchanging road beyond a second state highway (i.e., I-5 to SR 18 to SR 164).

In general, destinations that generate the greatest traffic volume or have the widest scope of recognition are given highest priority. Nationally recognized traffic generators receive priority over those that have state, regional, or local recognition. Evaluate the given interchange and select the destinations that provide the most benefit to the highway user.

As development occurs, it may be necessary to replace existing destinations with ones that have become more essential.

2-13.2 Destination Selection Factors for Supplemental Guide Signs

Apply the destination selection criteria equally, whether the signs are on conventional roads, freeways, or expressways. Consider the following factors when evaluating a supplemental sign request:

- On an expressway or freeway, determine if the destination meets criteria contained in the American Association of State Highway and Transportation Officials (AASHTO) publication *Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to Freeways Fifth Edition*.
- State law mandates destination signing for State Parks and regional shopping centers when distance criteria are met.
- Consider how the proposed signing will affect local roadway traffic operations. Work with the local agency to determine the route to a destination and the sign locations. In general, sign to the supplemental destination from the interchange or intersecting road that provides the most direct route to the destination.
- Determine if follow-through signing is needed and work with the local agency to determine sign locations. Local agencies assume responsibility for sign installation and maintenance and must concur with any proposed signs.
- Avoid signing to destinations that require complex navigation on multiple highways, unless the activity is of national significance.

2-13.3 Destination Selection Priorities

A. Overflow Messages From Primary Guide Signs – Occasionally, essential messages cannot be included on primary guide signs due to space limitations. Instead, place these essential messages on supplemental guide signs, giving them priority over any other supplemental sign messages.

B. Destinations Mandated by Statute

1. **State Parks** – State law (RCW 47.36.290) directs the department to install guide signing on interstate highways to State Parks located within 15 miles of the highway. These destinations have first priority on supplemental guide signs on interstate highways. Additionally, WSDOT policy is to install guide signs to a State Park within 15 miles of *any* state highway.

   The department installs and maintains these signs and provides follow through signing on any state route that connects the state highway to the park. All State Park signs shall have white letters, symbols, and border on a brown background.

   The State Parks and Recreation Commission is responsible for any State Park signing not located on a state highway.

a. **Freeway and Expressway Interchanges**

Mainline – Install signs displaying the name of the STATE PARK and a directional message, such as NEXT EXIT, in advance of the interchange, located to meet guide sign spacing requirements. If the park has restricted hours or days of operation, add a supplemental plaque displaying the operating schedule (i.e., CLOSED TUESDAYS) below the STATE PARK sign. No other supplemental plaques are used on the freeway mainline sign. Do not install mainline signing until all follow through signing is in place.

Ramp – Install signs displaying the message STATE PARK and a directional message, with a maximum of four recreational symbol plaques. Display the mileage to the park from the ramp terminal, using ¼ mile increments if the distance is less than 1 mile.

b. **Conventional Roadway Intersections** – Install signs displaying the name of the STATE PARK and a directional message (NEXT RIGHT/NEXT LEFT) in **advance** of the intersection leading most directly to the park. Install a maximum of four recreational symbol plaques below.

Install a white on brown sign with the message STATE PARK (D1-101) and a directional arrow at the intersection of a state route and roadway leading to a state park. Display the mileage to the park from the intersection. Use ¼-mile increments if the distance is less than 1 mile.

c. **Recreational Symbol Plaques** – A maximum of four recreational symbol plaques may be displayed under a state park directional sign, on both conventional roads and on freeway off-ramps.

- Plaques are 24 inch × 24 inch with white message on a brown background.
- If the park does not have camping facilities, display the text message NO CAMPING as one of the recreational plaques.
- If a park has restricted hours or days of operation, display the operating schedule (i.e., CLOSED TUESDAYS) as one of the plaques.
- The park manager for each individual park will determine the additional supplemental symbols to be displayed.
- If a BEACH message is to be shown, use a text message plaque instead of a symbol.
- Before replacing any state park sign, contact the park manager, to determine if any plaque changes are needed.
- If the symbols are seasonal, a written agreement is developed between the state park manager, the local maintenance superintendent, and region Traffic Operations. The agreement outlines who will be responsible for changing the symbols, at what specific time periods, as well as any cost reimbursement that may be involved.
- Headquarters Traffic Office maintains an inventory of the recreational symbols used at each state park. Inform Headquarters Traffic when symbol plaques are changed, added, or removed.

d. **Additional Signs** – CAMPGROUND FULL signs may be used at off-ramps and on conventional highways in conjunction with a State Park directional sign. It can be either a post mounted stand-alone sign or a changeable message plaque under the ramp or conventional highway sign. CAMPGROUND FULL signs may not be displayed on a freeway mainline.

A written agreement is developed between the state park manager, the local maintenance superintendent, and region Traffic Operations. The agreement outlines who will be responsible for changing the CAMPGROUND FULL sign, and for the sign fabrication, installation, maintenance, and removal. State Parks will be responsible for all associated costs, administered through a J account.

During seasonal closures, STATE PARK CLOSED plaques are installed on all state parks guide signs, including those on the freeway mainline. This is done rather than removing or turning them. Mount the plaque diagonally from lower left corner to upper right corner on the sign face. Use a panel size that is large enough to effectively cover the legend and a letter size at least as large as the upper case letters in the STATE PARK message. See Exhibit 2-1.

Exhibit 2-14 State Park Closed

2. **Regional Shopping Centers** – State law (RCW 47.36.270) and WAC 468-95-140 requires that regional shopping centers be signed from state highways, if spacing requirements can be met and the shopping center:
   - Has at least 500,000 square feet of leasable retail space.
   - Contains at least three major department stores owned by a national or regional retail chain.
   - Is located within 1 highway mile of a state highway.
   - Generates a minimum of 9,000 daily one-way vehicle trips.

All costs associated with fabricating, installing, and maintaining signs shall be the responsibility of the shopping center.

If the shopping center is not clearly visible from the state highway point of exit, follow-through signing must be in place on city or county roads prior to mainline sign installation.

Signing on the state highway to a county road or city street that bears the name of the regional shopping center fulfills the statutory requirements for signing to those centers.

C **Other Supplemental Guide Sign Destinations** – The following non- prioritized list includes examples of destinations (traffic generators) that may warrant supplemental guide signing. It is intended to aid in determining appropriate destinations.

Airports

Amtrak/Other Railroad

Bike Routes

Business Routes

Colleges/Universities

Event Venues,

Fairgrounds

Ferries

Historic District (may be signed as a Tourist Activity under MIS program if guide signs are full)

Industrial Parks

Military Installations

National Parks

Natural/Cultural/Historic Attractions

Park and Ride Lots

Ports/Port Districts

Recreational Areas

Scenic Byways

Stadiums (Sports Facilities)

Trails/Trailheads

Tribal Reservations

USFS (Headquarters Facilities/Campground)

2-14 Destination Selection Requirements and Installation Details for Specific Types of Traffic Generators

Specific traffic generators (destinations) must meet the criteria listed below to warrant a message on a supplemental guide sign. Appendix 2-23 contains the criteria for freeway installations in a table format. Supplemental guide signing shall be installed in accordance with the specific details shown below.

2-14.1 Airports

Airports are eligible for signing if they are included in the National Plan of Integrated Airport Systems and meet these criteria:

- Associated with an area population of 10,000 or more.
- Located within 5 miles of interchange or intersection.
- Airport runway shall be paved, lighted and 2,500 feet or more in length.
- Municipally or privately owned, and used for commercial enterprise with the following minimum number of regularly scheduled commercial flights per day:
  - 35 flights per day in major metropolitan area (greater than 50,000).
  - 20 flights per day in an urban area (5,000-49,999).
  - 15 flights per day in rural areas.

Contact the WSDOT Aviation Division to determine if a specific airport meets these criteria.

Airports that have scheduled flights can be signed with the airport name.

All other airports are signed with the airport symbol or word message.

Airports at remote locations serving a smaller population may be signed when their location is not obvious from the state highway, even if there are no commercial flights.

Existing signs to airports that do not meet these criteria may remain in place until a higher priority destination warrants a supplemental sign.

2-14.2 Amtrak/Other Passenger Rail Stations

Install Amtrak logo signing to Amtrak stations as described below. For other types of rail passenger stations such as those of a Public Transit Authority, a specific logo may be cooperatively developed with Public Transit Authority and department approval, and installed as described below.

A. Conventional Roadways

- Use Amtrak symbols or other approved logo signs in the trailblazer format with the appropriate directional arrows.

B. Multilane Highways

- If there is enough space to install an individual sign, the Amtrak symbol plaque or other approved logo may be placed on a green background panel with either of these messages: NEXT RIGHT or EXIT XXX (Appendix 2-24, part a).
- If there is not enough space to install an individual sign, the Amtrak symbol plaque or approved logo sign may be installed below the advance exit or the exit directional sign, on the post closest to the traveled way (Appendix 2-24, part b).
- If the sign cannot be installed as above, the Amtrak symbol plaque or approved logo sign may be installed below the supplemental guide sign, on the post closest to the traveled way (Appendix 2-24, part c).
- Install Amtrak trailblazer signs or other approved logo signs along freeway ramps or at ramp terminals. All trailblazer signs must be in place before any mainline signs are installed.
- The Amtrak symbol plaque or other approved logo sign may be installed as part of a multi-modal transportation logo board, along with approved symbols for other modes of transportation.

2-14.3 Business Route

BUSINESS ROUTE signs (M4-3) direct motorists to alternate routes passing through the business portion of a city or through a district of continuous business development. BUSINESS ROUTE signing is generally installed at the request of a local agency.

Any addition or deletion of an Interstate or US highway segment as a Business Route must first be approved by AASHTO. Proposals to add or delete such routes should be sent to the department's Transportation Data GIS & Modeling Office (TDGMO).

Designated Business Routes may be signed as follows:

- Install signing on a state highway business route only if it passes adequately and logically through a business district.
- BUSINESS LOOP (M1, 2, or 3) trailblazers along the route are installed and maintained by the local agency which has jurisdiction over the business route. A written agreement clarifies the jurisdiction.

2-14.4 Colleges and Universities

Supplemental signing may be considered for a State College or University, their satellite campuses, other regional public or private colleges and universities, and technical schools if they meet the guidelines below and if sign spacing requirements can be met.

Signing is installed from the state highway nearest the campus and is limited to the nearest and most direct interchange or intersection. Signing may also be installed from a freeway or expressway to a conventional state highway where the conventional highway is used primarily by local traffic. Signing is not provided from a freeway or expressway to another freeway or expressway.

Supplemental signing may be installed when:

- The school is accredited in Washington State. Accredited schools are listed on the Northwest Commission on Colleges and Universities (NWCCU) agency website at www.nwccu.org.
- The main or satellite campus is located within 5 miles of a state highway.
- Enrollment criteria are met. Call the Higher Education Coordinating Board at 360- 753-7800 for the current enrollment figures.

Enrollment criteria (including part time and full time) based on any semester or quarter within the last school year:

- 4,500 students in a major metropolitan area (50,000 or greater).
- 2,500 students in an urban area (5,000-49,999).
- 1,000 students in a rural area.

In metropolitan and urban areas where two or more colleges or universities share a common campus, enrollments may be combined. The enrollment for the minor school should be at least 1,000 students. Metropolitan and urban area boundaries can be determined from the state urban boundary map.

If school enrollment falls below the minimum number for one year, the school will be given written notice that the highway signing will be removed if the following fall semester or quarter enrollment does not reach the minimum number.

Two schools may not share the same sign, if they do not share a common campus. If two schools are located in the same area, but do not share a common campus, determine which school is shown on the sign by the following order of priority:

- State university.
- State college.
- Private university or college.
- Technical college or school.

University Mascot Logos – At a University's request, a University mascot logo may be installed on guide signs under the following conditions:

- It is a State University.
- The university name is already displayed on the guide sign.
- Mascot logos may be added only on signs for main campuses.
- The university must supply the logos and pay all costs including engineering, fabrication, installation, and traffic control.
- Maximum logo size is 30″ × 30″.

If there is insufficient space to display a mascot logo on the sign face, the logo will be installed directly above the upper left-hand corner of the guide sign. If the university wants the logo incorporated onto the face of the guide sign, they have the option of paying for a complete new guide sign to include the logo.

When the guide sign is due for replacement, it may be enlarged to incorporate the mascot logo onto the sign face at no cost to the university.

2-14.5 Event Venues, Arenas, Auditoriums, Convention Halls, Fairgrounds, Stadiums

Event venues may be considered for supplemental guide signs using the following criteria, but only where MUTCD spacing guidelines are met.

- In a major metropolitan area of 50,000 or greater population, the venue must be within 2 miles of the state highway, and the annual attendance at the facility must be at least 300,000.
- In an urban area of 5,000-49,999 population, the venue must be within 2 miles of the state highway, and the annual attendance at the facility must be at least 250,000.
- In rural areas, the venue must be within 5 miles of the state highway, and the annual attendance at the facility must be at least 200,000.
- Signs may be installed directing venue traffic from one state highway to another.

2-14.6 Industrial Parks

Supplemental guide signing to an industrial park may be considered using the following criteria, but only where MUTCD spacing guidelines are met.

- The industrial park has at least 500,000 square feet of space available for lease (may include a mix of manufacturing, service, and warehouse facilities).
- The industrial park is within 5 miles of the state highway.

2-14.7 Natural, Historic, and Cultural Attractions

A. General Criteria – Consider supplemental guide signing to natural, historic, and cultural attractions if the attraction meets guidelines shown below, but only where MUTCD sign spacing guidelines can be met. Signing is not provided if the attraction is readily visible from and has direct access to the state highway. Privately operated commercial attractions (i.e., Wild Waves) are signed as part of the Motorist Information Sign (MIS) program as a Tourist Activity.

Periodic reviews by region personnel confirm that signing is displayed only for attractions that meet eligibility criteria and that signs are removed or covered when the attraction is closed for the season, no longer meets criteria, or is no longer in operation. Reviews may also identify new attractions that meet eligibility criteria.

Natural, historic, and cultural attractions must meet the following general criteria to be considered for supplemental signing:

- The attraction must have regional or national significance and meet destination or traffic generator guidelines. Do not sign attractions that are primarily of local interest.
- The attraction must be located within 10 miles of the interchange or intersection being signed. Signing is installed only on the state highway nearest to the attraction. Any necessary follow-through signing shall be in place prior to installing state highway signs.

- The attraction must be open without appointment to the general public.
- Attractions must be accessible by a two-lane, all-weather road as a minimum.
- The attraction must be maintained in good repair and presented in a professional manner.
- If the attraction charges an entrance fee, the activity is responsible for all costs for fabrication, installation, maintenance and replacement. A co-signed agreement with the business or organization establishes the approximate costs and payment method. Examples are Fort Vancouver Historic Site and Maryhill Museum.
- If the activity is operated by a governmental agency or organization, the department will install the signs at no cost to that agency or organization.
- The signs shall be white letters on a green background. This color change increases the reflective service life of the signs. All existing white on brown signs should be replaced with white on green as normal service life expires. **Signing for Heritage Markers, State Parks, National Parks, or U.S. Forest Service facilities will remain white on brown.**
- For attractions located more than 1 mile from the interchange or intersection, display mileage information on the ramp terminal or direction signs.
- For seasonal operations, signs must be removed or covered with a CLOSED plaque during the off season. See Exhibit 2-1 for example

B. Natural Attractions – In addition to the general criteria above, consider signing to natural attractions if they are unique or of a type not generally accessible to the public. Examples of natural attractions are the Snoqualmie Falls, Palisades Rock Formation, the Ice Caves west of Trout Lake, Hurricane Ridge, and the Snake River Canyon.

C. Historic Attractions – In addition to the general criteria above, historic attractions may be considered for signing if:

- They are included in the National Register of Historic Places or the Washington Heritage Register as designated and maintained by the Washington State Department of Archaeology and Historic Preservation.
- The attraction includes one or more of the following features at the site:

  a. An interpretive center and/or a guided tour.

  b. Visible historic buildings, features, or ruins with interpretive markers.

  Examples of historic attractions are the Whitman Mission, Steptoe Battlefield, Jackson House, Fort Simcoe, and the Monticello Convention Site. The application form (Appendix 2-24) may be used to document if the attraction meets the eligibility criteria.

  Determine if the attraction is included on the National Register of Historic Places or the Washington Heritage Register at: https://wisaard.dahp.wa.gov.

D. Cultural Attractions – In addition to the general criteria above, consider signing to cultural attractions if they are similar to, or fall within, one of the following categories:

- **Museums** – Endorsed by the Washington State Historical Society.
- **Religious** – Sites, shrines, etc., that are of a unique religious nature and provide visitor facilities or tours.
- **Educational** – Centers other than public or private schools, vocational schools, or colleges and universities that are of outstanding educational value and provide visitor facilities or tours.
- **Scientific** – Locations used for research or scientific advancement that provide visitor facilities or tours.

Examples of cultural attractions are the Maryhill Museum, St. Mary's Mission, the Forest Learning Center near Mount St. Helens, and the Goldendale Observatory. The form in Appendix 2-25 may be used as an application for cultural attractions.

2-14.8 Heritage Markers

HERITAGE MARKER signs (I5-103/104) guide motorists to historical or other interpretive markers located along state highways (see Section 7-11). They are used where there is a marker but no building or other facility. Use both the advance sign as well as the "at point" sign to give adequate guidance and time for a motorist response. HERITAGE MARKER signs are white on a brown background and replace existing HISTORIC MARKER and ROADSIDE ATTRACTION signs. Examples of HERITAGE MARKER sites include Willy Keil's Grave, the Bridge of the Gods, and Earthquake Point north of Entiat.

Do not use a HERITAGE MARKER sign to direct motorists to a historical site on either the national or state registers. These sites are signed using Historical attraction criteria and signing.

2-14.9 Ports/Port Districts

Supplemental guide signing to Ports, or Port Districts may be considered if sign space is available per the MUTCD, using the following criteria:

- The facility is served by two or more modes of transportation and is generating commercial traffic.
- Goods move in and out of the facility.

For more information on Marine Ports, see Chapter 2 of the *Marine Ports and Navigation Plan*.

2-14.10 Recreational Activities and Areas

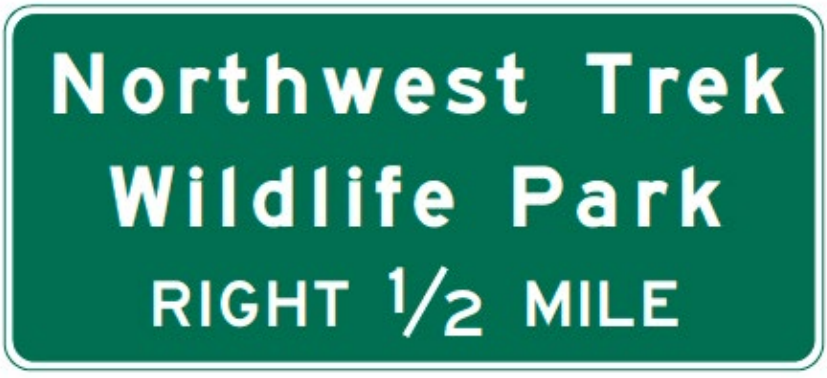
Supplemental guide signs to specific recreation activities open to the public (such as Emerald Downs racetrack, Cheney Stadium, or Northwest Trek) may be considered if MUTCD spacing guidelines are met, together with the following attendance criteria:

- Major Metropolitan Area – 300,000
- Urban Area – 250,000
- Rural Area – 100,000

Install RECREATION AREA (D7-7701) signing to guide motorists to public or private recreational activities that meet the criteria below. Display a maximum of four activity symbol plaques below the RECREATION AREA and direction message.

- The activity is not readily visible from the highway, and has no direct access to the highway.
- The activity is within 10 miles of the interchange or intersection being signed, and is served by at least a two lane, all-weather road.
- The activity is open to the public, without appointment, at least eight hours a day, five days a week including a Saturday and/or a Sunday.
- The destination facility must be maintained in good repair and presented in a professional manner.
- Location shall include free public restroom facilities with a sink and running water for hand washing, a flush toilet, toilet tissue, and sanitary towels or other hand-drying devices. Restroom facilities shall contain appropriate locks for occupant security and must be ADA accessible.
- If the activity charges an entrance fee, all costs for fabrication, installation, maintenance, and replacement are paid by the activity or organization.
- A co-signed agreement with the business or organization establishes the approximate costs and method for payment.
- Privately owned or operated recreational activities should be signed under the Motorist Information Signing Program, where applicable.
- Signing is installed only on the state highway nearest to the attraction. Follow-through signing shall be in place prior to installing state highway signs. For activities more than 1 mile from a freeway interchange, display mileage information on the ramp terminal sign. On conventional roads, show the mileage on the direction signs. The hours of operation may also be shown.
- Recreation signs without symbols shall be white letters on a green background. Replace existing brown and white signs as service life expires.

Exhibit 2-15



- For seasonal operations, signs must be removed or covered with a CLOSED plaque during the off season.

Along non-access controlled city streets that are part of the state highway system, within incorporated cities or towns with populations over 25,000, the local agency has jurisdiction for this signing.

Supplemental guide signs to specific recreation areas may be considered when the area is of regional significance such as Quinault Recreation Area. Signs and the symbol plaques shall be white on brown. See Exhibit 2-16.

Exhibit 2-16

Public Recreation Areas – Display the AREA NAME (e.g., CAPITAL FOREST).

Multiple Agency Recreation Areas – Display the AREA NAME (e.g., CUSHMAN- STAIRCASE RECREATION AREA) and each agency's logo.

Do not include recreational activity symbols on multi-agency signs. Requesting agencies shall coordinate installation of follow-through signing with local road jurisdictions.

The following symbol plaques may be used:

Exhibit 2-17

Recreational Activity	Sign Fabrication Number
Picnic Area	D7-2201
Fishing	D7-1301
Trailer Camping	D9-3a
Boat Launch	D7-1101
Swimming	D7-1401
Hiking*	D7-501
Skiing	D7-2001
Snowmobile Area	D7-2101
Public Golf Course	D7-701
Public Beach Area	D7-1402

**Note:* Sign trails of regional or statewide significance such as the Pacific Crest Trail, the John Wayne Trail, the Willapa Trail, and the Pacific Northwest Trail. Trail signs shall be a white on brown trail symbol with trail name below. Provide additional arrows and/or distance information as necessary.

2-14.11 Tribal Signing

A. Reservation Boundary Signing – ENTERING/LEAVING and (NAME OF) RESERVATION signs may be installed at reservation boundaries where the state highway passes through a tribal reservation. The boundary limits indicated are to be the original treaty boundary limits. If the reservation has a "patch work" boundary layout, place the boundary signs to encompass the entire patch work layout rather than installing individual sets of signs for each boundary crossing location. Signs shall be white letters on a green background.

B. Directional/Distance Signing – As sovereign nations, a tribal reservation may be considered as a primary or supplemental destination along with other local jurisdictions (a city or town). Tribal logos may be incorporated on directional signs. Any wording that refers to or implies a commercial enterprise is not allowed. Directional and distance signs shall be white letters on a green background.

Signing may be from one state highway to another if sign space is available. Ramp follow-through signing should show the mileage if the reservation is more than 1 mile away. Additional signing for the Tribal Center or Community Center may be considered at the nearest and most direct interchange or intersection, if it meets heritage, cultural, historic, or museum criteria.

Examples:

(NAME OF) RESERVATION	(NAME OF) TRIBAL CENTER
NEXT RIGHT or "X" Miles	NEXT RIGHT or "X" Miles

Tribal logo may be incorporated into the guide sign. The maximum logo size is 30″ x 30″. The logo shall show the shape and color both day and night.

If there is insufficient space to display a tribal logo on an existing sign face, the logo will be installed directly above the upper left-hand corner of the guide sign. If the Tribe wants the logo incorporated onto the face of the guide sign, they have the option of paying for a complete new guide sign to include the logo.

When the guide sign is due for replacement, it may be enlarged to incorporate the tribe logo onto the sign face at no cost to the Tribe.

C. Tribal Language Signs – Tribal Governments have requested certain traffic signs display both English and their tribal language on roads and highways that traverse tribal lands. WSDOT worked with the Washington Indian Transportation Policy Advisory Committee (WITPAC) to develop this signing program.

Information about the meanings of the words on the signs will be publicly available on the WSDOT Tribal Liaison webpage www.wsdot.wa.gov/tribal after the signs are installed.

Tribal Governments may request dual language signing on jurisdictional boundary and geographic features signs on or adjacent to tribal lands roadways under WSDOT jurisdiction. The following is the WSDOT's guidance on the display of both the English and tribal language on traffic signs.

The display of both the English and tribal languages on a single sign or sign assembly may be approved by WSDOT, based on the following guidelines:

1. Requests may include any jurisdictional boundary (WA MUTCD Section 2H.04 County/City Name Marker Signs) or geographic features (WA MUTCD Section 2H.04 Lake and Stream) signs include the following signs: Reservation Boundary signs, City entrance signs, County line boundaries and bodies of water such as lakes, rivers, streams, or creeks when that body of water is crossed by the state highway by the use of a bridge or the body of water is visible to the motorist. A letter of concurrence from the City or County is required for city entrance signs or county boundary signs. The letter of concurrence needs to specify that they are in agreement that both languages be displayed and identify the placement, above or below, of each language.
2. Such signs shall be limited to locations on or adjacent to tribal lands.
3. The sign message shall be tribal language as specified by the requesting Tribal Government.
4. Tribal languages shall not be displayed on any other sign including, but not limited to, Regulatory, Warning (including School Zone), and all other Guide (including Destination, Mileage, Street Name, General or Specific Service (Logo Signs), Tourist-Oriented Directional (Specific Service Signs), Scenic Byway Routes, and Acknowledgment) signs.
5. Tribal language signs may be installed on conventional highways, but not on freeway or expressway type highways. Freeways are high speed highways that have entrance and exit ramps. Examples include I-5, I-90, I-405, I-705, I-205, I-82, I-182, SR 520, SR 16, SR 167, SR 512 and others. Expressways are generally high speed 4-lane divided highways like SR 8 between Olympia and Aberdeen, parts of US 101, US 97 and US 12. Three sections of Expressways that are on or next to Tribal lands: US 97 from Union Gap to Toppenish, SR 20 from Anacortes to I-5 and US 101 near Kamilche.
6. Such signs shall be post mounted on WSDOT approved crashworthy roadside sign structures and not be overhead installations.
7. Installation of the signs shall not interfere with the placement of any other necessary signing and shall not compromise the safety or efficiency of traffic flow. The signing shall be limited to one sign at an appropriate location in each route direction.
8. All letters and numerals displayed on the sign for the main characters of the tribal language shall be as provided in the *Standard Highway Signs and Markings* reference publication. Unique characters that are necessary for the proper translation, but not provided in the FHWA Standard Alphabets, may be used. These unique characters are to be kept to a minimum and shall be based on the characteristics of the letter forms of the Standard Alphabets, such as stroke width and arc, to the extent practicable.

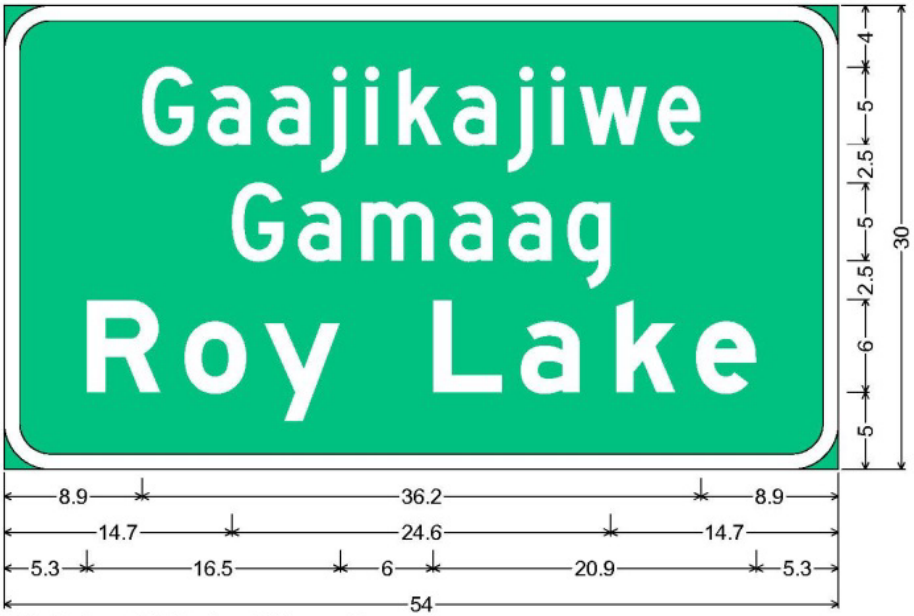
Process Overview

1. The Tribal Government will request signs through the WSDOT HQ Traffic Operations Office.
2. The Tribe will include the following items with the request:
   a. Submittal Letter
   b. Documentation that illustrates action of approval by the Tribal Government to request signs. For example, letter from Tribal Chair or Tribal Council Resolution.
   c. Letter of concurrence from the City or County is required for any requested city entrance signs or county boundary signs. The letter or concurrence needs to specify that they are in agreement that both languages be displayed and identify the placement, above or below, of each language.
   d. List of requested signs as entered into the spreadsheet: Tribal Language Signs. xlsx. Because of the length of some tribal words, some signs could be very large unless the word or phrase is separated onto two lines. Where possible, recommend where the word or phrase can be separated onto two lines without changing the meaning.
   e. If possible, submit electronically the spreadsheet referenced above to the WSDOT Traffic Office so information can be added to the spreadsheet as described below.
3. The WSDOT Regional Traffic Office will provide the following information back to the Tribe:
   a. Sign Panel designs (PDF)
   b. Completed spreadsheet: Tribal Language Signs.xlsx
   c. Cost estimate for each sign fabrication and installation according to WSDOT Traffic Operations Office.
   d. J-agreement for cost reimbursement, sign design, location, sign maintenance and replacement.
4. The Tribe will review the sign panel designs for accuracy. If there are errors in the sign design, the Tribe should contact the Regional Traffic Office with revisions. Once the tribal sign design is approved, the Tribe will send the WSDOT Traffic Office a completed agreement and payment.
5. When the completed agreement and payment are received, signs will be ordered for fabrication and installation.
6. If the sign needs to be replaced because it is damaged, the replacement cost will be the responsibility of the Tribe.
7. The WSDOT Regional Traffic Office will send the completed spreadsheet to the WSDOT Tribal Liaison who will make the English words, the tribal language words, and the English translation of the tribal words, and a phonetic representation of the words available on the WSDOT Tribal Liaison website.

Sign Panel Design

1. The tribal language may be placed above the English language on a case by case basis. Both language are upper lower case lettering.
2. Due to the length of some tribal words and phrases it is recommended to use the highway font Series D instead of E Mod. Series D is a similar font to E Mod but has less breadth to the letters by approximately 35 percent. By using the Series D font and one inch less than the standard font height, the overall width of the signs when placing the tribal language on two lines should in most cases fit on U channel post sign structures. If the word or phrase cannot be displayed on two lines the overall size of the sign may require a larger sign structure. This will increase the cost of the sign.
3. The I3-101 (Body of water) and I2-501 (County boundary) sign will include the tribal language in Series D, 6-inch font and the English language in E Mod, 6-inch font.
4. The I2-301 (City Entrance Signs) will include the tribal language in Series D, 8-inch font and the City Name with the English language in E Mod, 8-inch font.

Exhibit 2-18 Sign Design Example from Minnesota DOT



3.0" Radius, 1.0" Border, White on Green;
"Gaajikajiwe" D; "Gamaag" D; "Roy Lake" E Mod;

2-14.12 *United States Forest Service (USFS) Facilities*

Supplemental guide signing to a USFS facility (campground, Visitor's Center, or a Headquarters building) may be considered if distance criteria are met and sign space in accordance with the MUTCD is available.

The facility must be located within 1 mile of an interchange or intersection in a major metropolitan or urban area, and within 10 miles in a rural area. These signs are white letters on a brown background per agreement with the USFS (MOU NFS 00-MU- 11060000-040). Contact the Headquarters Traffic Office for further guidance.

2-15 Unwarranted Traffic Generators/Destinations

Guide signs to activities operated by private entities for profit, and to other activities not of general interest to the traveling public are not permitted on state highways.

Traffic generators that do not warrant guide signing include:

Businesses
TV/Radio Stations
Theaters
Casinos
Nurseries

Cemeteries
Local or State
Private/Public
Military (exception: A National Cemetery or VA Granted Cemetery, as designated by the U.S. Dept. of Veteran Affairs, that is located within 10 miles of the nearest intersection or interchange, may be signed.)

Communities
Civil Centers
Libraries
Churches
Subdivisions
Neighborhoods

Governmental
Research/Experimental
Facilities County Facilities
Courthouses
Vehicle Emissions Testing Facilities
Drivers and Vehicle License Centers
Transportation Buildings
Civil Defense Facilities
Maintenance Facilities
Power Plants

Schools
Grade/High
Seminaries

Medical
Mental Facilities
Research Facilities
Sanitariums
Treatment Centers
County, Fraternal, or Nursing Homes
Retirement Facilities

Military Sites or Detachments
Armories
Arsenals

Tree Nurseries/Arboretums

Camps
Scout, Church, 4-H, Youth, and YMCA/YWCA
(because these are not open to the public).

2-16 Follow-Through Signing

Follow-through signing provides motorists (after being directed off the state highway) with confirmation to destinations. Signs are installed and maintained by the agency responsible for the local roadway and must be in place before any directional signs are installed on the state highway.

When considering a destination for a supplemental guide sign, determine whether the local agency will install follow-through signing on the local roadway and coordinate the signing plan with them. Provide MUTCD guidelines for follow- through sign sizing to local agencies. Use 6-inch D series letters in high traffic volume or high speed areas. Use 5-inch C series letters, as a minimum, on lower volume or slower speed roadways. Include directional information or arrows as part of the legend.

Install follow-through signing in advance of decision points where route changes are required. Additional trailblazer signs may be placed at mandatory stop locations, but do not install these signs in combination with regulatory or warning signs.

2-17 General Service Signs

2-17.1 General

The MUTCD directs States to establish signing guidelines for several types of general services. Install GENERAL SERVICE signs where the services are not readily apparent to travelers and where they meet the criteria noted below.

Do not combine GENERAL SERVICE signing and MOTORIST INFORMATION (MIS LOGO) signs on the same back panel. If a specific MIS back panel is in place do not also install GENERAL SERVICE signs for that service. (e.g., if a FOOD back panel exists then a general MSS food sign will not be installed). A specific business can join the MIS program instead.

Periodic reviews by region personnel confirm that signing is displayed only for services and facilities that meet eligibility criteria and that signs are removed or covered when the service or facility is closed for the season or no longer in operation.

The following motorist service signs may be installed:

Exhibit 2-19

Sign Symbol	Sign Fabrication Number
Gas	D9-11
Food	D9-8
Lodging	D9-9
Phone	D9-1
Hospital	D9-2
Emergency Medical Care Facility	D9-13
Camping	D9-3
Recreational Vehicle Park (text only)	D9-301
RV Sanitary Station	D9-12
Restrooms	D9-7
Propane	D9-15
Electrical Vehicle (EV) Charging Station	D9-11b Alternate

Install one GENERAL SERVICE sign assembly at an interchange or intersection, with a maximum of four plaques. Combine the GENERAL SERVICE message with a directional message such as NEXT RIGHT, SECOND RIGHT, or the EXIT NUMBER (D9-101, D9-102, or D9-103).

The NEXT SERVICES MILES (D9-1601) sign may be placed below the MOTORIST SERVICE sign if the next services are more than 20 miles away.

A separate word message VISITOR INFORMATION sign may be installed under the GENERAL SERVICE sign.

When services are not readily visible from an interchange, install follow-through signs at ramp terminals, using the same legends or symbols as on the mainline signs. If the services are located more than 1 mile from the interchange or intersection, display the distance to the services on the ramp terminal or direction sign respectively.

Signs have white symbols or letters on a blue background.

GENERAL SERVICE plaques may be installed in conjunction with other guide signs:

- On ground mounted signs, install the plaque on either post below the sign.
- If more than two GENERAL SERVICE plaques are required, place them on a bracket below the guide sign, in a manner that does not interfere with the breakaway safety features of the sign structure.
- On overhead signs, a GENERAL SERVICE plaque is installed above the guide sign.

The department uses the following criteria to determine if a general service sign is warranted. The State Traffic Engineer can approve minor deviations on a case-by-case basis.

2-17.2 Gas, Diesel, and/or L-P Gas

- Vehicle services is required to include fuel, oil, and water to be consider as vehicle services.
- Location shall include free ADA accessible public restroom facilities with a sink and running water for hand washing, a flush toilet, toilet tissue, and sanitary towels or other hand-drying devices. Restroom facilities shall contain appropriate locks for occupant security.
- A free potable water drinking fountain and free cups as necessary must be supplied for public use.
- The facility must operate for at least 16 uninterrupted hours per day, seven days per week.
- A telephone must be available to the public.
- The facility must be within 1 mile of an interstate highway interchange, or within 5 miles, and not readily visible from a non-interstate highway.

2-17.3 Food

- The facility is required to be licensed or approved by the appropriate county health agency.
- The facility is required to operate for at least 12 uninterrupted hours per day, seven days per week, and serve breakfast, lunch, and dinner.
- Location shall include free ADA accessible public restroom facilities with a sink and running water for hand washing, a flush toilet, toilet tissue, and sanitary towels or other hand-drying devices. Restroom facilities shall contain appropriate locks for occupant security.
- A telephone must be available to the public.
- Seating capacity for a minimum of 20 patrons and parking for a minimum of ten vehicles, or drive-in service facilities must be provided.
- The facility must be within 1 mile of an interstate highway interchange, or within 5 miles, and not readily visible from a non-interstate highway.

2-17.4 Lodging

- The facility is required to be licensed by the Washington State Department of Health and provide proof of the license.
- Facilities signed from an interstate highway must have 12 units or more, each with a private bath.
- Facilities signed from non-interstate highways must have six units or more, each with a private bath.
- A telephone must be available to the public.
- The facility must be within 1 mile of an interstate highway interchange, or within 5 miles, and not readily visible from a non-interstate highway.

2-17.5 Phone

- Phone service is required to be available 24 hours per day, seven days per week.
- The phone is required to be located within 1 mile of an interstate highway interchange.
- Phone signing is not required if another service near the interchange has met the phone criteria as part of qualification.

2-17.6 Hospital

- Continuous emergency care service is required to be available, with a doctor on duty, or on immediate call 24 hours per day, seven days per week.
- Written certification of emergency care capability is required to be obtained from the Washington State Department of Health and provided to the department prior to sign installation.
- The hospital is required to be located not more than 20 minutes driving time from the interchange or intersection.
- For an area with two or more qualifying hospitals, provide signs to the closest facility, by approach direction, located within 20 minutes driving time from the interchange or intersection.
- Follow-through trailblazer signs are required from the highway to the hospital. They shall be installed and maintained by the local agency.

2-17.7 Emergency Medical Services Facility

- The facility is required to operate continuously 24 hours per day, seven days per week.
- Written certification of emergency care capability is required to be obtained from the Washington State Department of Health and provided to the department prior to sign installation.
- The facility is required at all times to have:
  - A Physician, a Registered Nurse, or a Paramedic on duty.
  - Or, an Emergency Medical Technician on duty, plus a Physician, Registered Nurse, or Paramedic on immediate call.
- Emergency transportation capabilities must be available.
- The facility must be located within 20 minutes driving time of the highway.
- For an area with two or more qualifying emergency care facilities, install signs to the closest facility (by approach direction).
- Do not use the Emergency Medical Services Facility sign if a hospital sign is installed at that intersection or interchange.

2-17.8 Camping

- The campground is required to be licensed or approved.
- Campground facilities is required to be within 5 miles of an interstate highway interchange, or within 8 miles of, and not readily visible from a non-interstate highway.
- Facilities are required to have at least 20 camping sites, 10 of which will accommodate tents.
- Facilities shall provide free ADA accessible public restrooms with a sink and running water for hand washing, a flush toilet, toilet tissue, and sanitary towels or other hand-drying devices. Restroom facilities shall contain appropriate locks for occupant security.
- Facilities shall provide free potable drinking water and free cups, as necessary, for public use.
- Camp area facilities are required to be available 24 hours per day with a full-time attendant on duty.
- For seasonal operations, the department removes or covers the sign with a CLOSED plaque during the off season.

2-17.9 Recreational Vehicle Park

- Recreational vehicle parks is required to be licensed or approved by the appropriate county office.
- Adequate parking must be provided for at least 10 recreational vehicles (camper truck, motor home, or recreational trailer).
- Facilities shall provide free ADA accessible public restrooms with a sink and running water for hand washing, a flush toilet, toilet tissue, and sanitary towels or other hand-drying devices. Restroom facilities shall contain appropriate locks for occupant security.
- Facilities shall provide free potable drinking water and free cups, as necessary for public use.
- All facilities are required to be available 24 hours per day.
- A telephone is required to be available to the public.
- The RV Park must be within 5 miles of either an interstate highway interchange or a non-interstate highway.
- For seasonal operations, the department removes or covers the sign with a CLOSED plaque during the off season.

2-17.10 Police (Local or State)

- The law enforcement agency is required to have an officer on the premises at all times, or a dispatcher on duty with an officer within radio or local telephone contact.
- The law enforcement agency is required to be located within a reasonable distance from the state highway.

2-17.11 Visitor Information Centers (VIC)

VISITOR INFORMATION CENTER (VIC) signs direct unfamiliar road users to a facility whose sole function is to provide tourist information and that meets the following criteria:

- The Visitor Information Center must operate a minimum of eight hours per day, seven days a week from Memorial Day to Labor Day, or during the months that tourists customarily visit the area. The region traffic engineer may approve different operating hours if the Visitor Center operators can document that a variance is reasonable and justified.
- The VIC must be operated by a nonprofit organization; however, the center may be sponsored by a commercial enterprise. For example, the VIC could be located within a commercial establishment such as a mall or shopping center provided the VIC is visibly separate from the commercial activity.
- Literature and information on visitor attractions are required to be provided to the public free of charge.
- The VIC is required to have either a full-time attendant on duty during the hours of operation, whose primary duty is to provide visitor information, or a functioning electronic means available to answer visitor questions.
- The VIC must be large enough to accommodate the anticipated number of visitors and provide the necessary display space for material of local and statewide interest.
- Parking space, for both cars and recreational vehicles, is required to accommodate the expected number of visitors.
- A telephone is required to be available to the public during operating hours.
- The VIC is required to be within 1 mile of an interstate highway interchange, or within 5 miles of a non-interstate highway, and not readily visible from it. Follow- through signing is required if the VIC is not visible from the interchange or intersection.
- During hours of operation, the center shall provide free ADA accessible public restroom facilities with a sink and running water for hand washing, a flush toilet, toilet tissue, and sanitary towels or other hand-drying devices. Restroom facilities shall contain appropriate locks for occupant security.
- Facilities shall provide free potable drinking water and free cups for public use.

Only one Visitor Information Center may be signed from an interchange or intersection. Where more than one facility requests signs, work with each to determine which best serves the public. Consider which VIC provides the most complete information, the ease of travel from the highway to the Center, and the amenities of each facility. Request that the signed VIC provide motorists with information including directions to the other.

The VISITOR INFORMATION CENTER sign can be combined with a second message for either a museum, historical, cultural, or recreational attraction, if that attraction meets the appropriate guidelines. The VIC must provide information about the attraction, through an on-premise outdoor kiosk or within the Center.

For seasonal operation, remove the sign or cover with a CLOSED plaque.

VIC supplemental signing is required to meet MUTCD sign spacing criteria. Where there is not adequate sign space available, a VIC text message plaque may be installed on an existing ground mounted sign.

The department generally provides VIC signing. However, if a Center changes locations within a one or two year period, it may be asked to pay for all relocation costs.

2-17.12 Electrical Vehicle (EV) Charging Stations

The Alternate Electric Vehicle Charging Symbol sign (D9-11b Alternate) may installed when the following criteria is meet:

- Open to the public;
- Within three miles of state highway interchange or state highway intersection;
- Continuous operations for at least 16 hours per day, 7 days per week;
- Adequate parking to accommodate the recharging of vehicles and provide safe ingress/egress;
- Level 3 – 480 Volt 3-phase power and the transformer is required to have adequate capacity to serve DC Rapid Charger(s).
- Follow through signing shall be in place prior to installing the symbol sign on the state highway system.

The Alternate EV Charging Symbol sign (D9-11b Alternate) shall be 24” × 24” on conventional highways, and 30” × 30” on expressways and freeways, and the sign is white on blue in color.

The sign layout shall conform to the design requirements as per FHWA’s Interim Approval for the “Optional Use of an Alternate Electric Vehicle Charging General Service Symbol Sign”, *Alternate Electrical Vehicle Charging Sign (D9-11b Alternate)*.

The Alternate Electric Vehicle Charging Symbol sign (D9-11b Alternate) shall be supplemented with a Directional Arrow 90 Degrees (M6-1B) when a left or right turn is required from a conventional highway, expressway, or freeway off ramp.

The requesting group is responsible for the sign fabrication and installation costs. A JX account is to be set up to administer the funds. Sign installation and removal will be by WSDOT personnel.

2-18 Other Essential Guide Signs

2-18.1 Street Name and Advance Street Name Signs

STREET NAME (D3 Series) signs are useful navigational tools for the roadway user and are installed at roadway intersections. Street name signs are white letters on a green background. Upper and lower case letters are used.

Signs showing the historical street name may be used in conjunction with a current street name sign. All costs associated with the historic street name shall be the responsibility of the local agency making the request.

In urban areas, STREET NAME signs are installed at the intersection. For significant cross streets, channelized intersections, and at signalized intersections, ADVANCE STREET NAME signs should also be installed. Place them 200 feet or more in advance of intersections to alert motorists to the upcoming roadway and the possibility of turns or lane changes, etc. A directional chevron may be used on the street name sign indicating the direction of the side street.

In rural areas, where a county road intersects the state highway, a STREET NAME sign identifying the state route is installed above the state installed STOP sign. The county is responsible for the original installation, and the department maintains these signs.

Where ADVANCE INTERSECTION WARNING signs are used, (primarily in rural or suburban areas) it is WSDOT policy to install the black on yellow ROAD NAME (D3-201) sign above or below the INTERSECTION WARNING sign.

On city streets that are part of state highways, the local agency shall install and maintain street signs within the corporate limits (RCW 47.24.020). Use this table to determine appropriate letter size for street name signs:

Exhibit 2-20

Roadway Type	Single or Multilane	Single Lane	Single Lane	Multilane	Multilane	Signal Mast Arm
Posted Speed Limit (mph)	25	30–45	50+	30–40	45+	N/A
Street Name Letter Size	4″/3″	6″/4.5″	6″/4.5″	6″/4.5″	8″/6″	12”/9” #
Advance Street Name Letter Size	6″/4.5″*	6″/4.5″	6″/4.5″	6″/4.5″	8″/6″	N/A
Fabrication Number	D3-101 D3-102	D3-101 D3-102 D3-103 D3-201 D3-301 D3-302** D3-401	D3-101 D3-102 D3-103 D3-201 D3-301 D3-302** D3-401	D3-101 D3-102 D3-103 D3-201 D3-301 D3-302** D3-401	D3-101 D3-102 D3-201 D3-301 D3-302** D3-401	D3-501

*Use only at urban signalized intersections and channelized intersections with exclusive turn lanes.

**Use at Advance Street Name sign installations only.

#For posted speed limits less than 40 mph, 8″/6″ letter heights may be used.

2-18.2 Border Crossing – Canadian Customs

Several Canadian Customs border crossing stations have limited hours of operation and are closed to motorists outside these hours. For these crossing stations, install signing to inform motorists of the hours of operation and locate the signs to provide them an opportunity to find an alternate route or to delay their crossing. Place the sign in advance of the closest exit before the border where overnight accommodations are available.

Canadian Customs at 24-hour border crossings do not need advance signing showing hours of operation.

2-18.3 City and County Entrance

The department is responsible for installing CITY and COUNTY ENTRANCE signs (I2-201/301) on state highways (RCW 47.36.120). The signs shall be white on green. These signs are placed at city and county boundary limits and are different than CITY ENTRANCE MARKERS discussed in Section 2-20.3.

Instead of the standard ENTRANCE (I2-201/I2-301) sign, the city or county may supply and maintain a sign with a political jurisdiction logo, per the MUTCD.

2-18.4 Unincorporated Community

COMMUNITY ENTRANCE signs (I2-301) may be installed on each non-limited access state highway approach to an unincorporated community that includes:

- A United States Postal Service office.
- At least two motorist services, which may be any combination of gas, food, or lodging.

Supplemental destination guide signing to the community may be considered if it is within 10 miles from a rural state highway interchange or intersection.

Do not install destination signing to unincorporated communities from an urban area interchange.

2-18.5 City Center

Historically, the department has provided CITY CENTER signs at the request of local governments, to direct motorists to local government buildings (i.e., city hall, courthouse). Currently, requests for CITY CENTER signs often come from local business communities to direct motorists to business areas within a city.

CITY CENTER signing requests should include the following information:

- Description and location of all city center exits within the corporate limits.
- The interchange or intersection name of the proposed sign location.
- Verification of local agency agreement on the location of the city center.

When reviewing CITY CENTER signing requests, conduct a field review to determine the effectiveness and feasibility of sign locations and confirm other details of the request letter. Include the local government, business community, and other interested groups to assure agreement on the location of the city center.

All costs for sign fabrication and installation are the responsibility of the city making the signing request.

2-18.6 Milepost Markers

MILEPOST MARKERS are numbered location markers installed along all state highways and used primarily for reference purposes. The Statewide Travel and Collision Data Office establishes each milepost location, which is signed with a MILEPOST MARKER in accordance with the following criteria (adopted from rescinded department Directive D32-20).

- On two-lane roadways, install the double-faced MILEPOST MARKER (D10-101, D10-102, and D10-103) on the right side of the roadway, in the direction of increasing milepost.
- On multilane highways, install the single faced MILEPOST MARKER (D10-1, D10-2, and D10-3) for each roadway direction, on the right side of the roadway.
- MILEPOST MARKERS on spur routes display the letter "S" below the mileage figure.
- MILEPOST MARKERS must be installed within 50 feet of their designated location. If that is not physically possible, do not install that MILEPOST MARKER.

When a milepost marker is relocated it must be documented in the Traffic Sign Maintenance System (TSMS). Headquarters Traffic supplies this information to the Roadway Data Office annually so the milepost marker can be accurately relocated in the State Highway Log. See Standard Plan G-10.10-00 and G20.10-00 for installation details.

2-18.7 Highway and Freeway Entrance

Install the HIGHWAY ENTRANCE sign (E12-101) on two-lane two-way undivided highways where interchanges are provided at intersecting crossroads. Install signs on both sides of the on-ramp, facing approaching traffic, to clearly identify the entrance to the on-ramp.

Install the FREEWAY ENTRANCE sign (E12-201) on both sides of each freeway or expressway on-ramp, facing approaching traffic, to identify the ramp entrance.

2-18.8 Other Agencies

Consider installation of supplemental guide signs to facilities of other federal, state and local agencies when space is available per the MUTCD. Sign colors are determined by the type of sign destination (recreation, emergency, or direction).

- **Department of Natural Resources Campgrounds** – White letters on brown background.
- **State Patrol** – White letters on blue background.
- **State Public Fishing Areas** – White letters on brown background.
- **Government Fish Hatcheries Open to the Public** – White letters on green background.
- **Department of Corrections Facilities** – White letters on green background.

2-19 Miscellaneous Signing

2-19.1 Adopt-a-Highway or Adopt-a-Trail

ADOPT-A-HIGHWAY/TRAIL (AAH/AAT) signs are installed to recognize both volunteer groups and businesses that sponsor litter pick up, or other roadside, or trail enhancement activities as part of the AAH program. The program is administered through the Headquarters Maintenance Office, with regional coordinators assigning locations to groups. Adopted roadside sections can include one or both sides of the roadway.

AAH signs are placed at or near the beginning of an adopted section. Lateral placement of the AAH signs may be up to 50 feet from the edge of the travel lane, if right of way is available and the signs are still visible from the traveled lanes. All AAH signs mounted on the same post must be the same width.

The name displayed on the AAH recognition sign shall be the official name of the organization, individuals, or business sponsoring the section and must be pre-approved by the department.

Volunteer adoption sections are signed as follows:

- Sections adopted by volunteer groups are signed using I6-901, I6-901A, I6-902, I6-902A, I6-904, and I6-905A signs.
- If the section includes both directions of travel, install signs for each.
- On divided highways, AAH signs are installed on the right shoulder only.

Sponsored adoption sections are signed as follows:

- Sections adopted by businesses are signed using an I6-906 sign.
- On divided highways, AAH signs may be installed on either the median or the right shoulder.
- The sponsor's logo/name plaque is provided to the region for WSDOT installation on the AAH sign. The plaque will be a 0.050 inch aluminum overlay.
- Size requirements are a maximum of three lines, with 20 spaces per line.
- If a sponsor's name will not fit within the sign width, the letter height will be reduced until it can.

AAH recognition signs may also be installed for special enhancement projects such as landscaping at interchanges, or other areas. In these cases, the smaller sign shall be used and the region traffic engineer shall determine sign placement on a case-by-case basis.

Spacing between AAH signs and other traffic control signs shall conform to MUTCD Section 2H.08. AAH signs are shown in Appendices 2-26 and 2-27.

2-19.2 Roadside Memorial Sign Program

The Headquarters Traffic Office administers the DUI Victim Memorial signing program and approves all locations for signing. Refer citizen requests for Victim Memorial signs to the Headquarters Traffic Office.

Install one of the following signs: PLEASE DON'T DRINK AND DRIVE (I20-201), PLEASE DON'T DRUG AND DRIVE (I20-201A), PLEASE DON'T SPEED (I20-201B), PLEASE DON'T TEXT AND DRIVE (I20-201C), PLEASE DRIVE SAFELY (I20-201D), PLEASE RIDE SAFELY (I20-201E), PLEASE WATCH FOR MOTORCYCLES (I20-201F), PLEASE WATCH FOR BICYCLISTS (I20-201G), or SEAT BELT SAVE LIVES (I20-201H) with the IN MEMORY OF (I20-203) or SPONSORED BY (I20-204) plaque at approved locations.

Specific sign locations are determined on an individual basis during the review of the sign request. In general, along non-interstate highways, one sign is installed for each direction of travel. Install the sign near the physical crash location, while considering sign spacing, sight distance, and other factors that may preclude using the exact crash site.

For the Interstate system, one sign is installed along the on-ramp nearest to the collision scene, in the direction of travel that the collision occurred.

Information on the Roadside Memorial Sign Program is available at: www.wsdot.wa.gov/operations/traffic/signs/duisign.htm.

2-19.3 City/Community Entrance Markers

WSDOT may allow cities or communities, either by permit or agreement, to construct and maintain city/community entrance beautification areas on state highway right of way. The agreement may include a CITY or COMMUNITY ENTRANCE MARKER.

On a state highway, one ENTRANCE MARKER may be installed for each direction of travel near where it enters a city or community. Any landscaping associated with the marker shall be in compliance with the WSDOT *Roadside Policy Manual* M 3100, and approved by the region Landscape Architect.

An ENTRANCE MARKER for a neighborhood community that lies within the corporate limits of a city or town may be allowed if the city or town approves the neighborhood's marker. This marker will count as one of the two allowed per city or town.

An ENTRANCE MARKER visible to any state highway is required to meet these guidelines:

- Be simple, dignified, and devoid of advertising.
- Be positioned in accordance with *Design Manual* Chapter 1600, nor reduce available space for those who walk and bike, reduce accessibility for person with disabilities, or reduce sight distance below minimum design criteria.
- Shall not interfere with, nor distract from any existing or future traffic control or safety device.
- Any lighting associated with the marker shall comply with RCW 47.36.180.
- Be sponsored by the city or a community group in which it is located.

The city or community group is responsible for maintaining the marker and any associated landscaping. Inadequate maintenance of either, as determined by the department, may result in marker removal.

If a highway project (such as roadway widening) will displace an ENTRANCE MARKER, the city or community group is responsible for relocating and/or removing it. Markers not relocated shall be removed by WSDOT, with removal and disposal costs billed to the city or community group.

A. Entrance Markers on Limited Access Highways – The total marker area shall not exceed 100 square feet, and the message area shall not exceed approximately 60 square feet. At highway interchanges, the marker must be oriented so it can be read by the motorist leaving the ramp and not by the motorist on the highway mainline.

Non-Profit Service Club Plaques (i.e., Kiwanis, Lions, Rotary) may not be installed on ENTRANCE MARKERS within limited access highways. These signs are considered to be Type (1)(c) signs and are regulated under the Scenic Vistas Act (RCW 47.42 and WAC 468-66).

1. **Interstate** – ENTRANCE MARKERS installed on Interstate right of way require FHWA approval. The State Traffic Engineer reviews the design and placement of city ENTRANCE MARKER requests on interstate roadways before recommending approval to the FHWA. If approved, the marker is placed between the interchange ramp and the right of way line, in the area of the ramp terminal with the connecting city street, and not visible to mainline traffic.

2. **Non-Interstate** – The region traffic engineer approves the design and placement of the marker on non-interstate routes. If there are any deviations from the guidelines above, the design must be submitted to the State Traffic Engineer for approval. For undivided highways, the marker is placed just inside corporate limits, or at the far side of an intersection located inside corporate limits.

B. Entrance Markers on Non-Limited Access Highways – The total marker size shall not exceed 150 square feet, including the border and trim, and service club plaques. The service club plaque area of the sign shall not be disproportional to the marker message. The maximum size for each service club plaque is 24″ × 24″.

Non-Profit Service Club Plaques (i.e., Kiwanis, Lions, Rotary) may be installed on a city ENTRANCE MARKER along a state highway if the marker is located within corporate limits and is not within a limited access area. These signs are considered to be Type (1)(b) signs and are regulated by the Scenic Vistas Act (RCW 47.42 and WAC 468-66).

The region traffic engineer shall approve the design and placement of the marker. If there are any deviations from the guidelines, the design and placement shall be submitted to the State Traffic Engineer for approval.

Install the city ENTRANCE MARKER inside the city limits, beyond the curb line or outside edge of the roadway. ENTRANCE MARKERS for unincorporated communities may be considered for placement on state highway right of way. The marker must be located beyond the clear zone if it does not meet break- away standards.

2-19.4 Carpool Information

CARPOOL INFORMATION signs (D12-201, D12-202) may be installed along conventional two-lane roads, on-ramps to multilane highways, and in park and ride lots. They should not be placed on the mainline of multilane facilities.

Transit logos may be included in the sign design in accordance with MUTCD Section 2D-48. These signs are considered incidental and can be removed if sign space is needed for a higher priority sign.

The requesting agency is responsible for sign fabrication and initial installation costs. WSDOT is responsible for the sign maintenance. Sign spacing:

- Use a 300-foot spacing between signs on conventional two-lane, high-speed roadways.
- Use 150-foot spacing for freeway on-ramps, and for both multilane and two-lane, low-speed roadways in incorporated areas.

2-19.5 Commercial Dump Prohibition

Some rest areas along state highways provide Recreation Vehicle dump stations for use by noncommercial vehicles. Install the COMMERCIAL VEHICLE USE PROHIBITED (I8-704) sign in the rest area at these RV dump sites. This is the only valid application for this sign on state highways.

2-19.6 Fire District Boundary

The ENTERING FIRE DISTRICT and LEAVING FIRE DISTRICT signs (I8-804) may be installed at Fire District boundaries along state highways using these guidelines:

- Upon region approval, signs shall be installed and maintained by the jurisdiction requesting the sign(s). A General Permit issued by the area maintenance office is required.
- Signs should be installed at the district boundary, if possible, or no further than 1,000 feet from the boundary.
- Signs may be placed away from the roadway near the edge of the right of way. They shall not obstruct a driver's view or constitute a hazard by their location.
- Mounting posts shall be of wood, no larger than 4 inches × 4 inches, or they may be perforated square steel. Mounting height shall be 7 feet to the bottom of the sign.
- The sign color shall be white letters on blue background.
- A jurisdictional logo may be included on the sign.

2-19.7 Fire Danger Information

FIRE DANGER INFORMATION signs (with arrow indicator) are requested or sponsored by either the Department of Natural Resources (DNR) or the local fire district authority who submits a written request to the region Traffic Office.

DNR or the fire district shall be responsible for the sign fabrication, installation, and maintenance costs, as well as for the daily message changes. WSDOT can fabricate and/or install the sign via a J Agreement, or the fire district can fabricate and install the sign if the department approves. A General Permit issued through the area maintenance office is required.

The fire district must agree to properly maintain the sign and to cover it during the winter when there is no fire danger, or to replace the sign when the message or colors begin to fade or fail.

Signs are not allowed on Interstate right of way. Install the FIRE DANGER sign at or near the right of way line. If the sign is within the clear zone, it must have appropriate safety breakaway features. Mounting posts shall be of wood, no larger than 4 inches × 4 inches, or they may be perforated square steel. Mounting height shall be 7 feet to the bottom of the sign.

2-19.8 Fire Hydrant Marker

FIRE HYDRANT MARKER (I7-401) signs may be installed on limited access highways to help fire department personnel locate fire hydrants that are outside of the right of way. The sign shall be placed parallel to, and facing the roadway. The sign shall be visible from the shoulder, mounted either on the right of way fence or on a post, and shall display the distance from the edge of traveled way to the fire hydrant. If requested by the fire department, a 24-inch plaque may be added below the sign to indicate the nearest street or intersection.

The region traffic engineer shall contact local fire departments to determine signing needs for fire hydrants located near limited access highways.

The department is responsible for installing and maintaining these signs.

2-19.9 Apple Maggot

Many people carry homegrown fruit and municipal waste throughout the state without realizing that they may also be transporting harmful pests, such as the apple maggot, thereby increasing the insects' range. Washington State Department of Agriculture (WSDA) established specific geographical boundaries where the transport of homegrown fruit is prohibited. At their request, signs were installed at several locations throughout the state in an effort to stop the transport of homegrown fruit. Sign fabrication, installation, and maintenance costs are paid for by WSDA through an Interagency Agreement. Contact Headquarters Traffic before replacing any apple maggot signs. Signs locations and messages are:

State Borders and Quarantine Area Borders	DON'T CROSS THE LINE NO HOMEGROWN FRUIT BEYOND THIS POINT ENTERING APPLE MAGGOT PEST – FREE AREA

2-19.10 Landscape and Vegetation Acknowledgement

Community, local groups, or businesses sometimes install and/or maintain landscaping or vegetation plantings within state highway right of way, generally as part of beautification of a community entrance. A General Permit issued by the department is required.

One sign acknowledging the group may be allowed as described below:

- The sign design, including size, message layout, color, and sign fabrication material is submitted to the region Traffic Office for review and approval.
- Sign size is limited to 3 feet × 3 feet; letter size is limited to 2 inches. This is not considered a highway sign and is not intended to be read by motorists.
- The sign shall not contain any advertising or service club information, or resemble a city/community entrance sign.
- The sign is installed at or near the right of way line. On limited access facilities, the sign is placed between the ramp and right of way line, and not visible to mainline traffic.
- The sign sponsor shall be notified and instructed to replace the sign when needed. The sign shall be removed if it is not replaced in a timely manner.
- When the General Permit expires without renewal, or the landscaping/vegetation is no longer maintained, the sign shall be removed.

2-19.11 Limited Access

For state highways that operate with intermittent access control, install ENTERING LIMITED ACCESS AREA (I2-601) and LEAVING LIMITED ACCESS AREA (I2-701) signs in accordance with RCW 47.52.110. Fully controlled limited access highways do not need signs.

2-19.12 Litter Control

To Be Determined.

2-19.13 Post Offices

Post offices may be signed from state highways in unincorporated areas if the post office is not visible from the state highway and there is a demonstrated need for the sign (D1-101). Cities or towns may sign for post offices inside incorporated limits.

2-19.14 Private Roads

WSDOT does not supply, fabricate, install, or maintain STOP signs or STREET NAME signs for private roadways that intersect with state highways. Citizens may install their own signs at such intersections, in accordance with the MUTCD, and working with the area Maintenance Superintendent. A general permit is required when a STOP sign or private ROAD NAME sign is installed on WSDOT right of way at a private road approach. The citizen requesting the sign must secure the permit and coordinate installation details with the area Maintenance Superintendent. Maintenance for private road signs is the responsibility of the citizen installing the signs.

Private road name signs (D3-104) shall be fabricated in accordance with the *Sign Fabrication Manual* and must indicate the road is private either by a sign header or by words ("Private" or "PVT") on the sign. White letters on a green background is the preferred color but a local jurisdiction may determine that white on blue or black on white are acceptable.

2-19.15 Refuse Station

REFUSE STATION signing may be installed under the following conditions:

- The site is required to be county or city owned and open to the general public. Private refuse stations will not be signed.
- The is required to must be a major refuse station, not just a drop-off location.
- Signs are not installed on any freeway facility.
- The refuse station must be located within ½ mile of the state highway.
- Use the word "Refuse" instead of the word "Transfer" to avoid possible confusion with transportation hub centers that may also be called Transfer stations. The word "Garbage" is not used.
- The REFUSE STATION sign shall be a 24 inch × 24 inch white on green plaque.
- Install the plaque above or below any ground mounted guide or information sign at the intersection. If there are no signs, the plaque may be placed on its own sign post.
- A city or county may install a REFUSE STATION sign on its right of way at an intersection, instead of a highway sign. The sign would be considered a Type 1 sign under the Scenic Vistas Act (WAC 468-66-050).

2-19.16 Salmon and Other Fish

WSDOT receives requests from fish related user groups to sign a stream or body of water with a specific fish related message. Signs related to preserving the fish habitat may be installed along a state highway; however, only one type of fish related sign will be allowed for a location. Where several user groups (i.e., salmon, steelhead, or trout) request signing in a location, suggest that they work together to develop a single fish related sign message and to seek support from the local jurisdiction. An overall signing plan with support documentation should be submitted to the region Traffic Office, preferably by the local jurisdiction or by an official organization or agency.

- The stream crossing or body of water is required to be year round.
- Multiple signs, supported, endorsed, or maintained by different user groups (i.e., salmon, steelhead, and trout) will not be allowed.
- The requesting user group is responsible for the sign fabrication, installation costs, and all maintenance and replacement costs. A J account can be set up to administer the funds. Sign installation and removal will be by WSDOT personnel.
- Sign size will be 18″ × 24″, 24″ × 24″, or 24″ × 36″, dependent on the fish logo and line message approved by WSDOT.
- Sign colors are white letters on a blue background.

2-19.17 Water Crossing

A STREAM NAME or WATER CROSSING (I3-101) sign may be installed on a state roadway to identify a body of water that traverses or parallels a state highway, using these guidelines:

- The body of water is required to be identified by name on a USGS map.
- If the body of water traverses the highway, the water way must be bridged by a highway structure. A single culvert crossing or a seasonal stream does not qualify for a sign.
- Sign color shall be white on green.
- On conventional roadways, letter height is 6″ upper case and 4½″ lower case letters.
- On expressways or freeways, letter height is 8″ upper case and 6″ lower case letters.

2-19.18 Watersheds

Watershed Signs may be installed per the following:

- The Watershed has to be recognized by Washington Department of Ecology (Watershed Finder)

Within State Highway Right of Way –

- The requesting agency or group is responsible for the sign fabrication, installation costs, and all future maintenance and replacement costs. A JX account can be set up to administer the funds. Sign installation and removal will be by WSDOT personnel.
- The maximum sign size is 12 square feet.
- The sign color are white legend on either blue background or green background.
- The Watershed name may be combined with the water crossing (river, creek, or stream – Colville River Watershed).

Outside of State Highway Right of Way –

- Can be treated as Type 1 signs (WAC 468-66-050) and installed off the state right of way. Type 1 signs must be supported by an official agency or organization.
- Permission of the land owner.

2-19.19 Water Related Signs NOT to Be Installed

The following water related signs shall not be installed on any state highway:

- Conservation District Boundary Area
- Drainage Basin
- Drinking and Ground Water Management Area
- Groundwater Protection Region or Area
- Groundwater Conservation Region or Area
- Surface Water Management Area
- Wellhead Protection Area

These signs do not assist motorists in their driving, but can be treated as Type 1 signs (WAC 468-66-050) and installed off the state right of way. Type 1 signs must be supported by an official agency or organization.

2-19.20 Watchable Wildlife

The WILDLIFE VIEWING (D5-907) signs may be installed for locations that are open to the public and within 10 miles of the state highway. Install the sign on the highway exit or intersection nearest the viewing area. Use the BINOCULARS symbol sign for a trailblazer and for site identification if no other signing is posted. Signs are white on a brown background.

2-19.21 Evacuation Route

Install EVACUATION ROUTE (I25-101, I25-201) symbol signs to indicate the route that people should follow to leave an area when a tsunami, volcanic eruption, fire, or other hazard is threatening. Region Traffic Offices are to coordinate the location of Evacuation Route signs with City, County, or Tribal Emergency Management personnel.

2-20 Variable Message Signs

Variable Message Signs (VMS) are traffic control devices designed to display diverse messages to alert roadway users about specific conditions or situations. VMS are part of WSDOT's Traffic Management System and are operated by each region Traffic Management Center (TMC).

VMS are located on many highways throughout the state. Some are used exclusively to provide information about variable speed limits, lane use restrictions, active traffic management, or traction requirements. Others may provide information about:

- Traffic incident information.
- Traffic restrictions or emergency conditions.
- Special event related traffic impact information.
- Upcoming road closures or other impacts.

Operation of the Variable Message Signs is coordinated by the region's TMC and is governed by the Variable Message Sign Policies, Guidance, Operations at: http://sharedot/ops/traffic/TO%20Policies%20and%20Plans/Illumination,%20Traffic%20Signals,%20and%20ITS/VMS%20Operations%20Policy%202013-02.pdf.

2-21 Highway Advisory Radio (HAR) and Traveler Information Station (TIS) Signing

HAR and TIS systems are low power AM radio stations installed to provide the traveling public with traffic alerts or traveler information. They are sometimes used in conjunction with a Variable Message Sign (VMS). Both HAR and TIS installations must comply with Federal Communications Commission (FCC) requirements and must be approved by and coordinated through the WSDOT ITS and Communications office. HAR and TIS system messages are governed by the HAR/TIS procedures which can be found at http://sharedot/ops/traffic/TO%20Policies%20and%20Plans/Highway%20Advisory%20Radio/HARPolicy.pdf.

HAR and TIS signs are secondary to official traffic control signs (i.e., regulatory and warning signs, guide signs) and are installed only when MUTCD and WSDOT sign spacing requirements can be met.

2-21.1 Highway Advisory Radio (HAR) System Signs

- Install a TRAFFIC ADVISORY TUNE XX AM WHEN FLASHING (I35-101) at each HAR location.
- Install flashing beacons above the sign that are activated by the TMC when HAR messages are being broadcast.
- HAR signs, Traffic Alert/Traffic Advisory signs, and Mountain Pass Information/ Road Conditions signs shall be a non-reflective black legend on a reflective yellow background.

2-21.2 Traveler Information Signs (TIS)

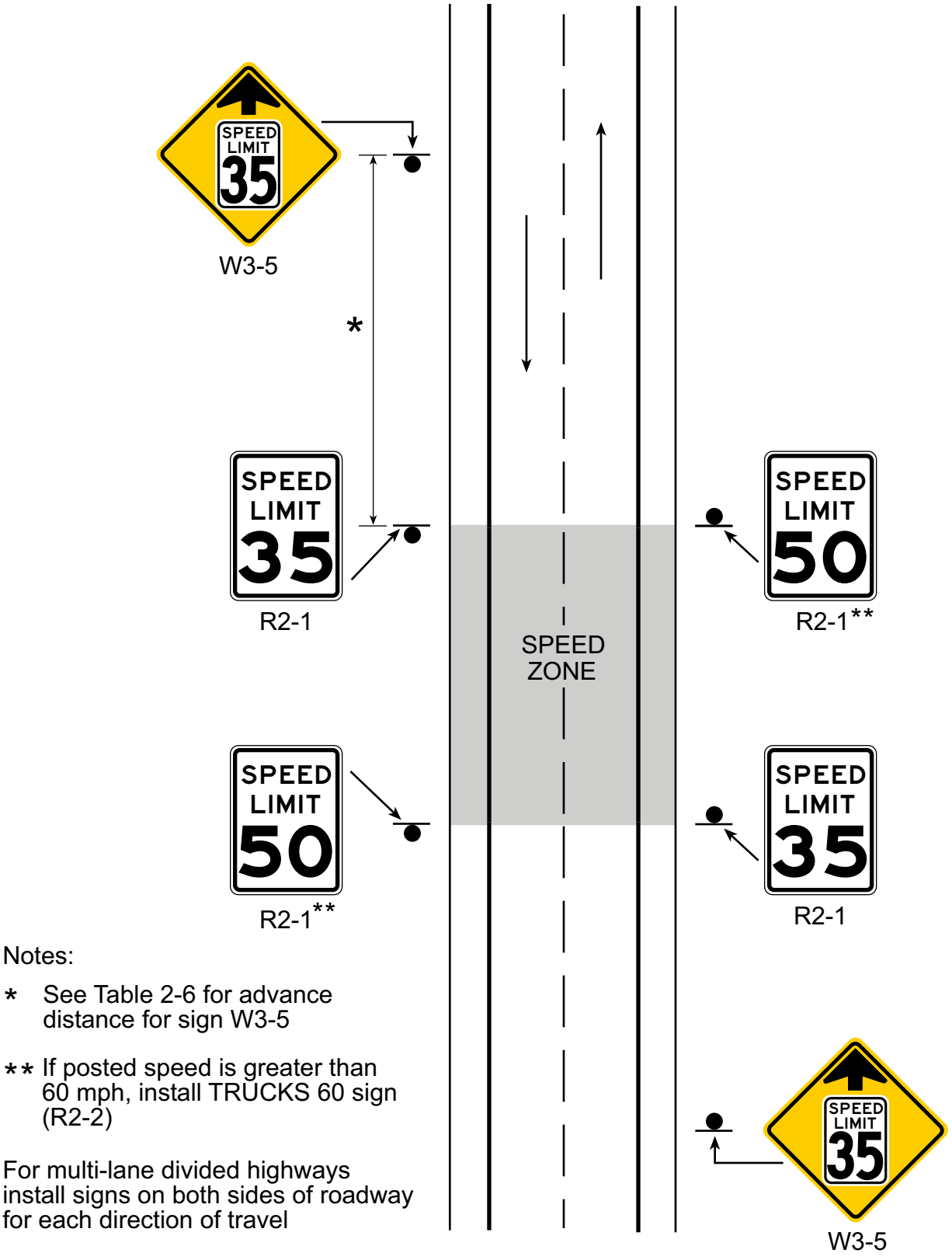
TIS systems give tourist and recreational information.

- Install a "TRAVEL INFORMATION TUNE (XXXX) AM" at any TIS location.
- The sign shall be a reflective white legend on a reflective blue background, with the exceptions of TIS signs for recreation in National Parks, National Forests, and National Historic Reserves. These are the **ONLY** TIS signs that may be a white reflective legend on a brown reflective background. As well, these agencies may incorporate their official agency logo on the TIS sign.
- When the preemptive message EMERGENCY INFO WHEN FLASHING is included in the TIS sign, it shall be a non-reflective black message on a reflective yellow background. Flashing beacons shall be installed to be activated by the TMC when emergency messages are being broadcast.
- All TIS sign fabrication, installation, and maintenance costs are the responsibility of the requesting agency. Signs will be fabricated to WSDOT standards and may only be installed by WSDOT crews.

2-22 Appendices

Appendix 2-1	Speed Zone Signing
Appendix 2-2	Intersection U-Turn Signing
Appendix 2-3	Auxiliary Climbing Lane Signing
Appendix 2-4	Auxiliary Passing Lane Signing
Appendix 2-5	Wrong Way Signing for At-Grade Intersections
Appendix 2-6-1	Wrong Way Signing for Diamond Interchange Ramps
Appendix 2-6-2	Wrong Way Signing for Partial Cloverleaf (Barrier or Curb Separated) Interchange Ramps
Appendix 2-6-3	Wrong Way Signing for Partial Cloverleaf (Paint Separated) Interchange Ramps
Appendix 2-6-4	Wrong Way Signing for Slip Exit Ramp
Appendix 2-6-5	Wrong Way Signing for Two-Way Traffic
Appendix 2-6-6	Wrong Way Signing for Roundabouts
Appendix 2-7	Roundabout Signing
Appendix 2-8	Shoulder Driving Signing

Appendix 2-1 Speed Zone Signing



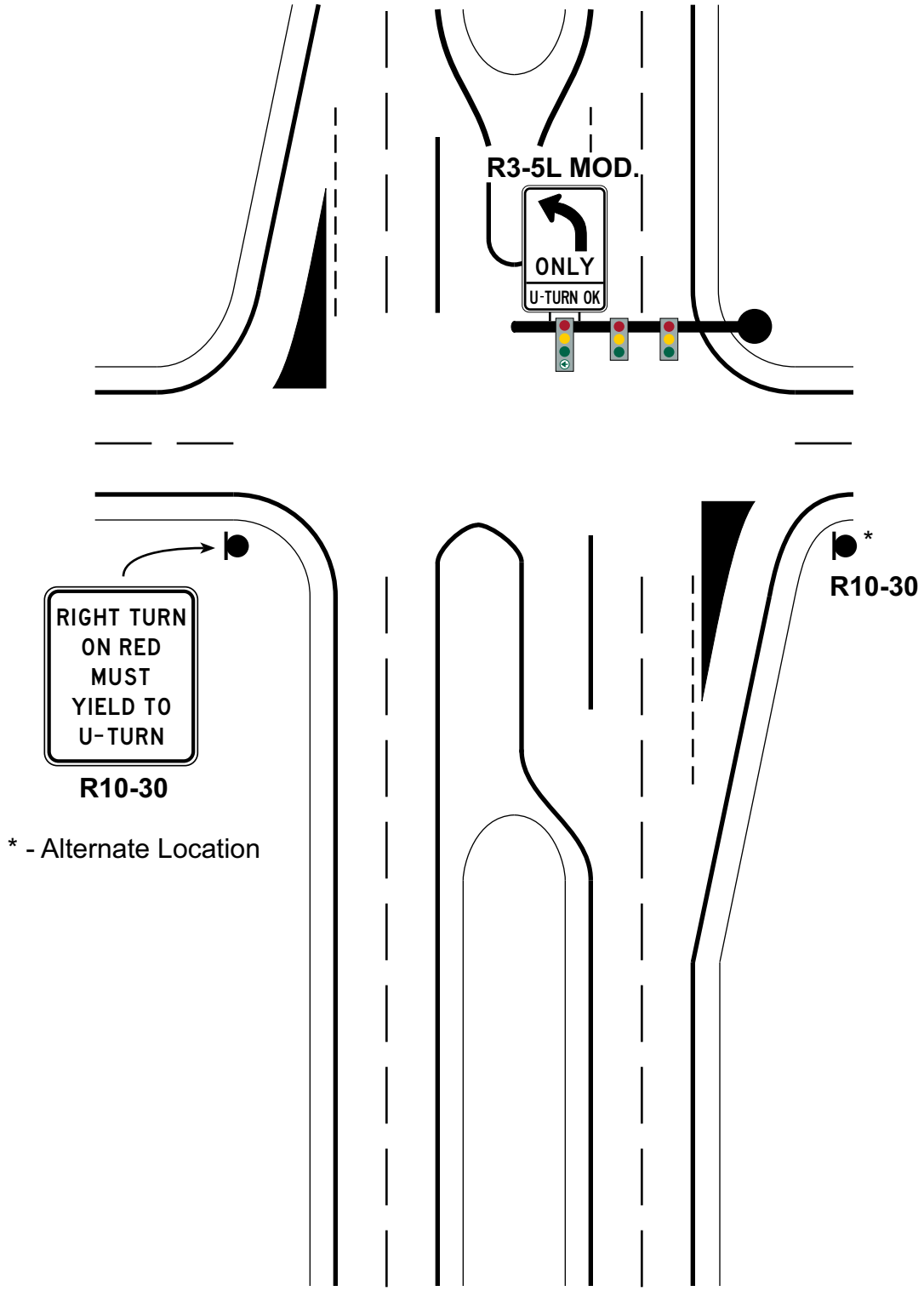
Notes:

* See Table 2-6 for advance distance for sign W3-5

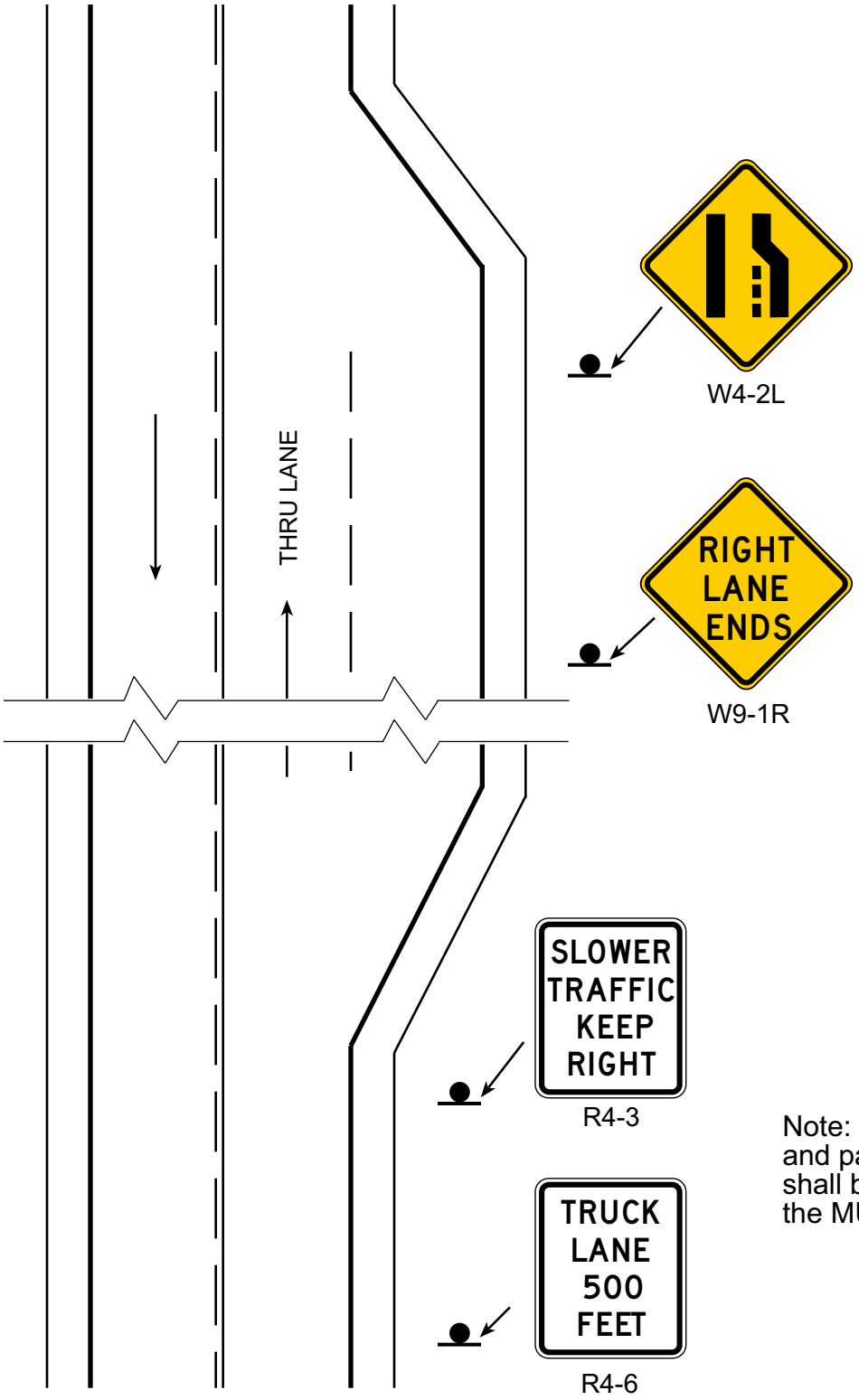
** If posted speed is greater than 60 mph, install TRUCKS 60 sign (R2-2)

For multi-lane divided highways install signs on both sides of roadway for each direction of travel

Appendix 2-2 Intersection U-Turn Signing

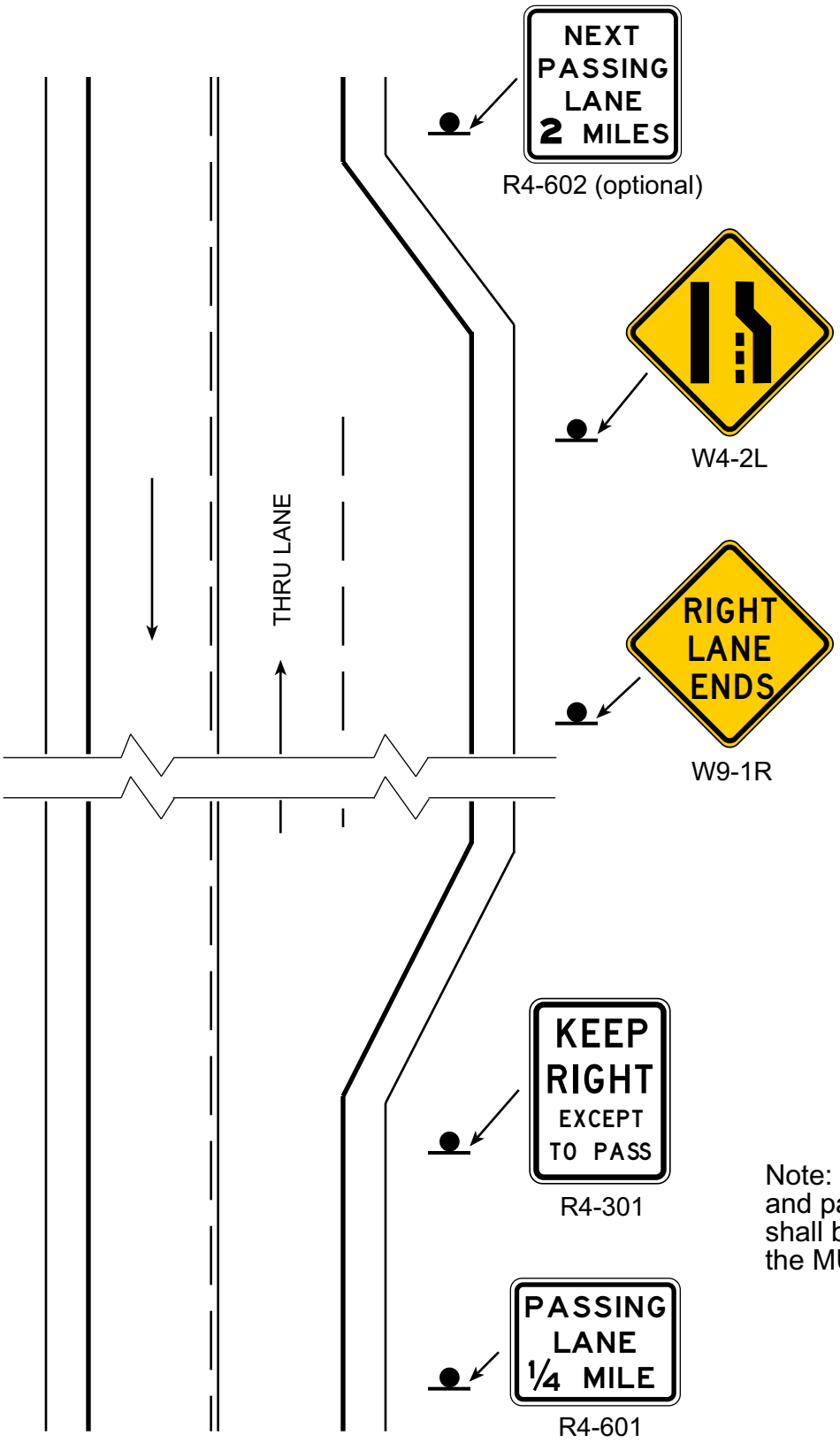


Appendix 2-3 Auxiliary Climbing Lane Signing



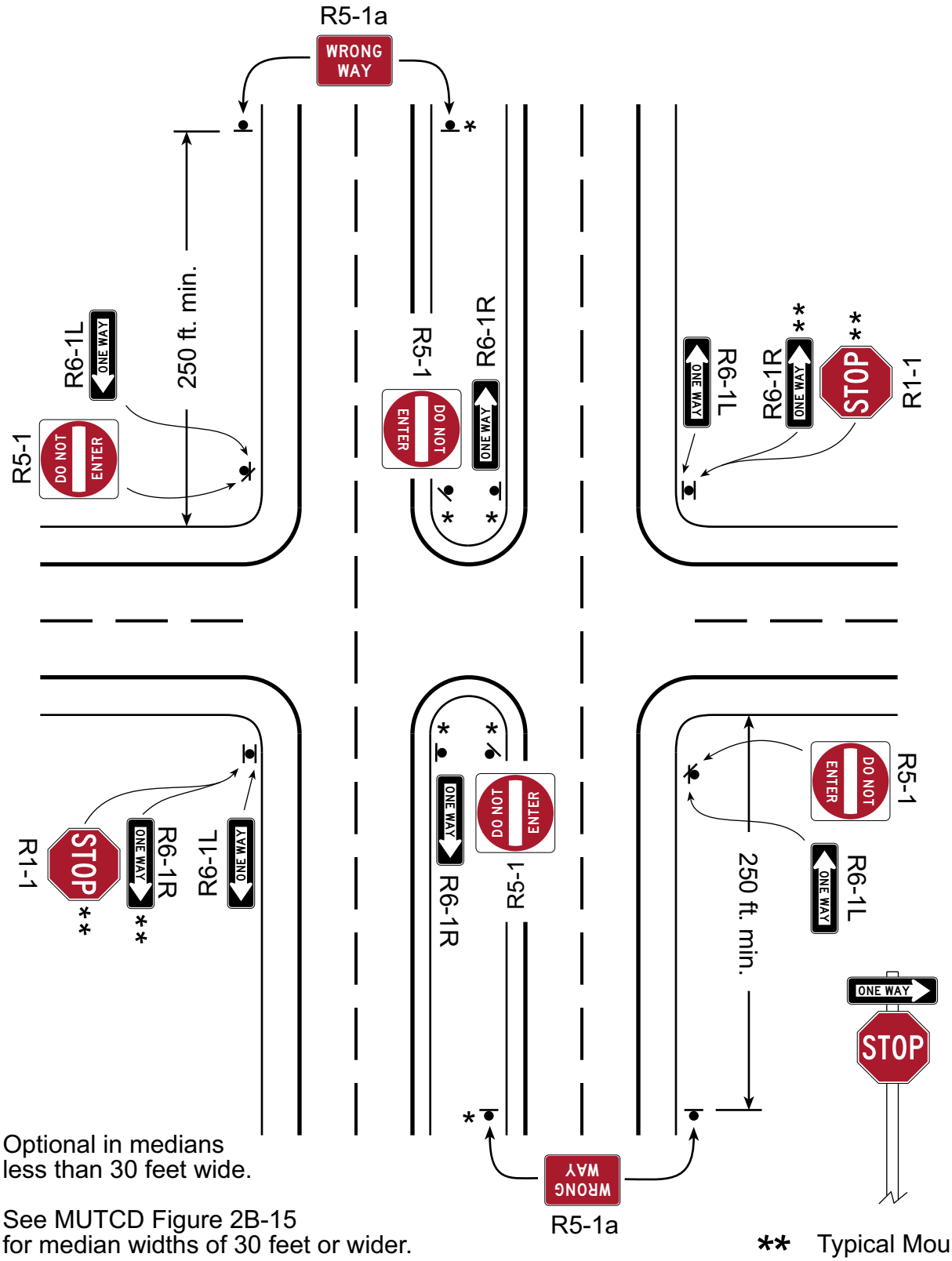
Note: Sign spacing and pavement markings shall be installed per the MUTCD

Appendix 2-4 Auxiliary Passing Lane Signing

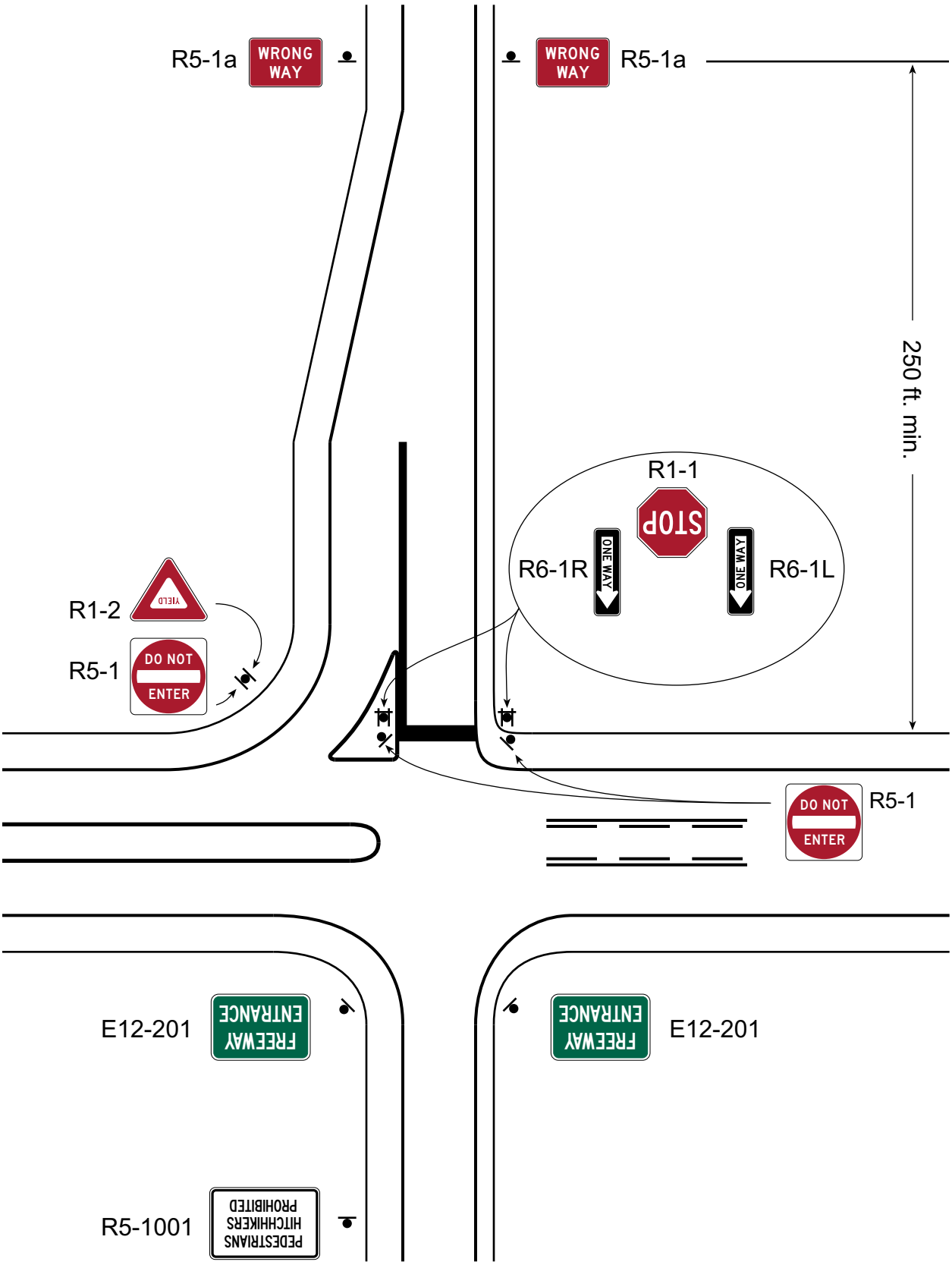


Note: Sign spacing and pavement markings shall be installed per the MUTCD

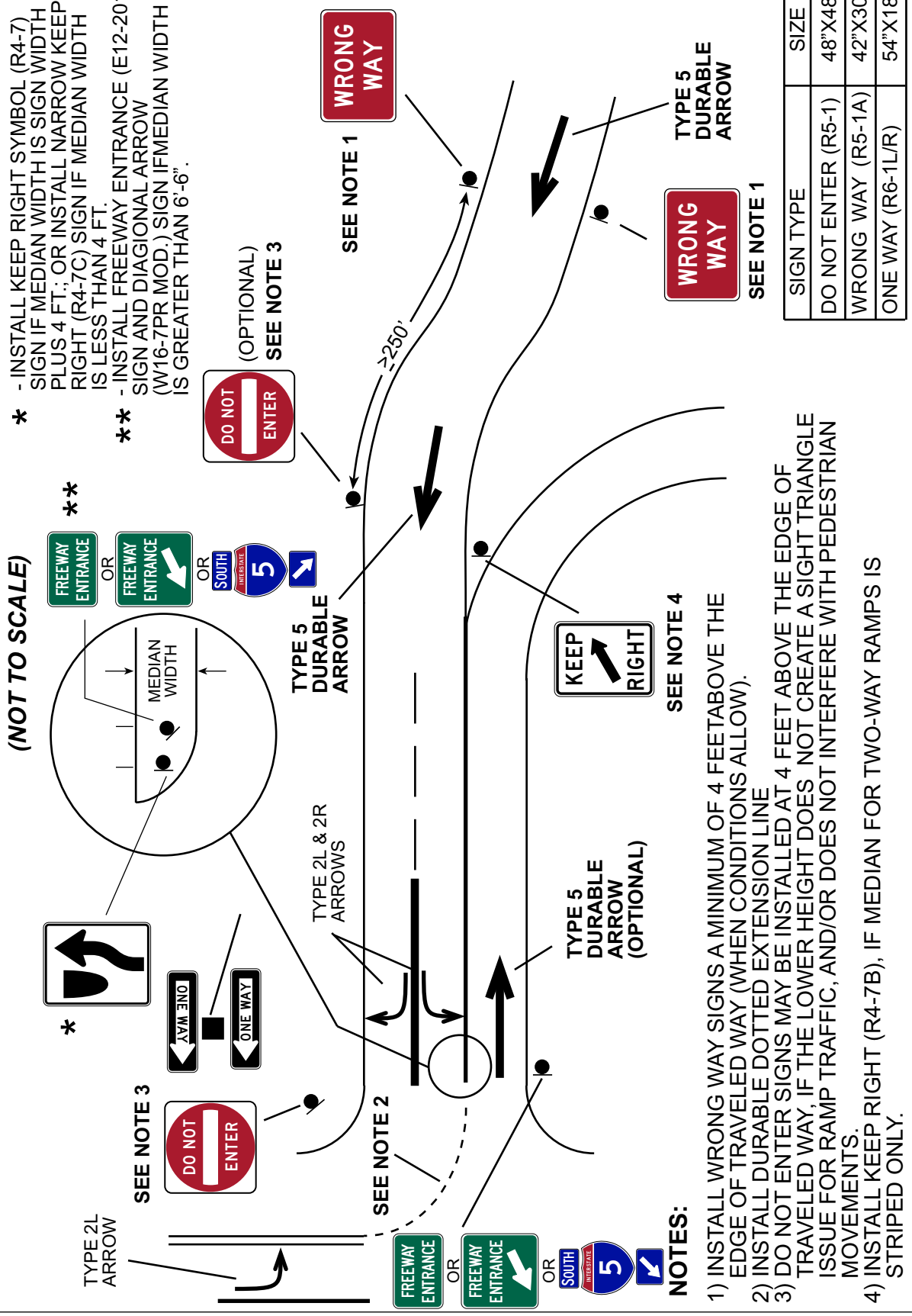
Appendix 2-5 Wrong Way Signing for At-Grade Intersections



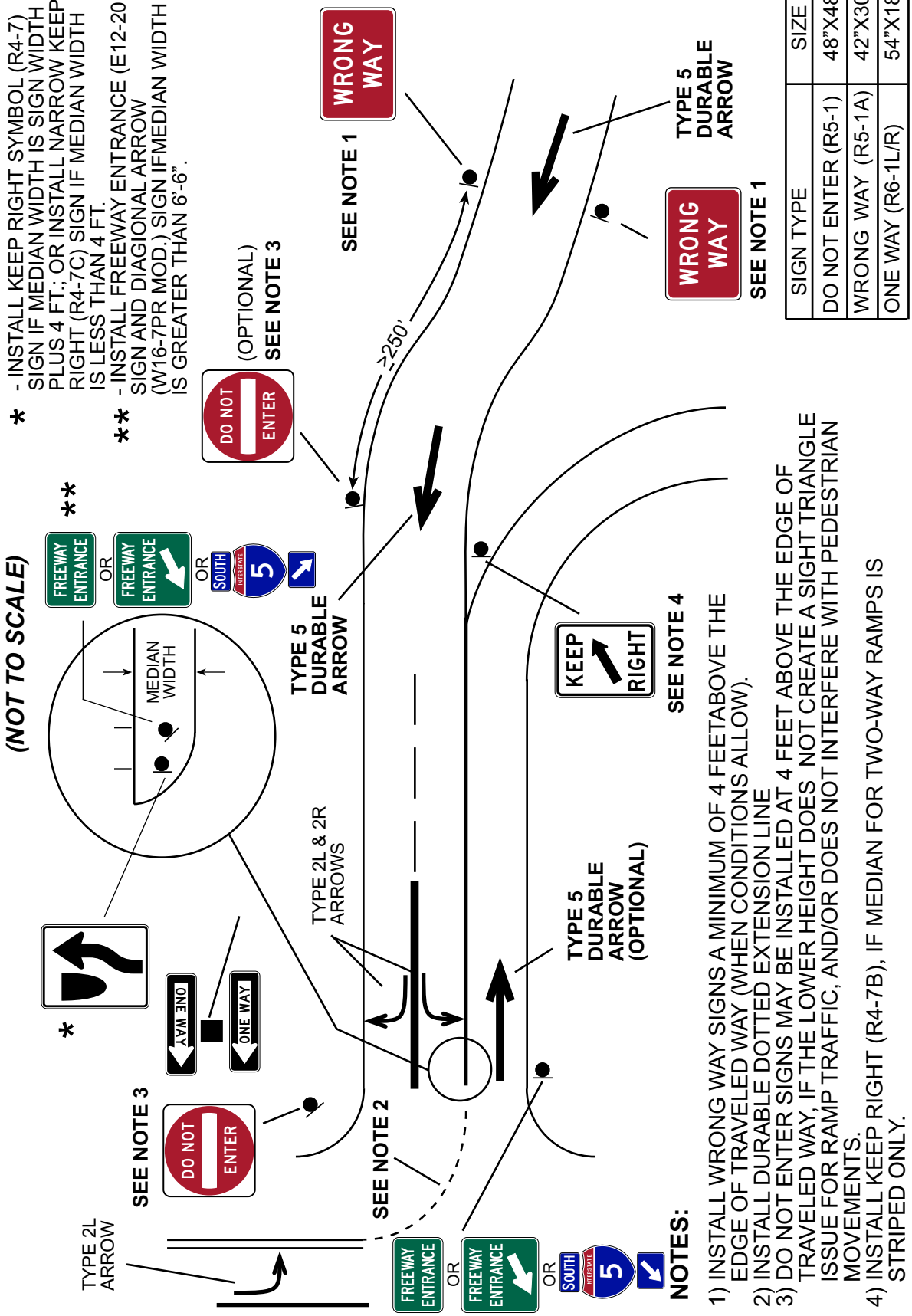
Appendix 2-6-1 Wrong Way Signing for Diamond Interchange Ramps



Appendix 2-6-2 Wrong Way Signing for Partial Cloverleaf (Barrier or Curb Separated) Interchange Ramps

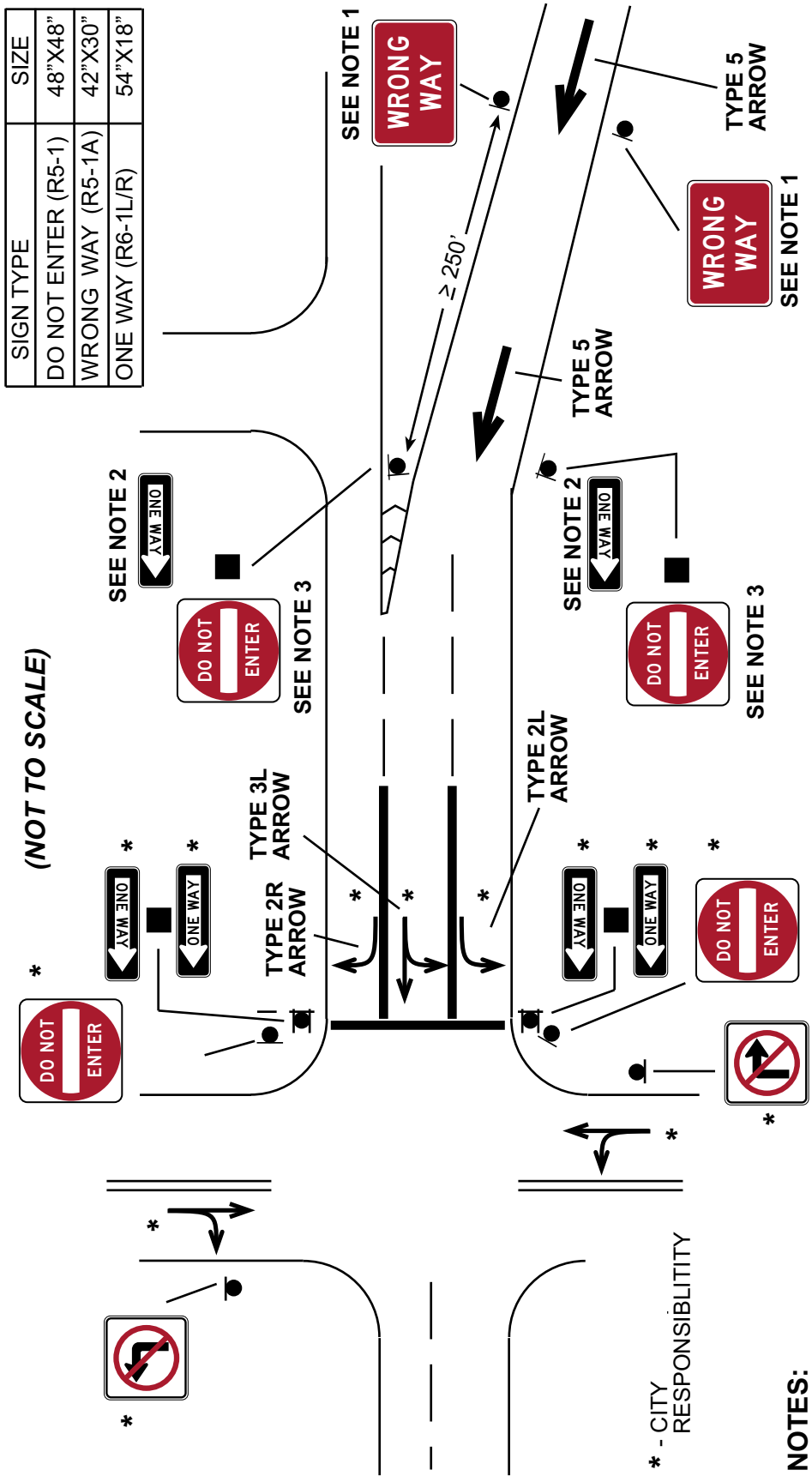


Appendix 2-6-3 Wrong Way Signing for Partial Cloverleaf (Paint Separated) Interchange Ramps

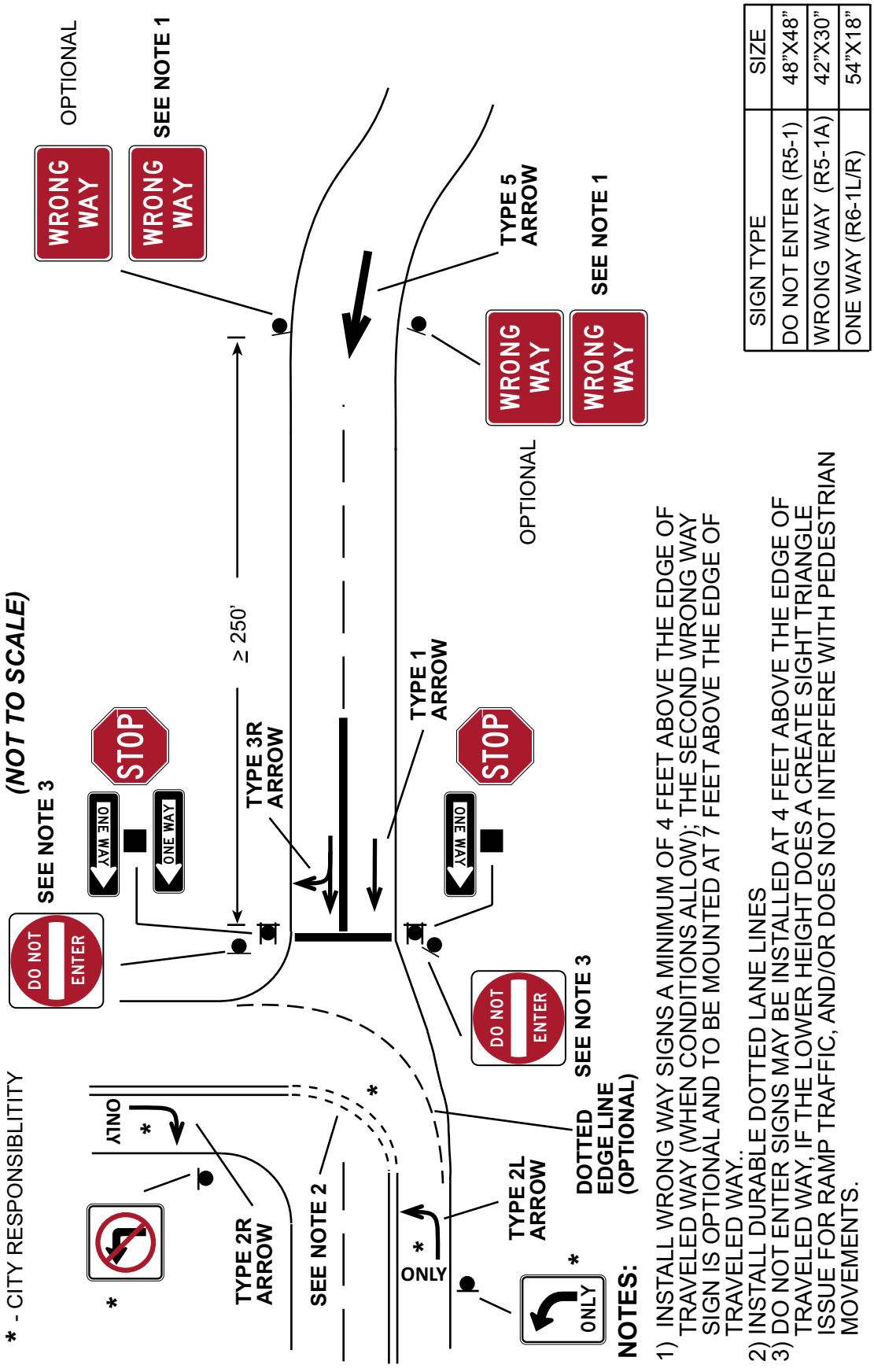


SIGN TYPE	SIZE
DO NOT ENTER (R5-1)	48"X48"
WRONG WAY (R5-1A)	42"X30"
ONE WAY (R6-1L/R)	54"X18"

Appendix 2-6-4 Wrong Way Signing for Slip Exit Ramp

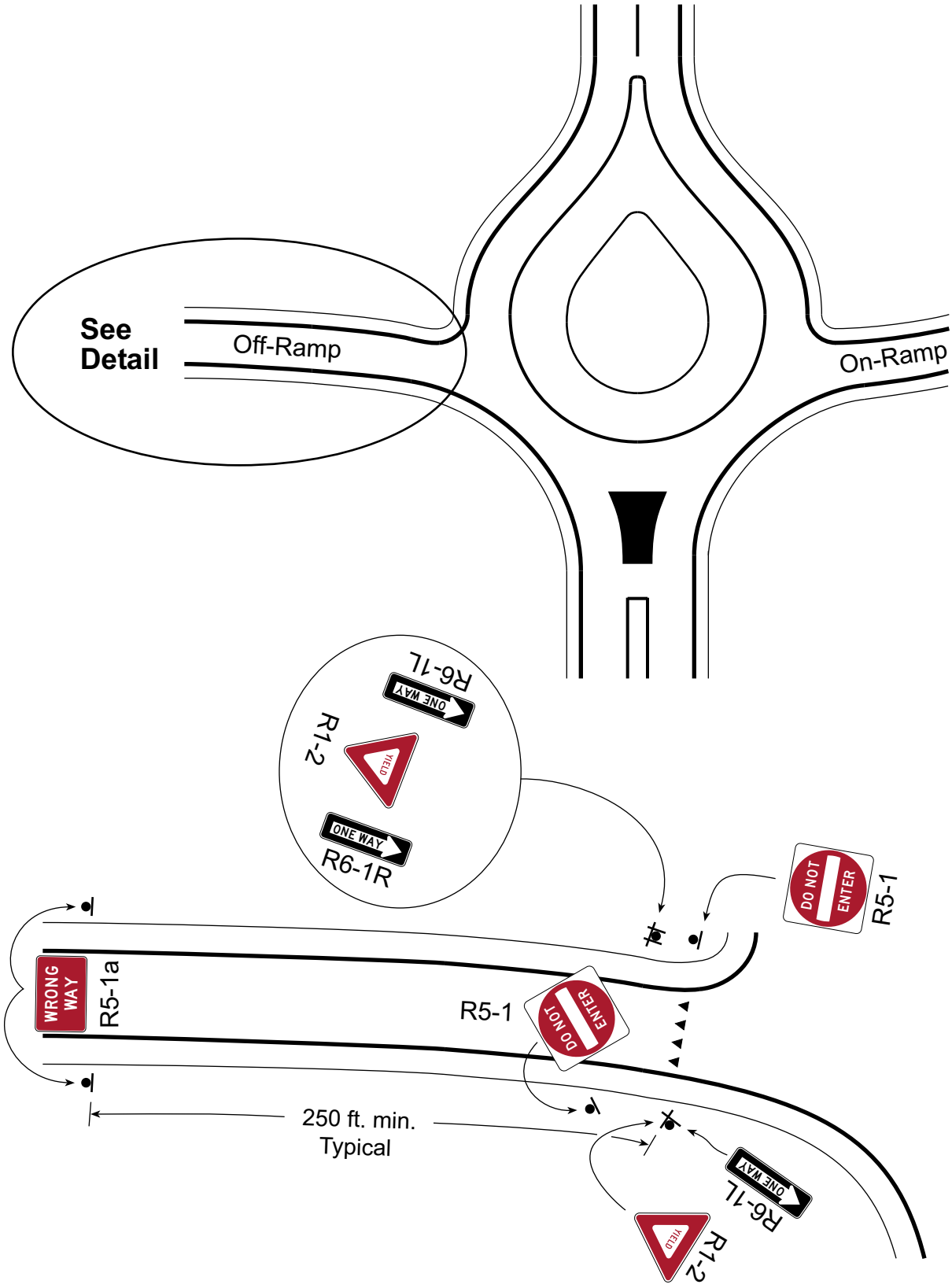


Appendix 2-6-5 Wrong Way Signing for Two-Way Traffic Across From Exit Ramp

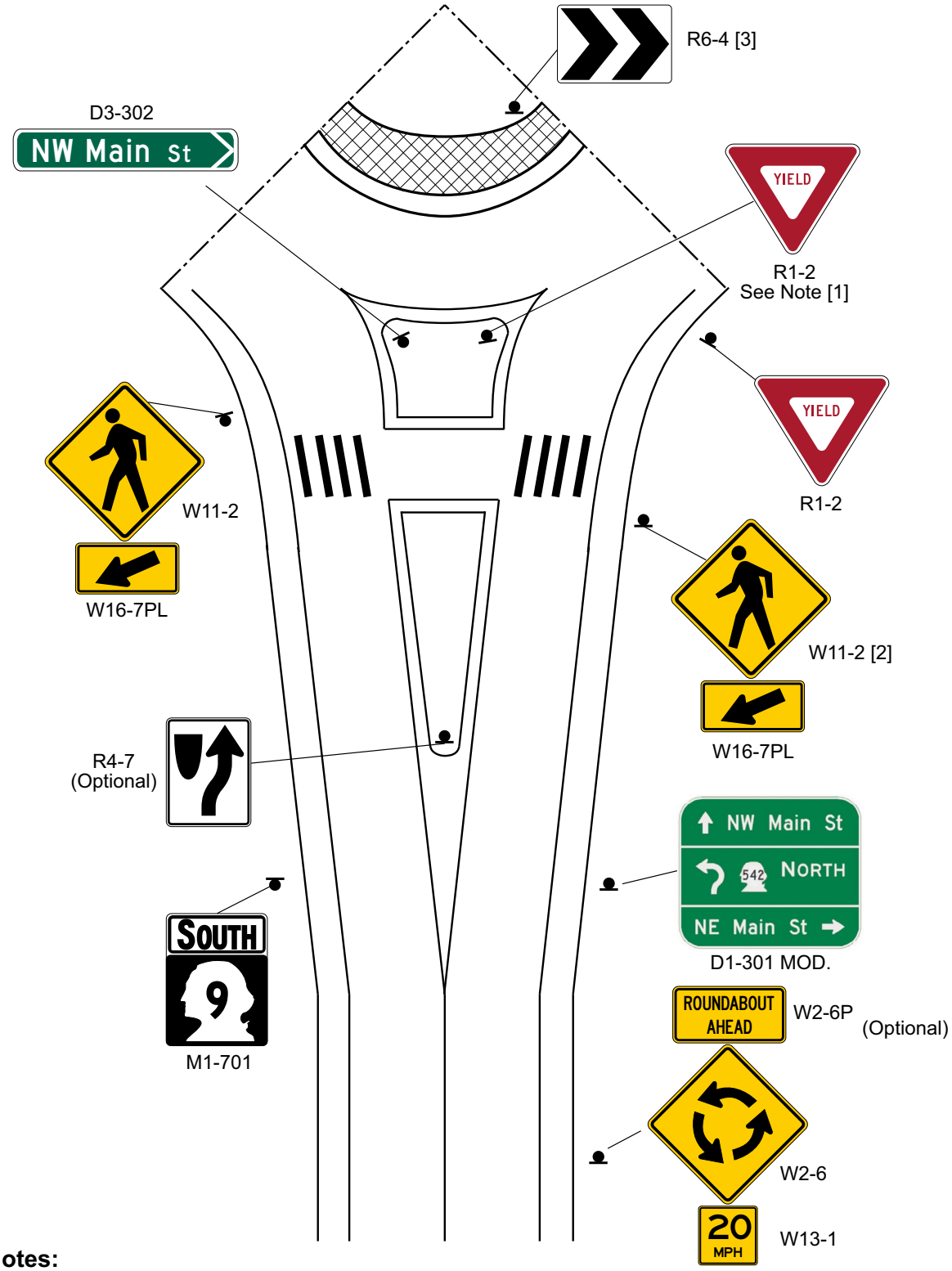


SIGN TYPE	SIZE
DO NOT ENTER (R5-1)	48”X48”
WRONG WAY (R5-1A)	42”X30”
ONE WAY (R6-1L/R)	54”X18”

Appendix 2-6-6 Wrong Way Signing for Roundabouts



Appendix 2-7 Roundabout Signing



Notes:

[1] Provide on two-lane enteries; consider adding the yield sign when the view of right-side sign may be obstructed.

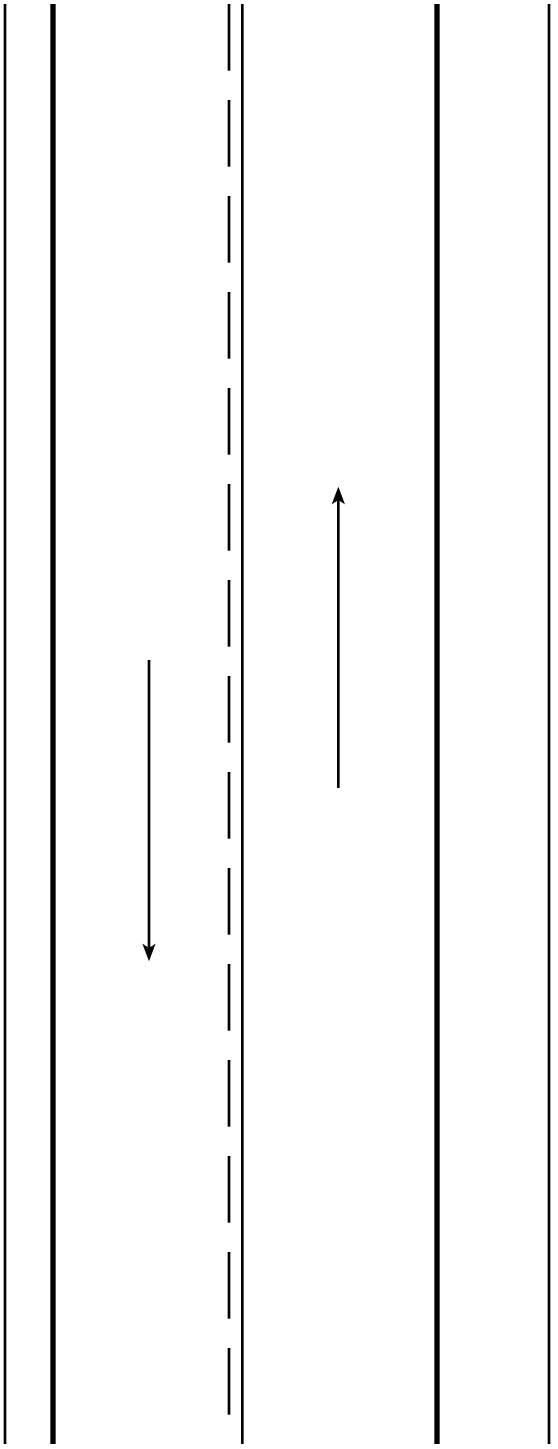
[2] Ensure the pedestrian warning sign does not obstruct view of the yield sign.

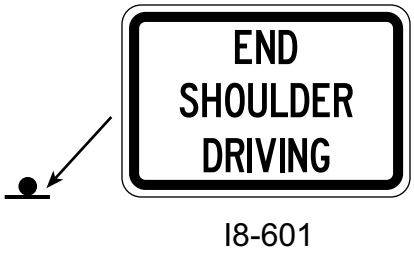
[3] See Section 2.7(11) for sign sizes.

[4] Install a R3-8 Mod. (Advance Circular Lane Control) sign for multi-lane roundabouts in advance of the (W11-2) Pedestrian Crossing sign.

Appendix 2-8 Shoulder Driving Signing

Note: Sign spacing and pavement markings shall be installed per the MUTCD





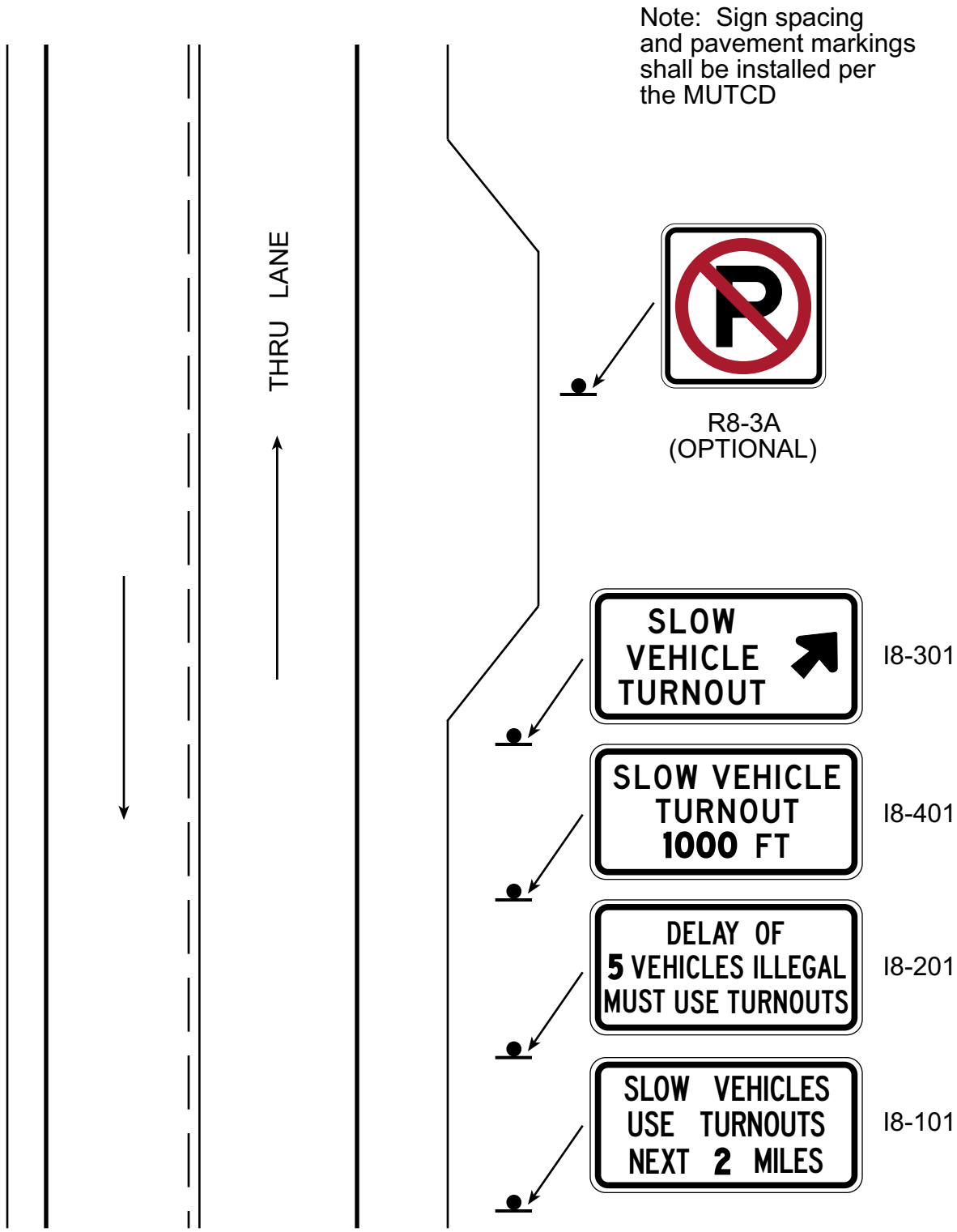
I8-601

I8-501

I7-702

I8-701

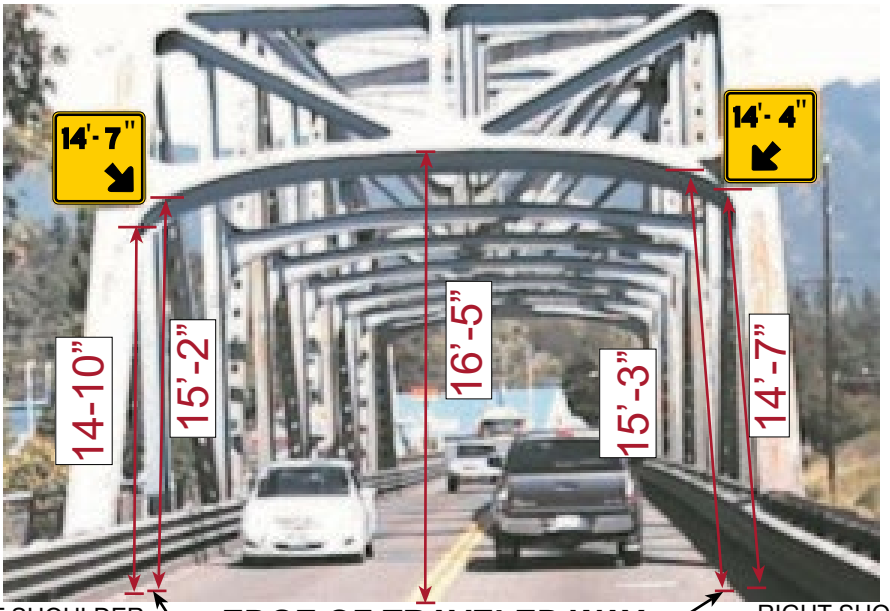
Appendix 2-9 Slow Moving Vehicle Turn-Out Signing



Appendix 2-10-1 Low Clearance Signing

Through Truss Bridge

Two Lane Highway - Vertical Clearance between 14'-3" and 15'-3" over Traveled Lanes
Shoulder Widths 2' Feet or Less Shoulders
(Looking East)

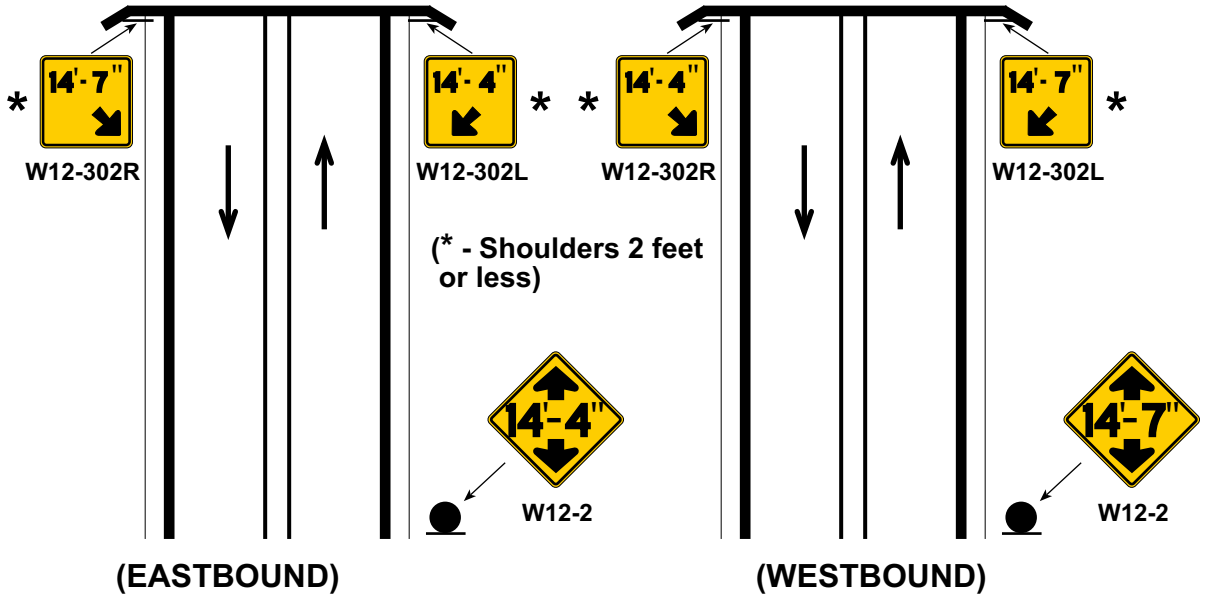


Notes:

1.

Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

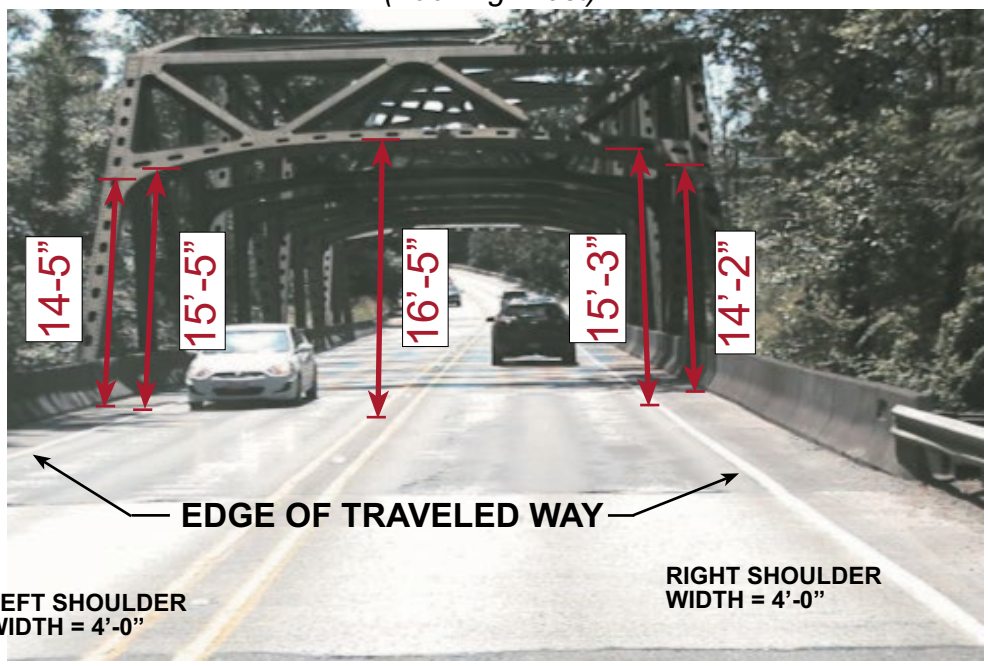
2. **See MUTCD Table 2C-4 for the placement of W12-2 signs.**



Appendix 2-10-2 Low Clearance Signing

Through Truss Bridge

Two Lane Highway - Vertical Clearance between 14'-3" and 15'-3" over Traveled Lanes
Shoulders Greater than Two Feet
(Looking West)

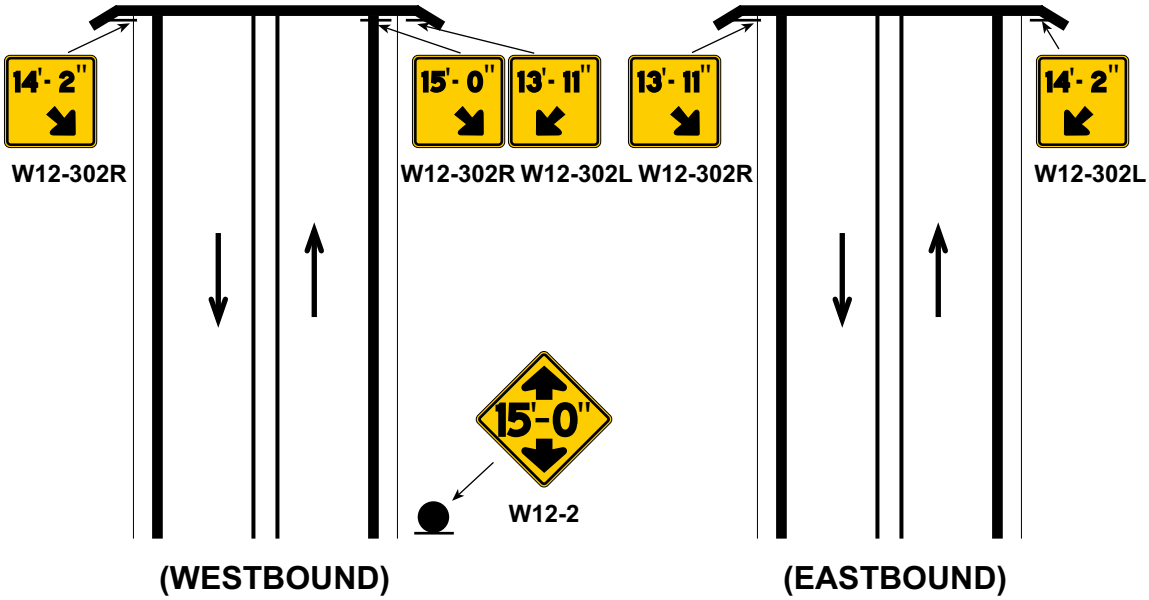


Notes:

1.

Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

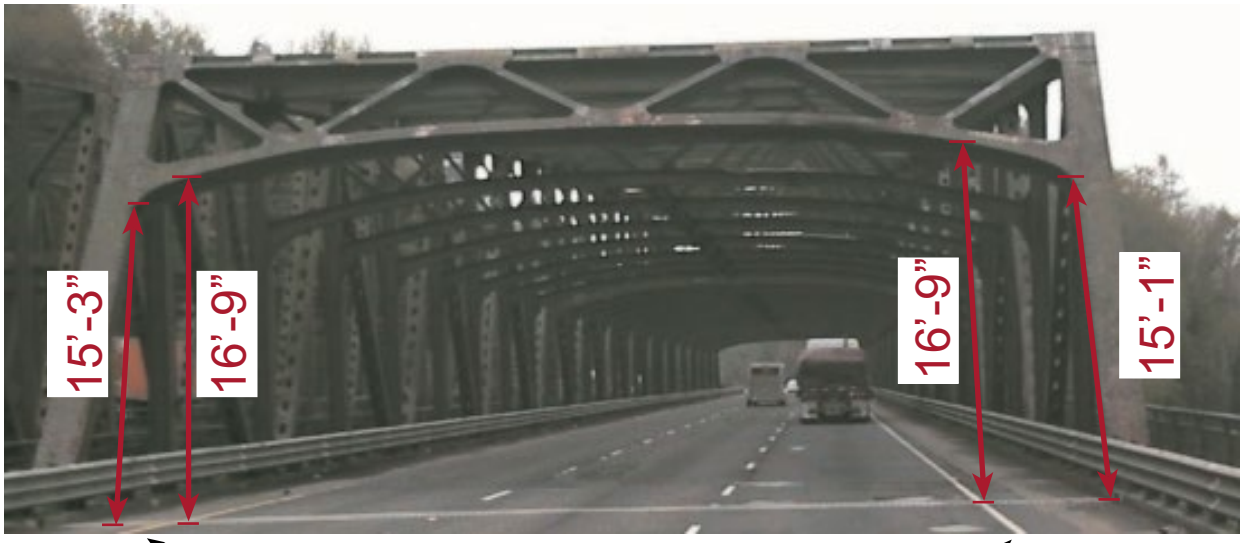
2. See MUTCD Table 2C-4 for the placement of W12-2 signs.



Appendix 2-10-3 Low Clearance Signing

Through Truss Bridge

Multi-Lane Highway - 15'-3" or less Vertical Clearance over Shoulders
Shoulders Widths Greater than Two Feet
(Looking South)



LEFT SHOULDER WIDTH = 5'- 6"

EDGE OF TRAVELED WAY

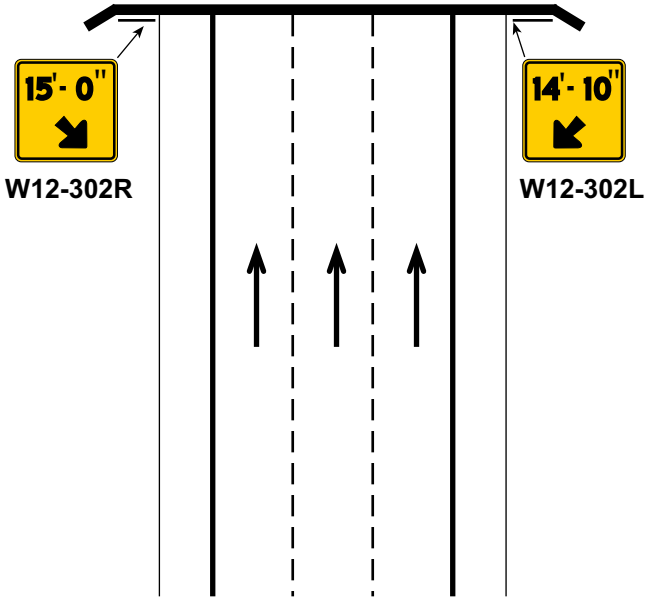
RIGHT SHOULDER WIDTH = 5'- 8"

Notes:

1.

Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

2. See MUTCD Table 2C-4 for the placement of W12-2 signs.

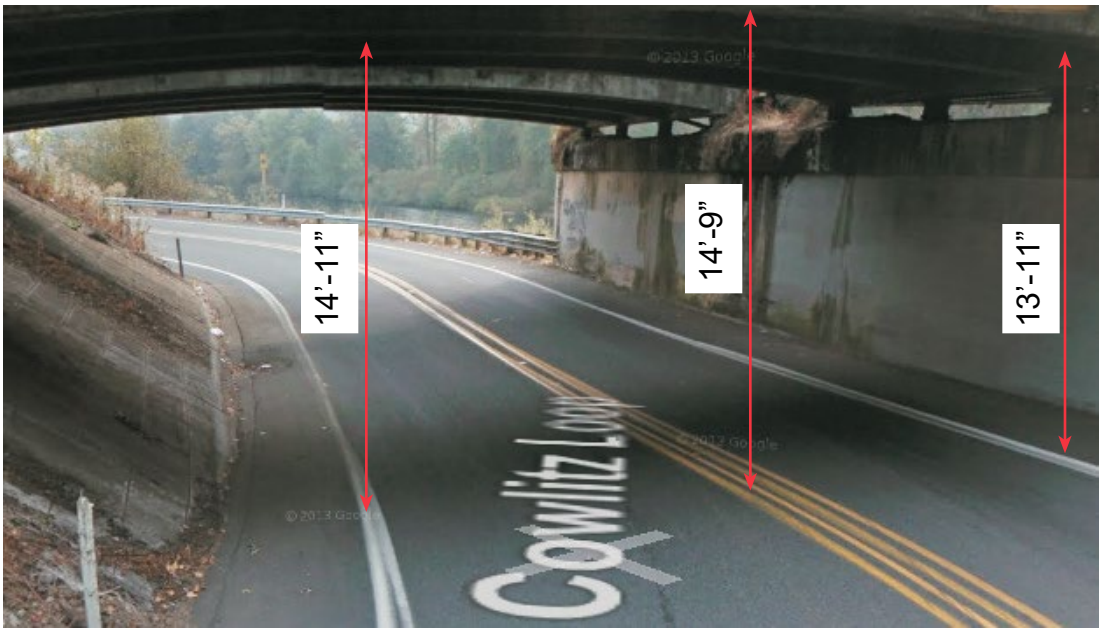


W12-302R W12-302L

Appendix 2-10-4 Low Clearance Signing

Non-Through Truss Bridge

Vertical Clearance 14'-3" or less over Traveled Lanes
(Looking East)

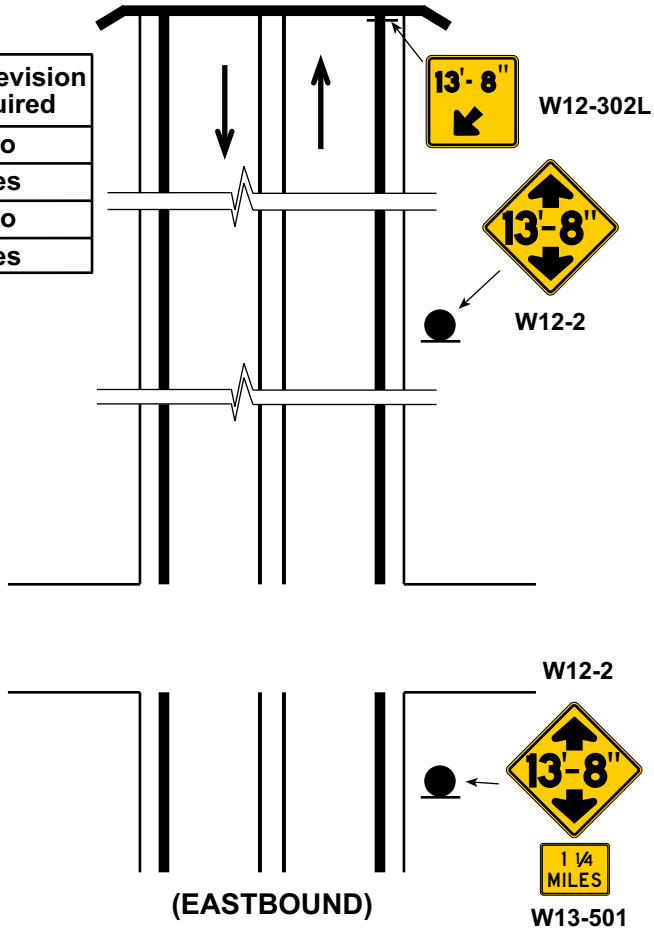


Notes:

1.

Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

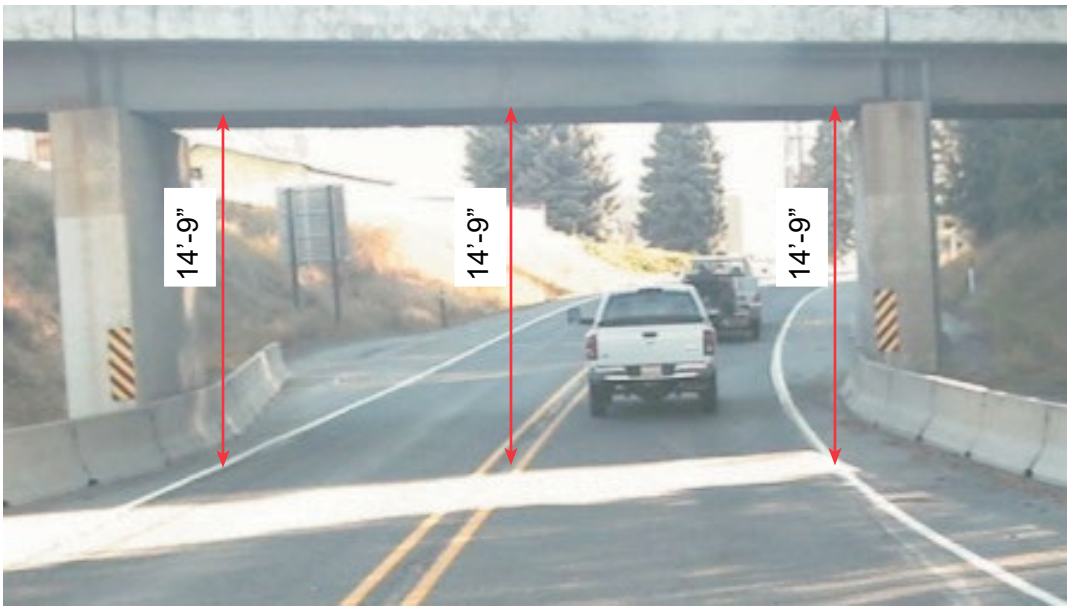
2. **See MUTCD Table 2C-4 for the placement of W12-2 signs.**



Appendix 2-10-5 Low Clearance Signing

Non-Through Truss Bridge

Vertical Clearance between 14'-3" and 15'-3" over Traveled Lanes
(Looking North)

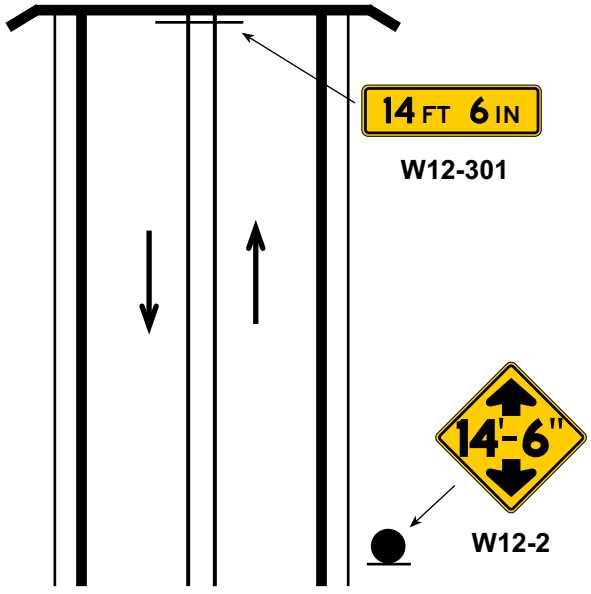


Notes:

1.

Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

2. **See MUTCD Table 2C-4 for the placement of W12-2 signs.**

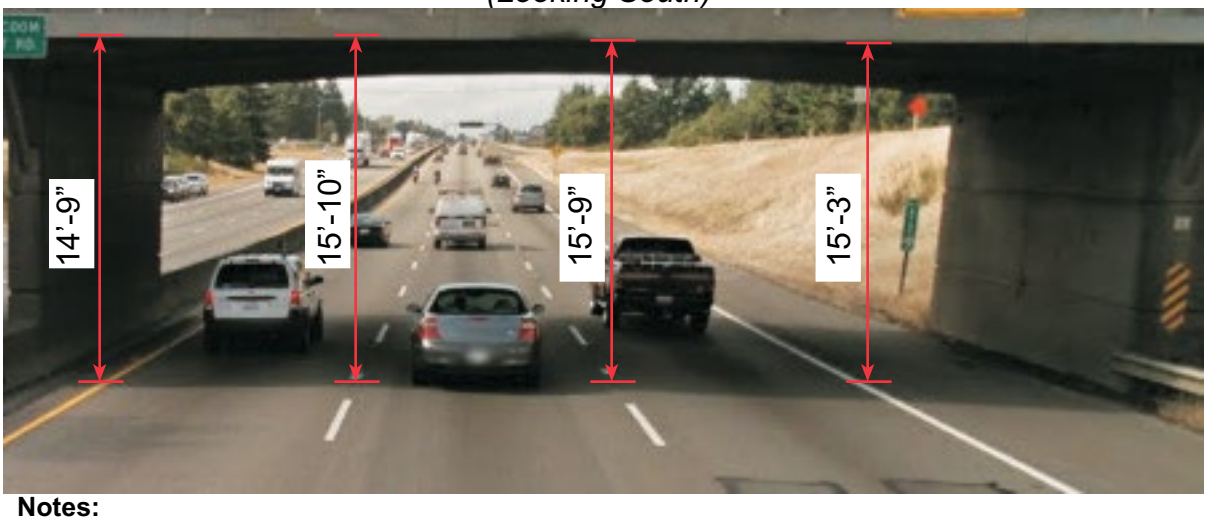


(NORTHBOUND)

Appendix 2-10-6 Low Clearance Signing

Non-Through Truss Bridge

Multi Lane Highway - Vertical Clearance between 14'-3" and 15'-3" over Traveled Lanes
Varied Heights over Traveled Lanes
(Looking South)

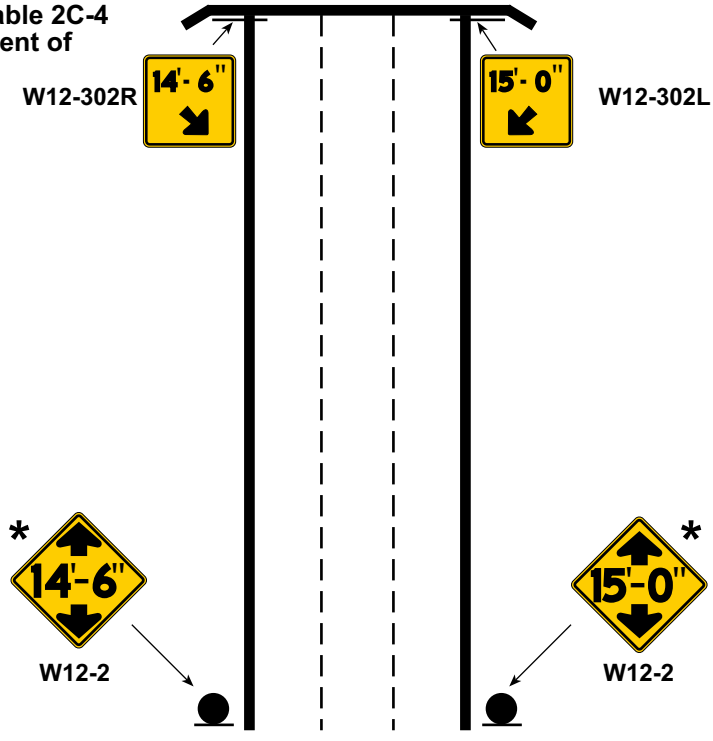


Notes:

1.

Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

2. See MUTCD Table 2C-4 for the placement of W12-2 signs.

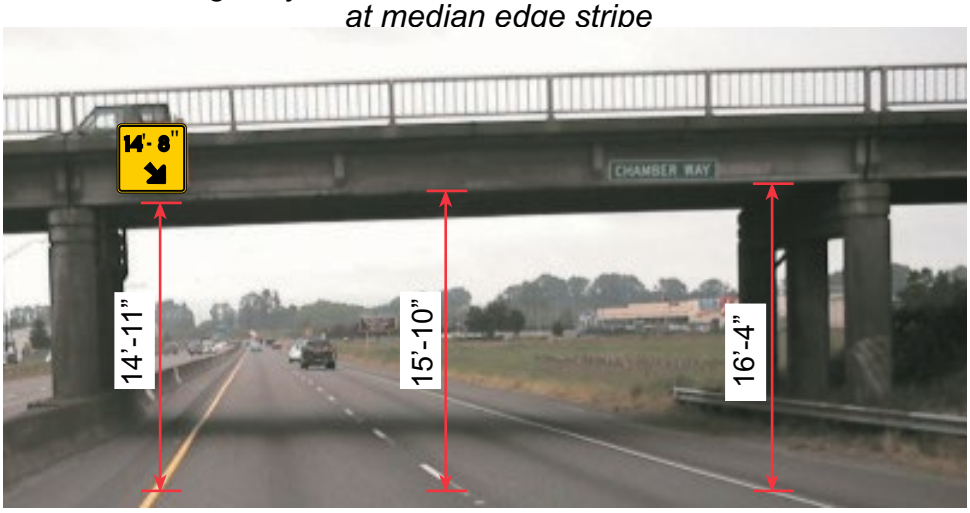


* - When applicable install the W12-2 signs in advance of an existing exit ramp, per Condition "A" in MUTCD Table 2C-4.

Appendix 2-10-7 Low Clearance Signing

Non-Through Truss Bridge

Multi Lane Highway - Vertical Clearance between 14'-3" and 15'-3", at median edge stripe

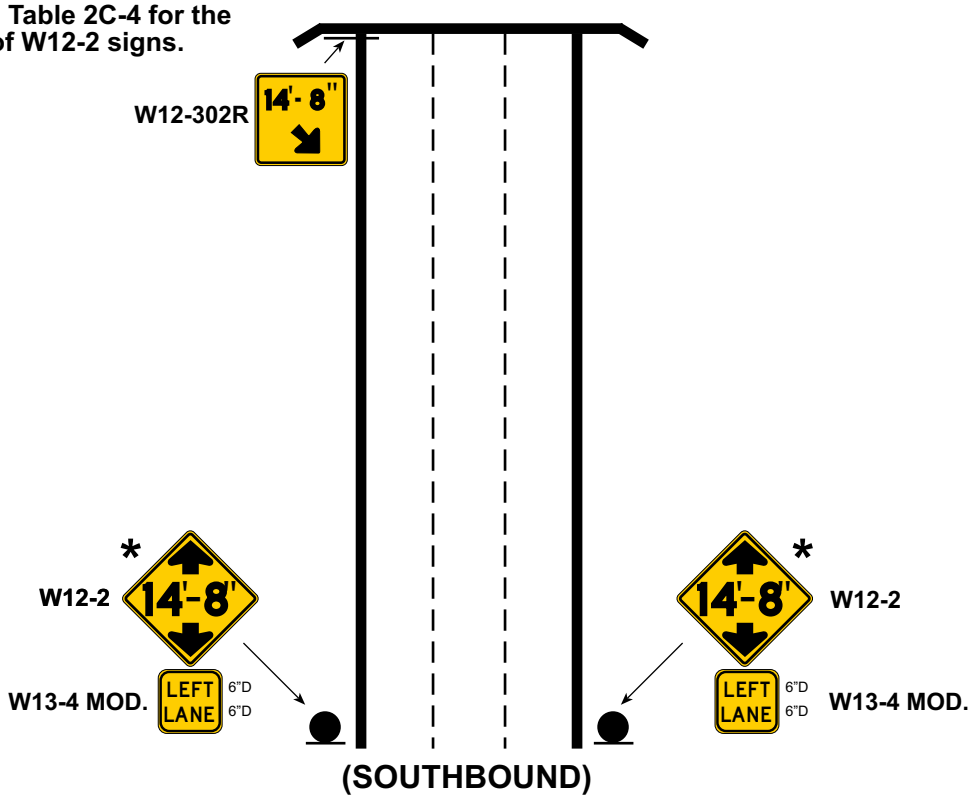


Notes:

1.

Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

2. See MUTCD Table 2C-4 for the placement of W12-2 signs.

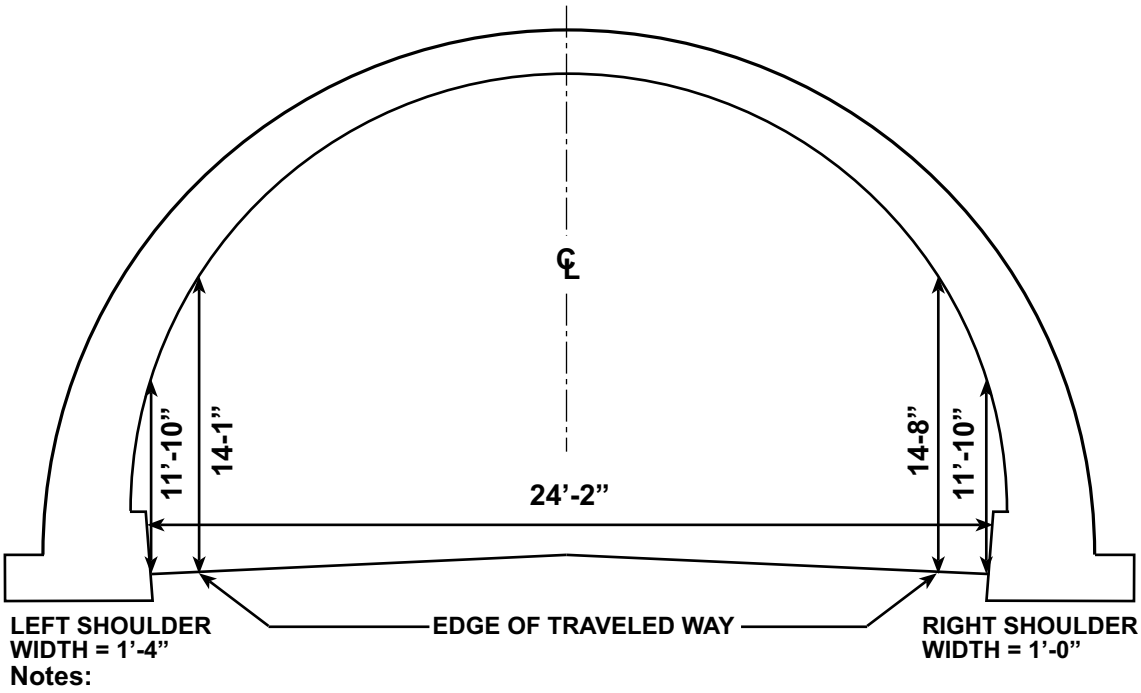


* - When applicable install the W12-2 signs in advance of an existing exit ramp, per Condition "A" in MUTCD Table 2C-4.

Appendix 2-10-8 Low Clearance Signing

Arched Tunnel

Two Way Traffic - Vertical Clearance between 14’-3” and 15’-3” over Traveled Lanes

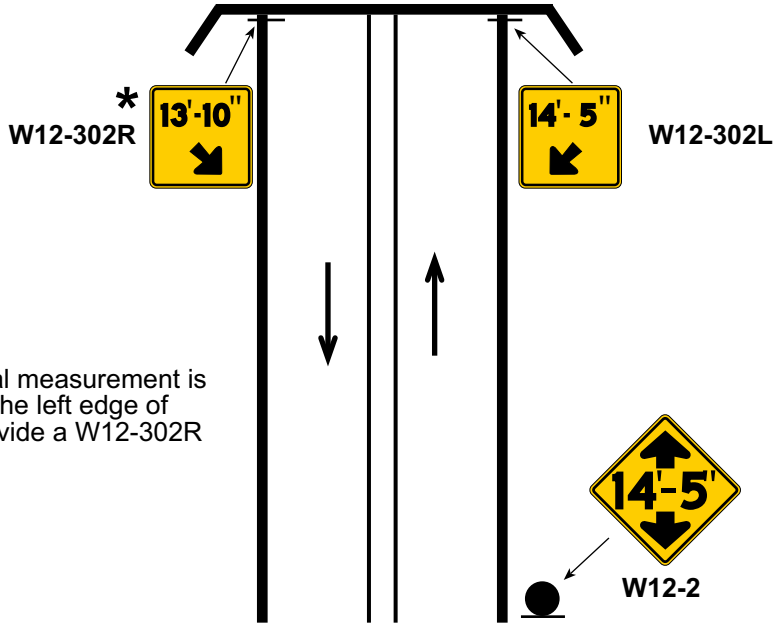


Notes:

1.

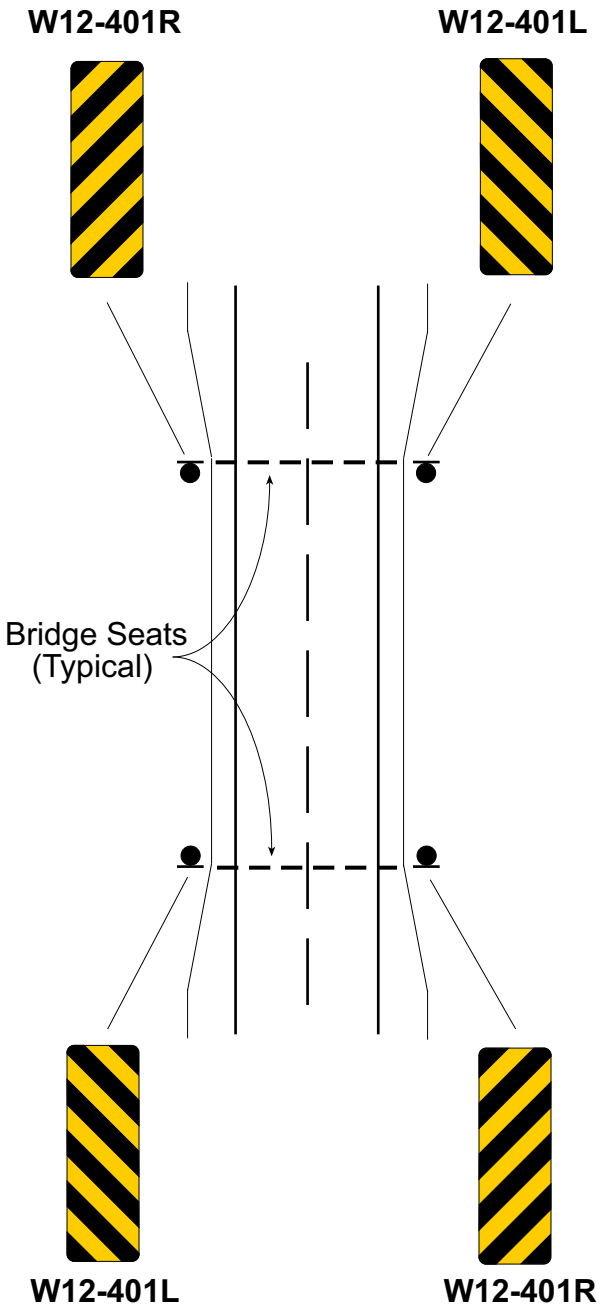
Actual Measured Opening	Measured Height Difference	Sign Revision Required
Increases	≤ 2 inches	No
Increases	> 2 inches	Yes
Decreases	≤ 1 inch	No
Decreases	> 1 inch	Yes

2. **See MUTCD Table 2C-4 for the placement of W12-2 signs.**



* - When the actual measurement is 15’-3” or less at the left edge of traveled way provide a W12-302R

Appendix 2-11-1 Lateral Clearance Markers-Objects within Outside Shoulder



Notes:

Lateral Clearance markers are used to mark obstructions within or adjacent to the roadway. (MUTCD, Section 2C.64)

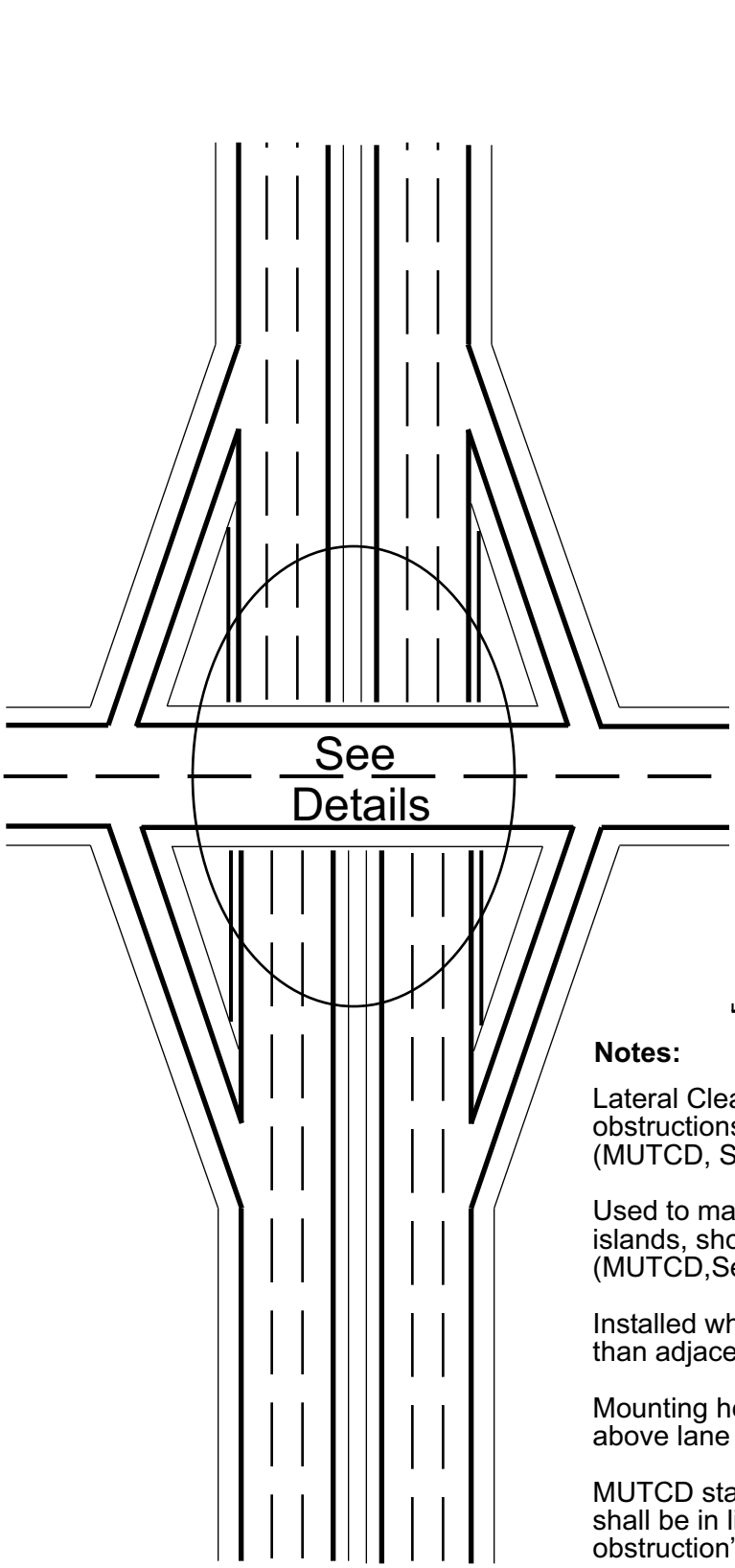
Used to mark bridge piers, narrow shoulders, islands, shoulder drop-offs, barriers, etc. (MUTCD,Section 2C.65)

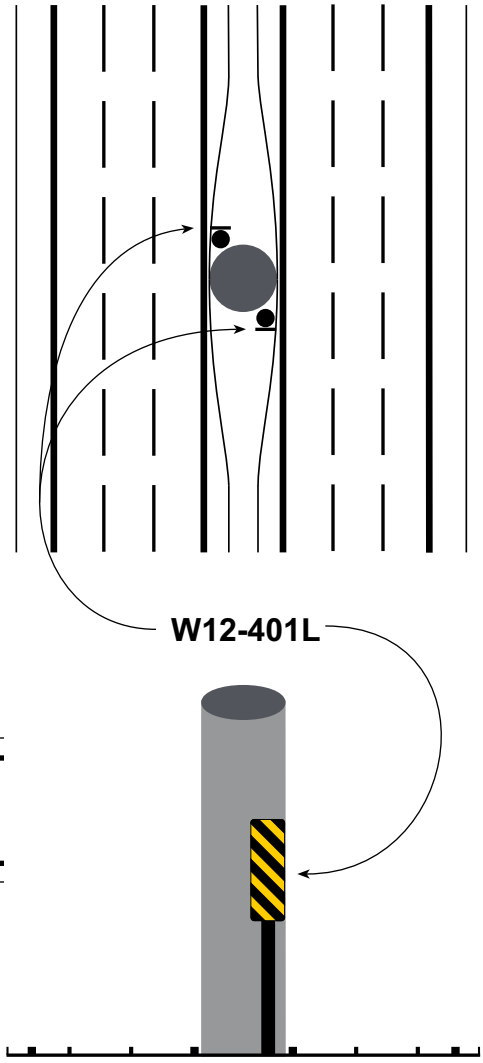
Installed when shoulder width is narrower than adjacent roadway shoulder sections.

Mounting height to bottom of marker is 4 feet above lane edge. (MUTCD, Section 2C.63)

MUTCD states “the inside edge of the marker shall be in line with the inner edge of the obstruction”. (MUTCD, Section 2C.65)

Appendix 2-11-2 Lateral Clearance Markers – Objects Within Inside Shoulder





Notes:

Lateral Clearance markers are used to mark obstructions within or adjacent to the roadway. (MUTCD, Section 2C.64)

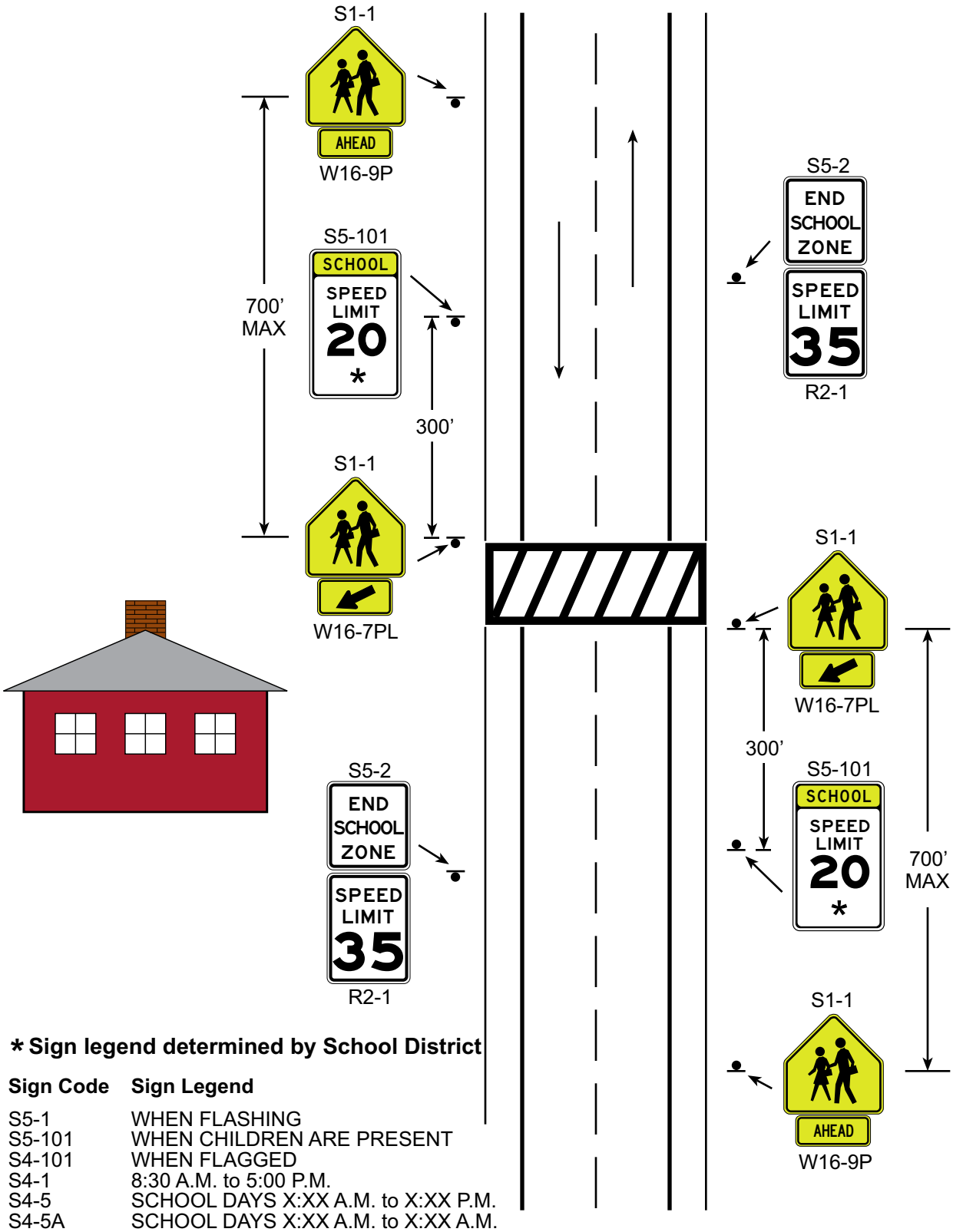
Used to mark bridge piers, narrow shoulders, islands, shoulder drop-offs, barriers, etc. (MUTCD,Section 2C.65)

Installed when shoulder width is narrower than adjacent roadway shoulder sections.

Mounting height to bottom of marker is 4 feet above lane edge. (MUTCD, Section 2C.63)

MUTCD states “the inside edge of the marker shall be in line with the inner edge of the obstruction”. (MUTCD, Section 2C.65)

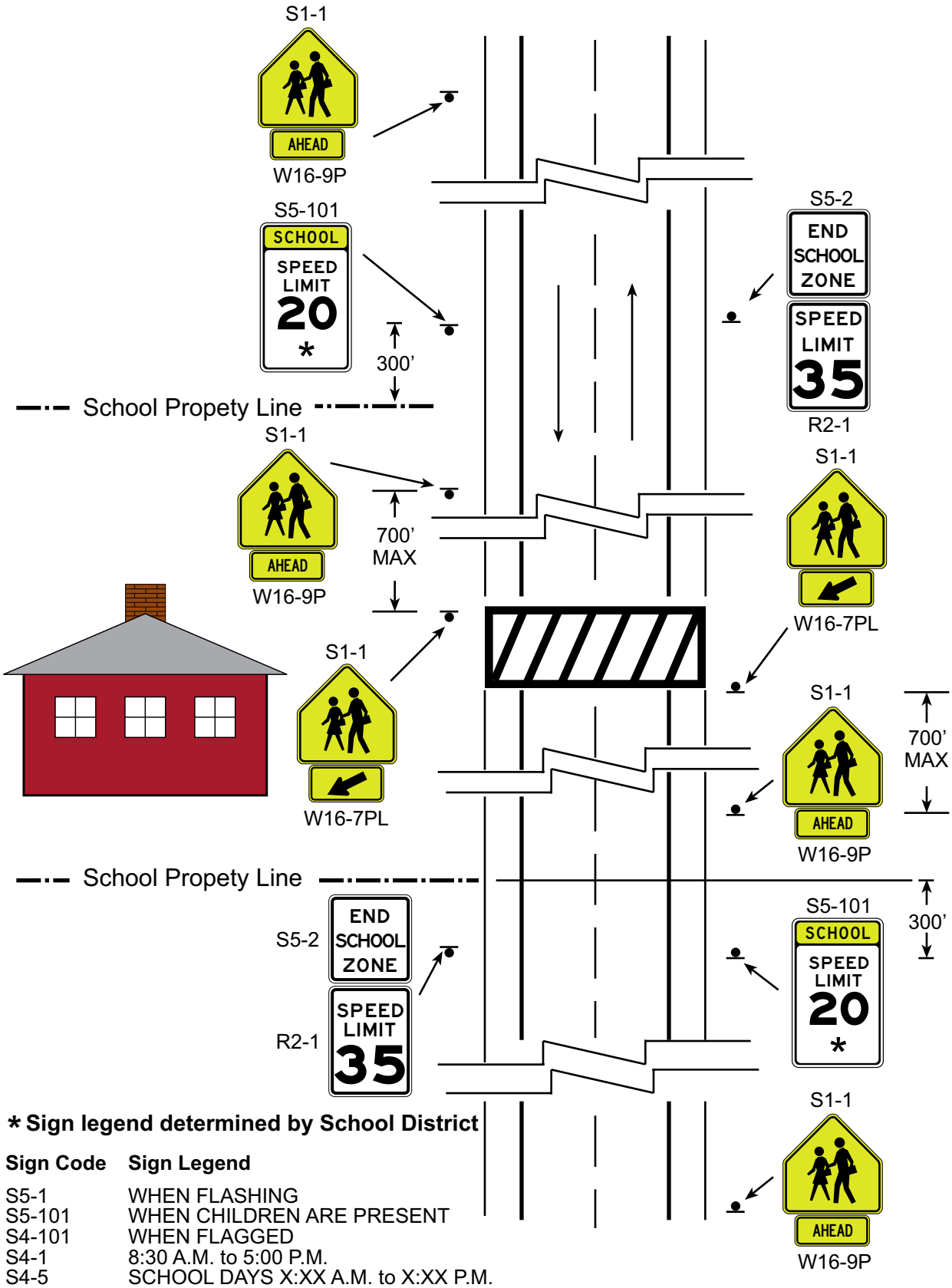
Appendix 2-12-1 Reduced School Speed Zone Signing at School Crosswalks



*** Sign legend determined by School District**

Sign Code	Sign Legend
S5-1	WHEN FLASHING
S5-101	WHEN CHILDREN ARE PRESENT
S4-101	WHEN FLAGGED
S4-1	8:30 A.M. to 5:00 P.M.
S4-5	SCHOOL DAYS X:XX A.M. to X:XX P.M.
S4-5A	SCHOOL DAYS X:XX A.M. to X:XX A.M. SCHOOL DAYS X:XX P.M. to X:XX P.M.

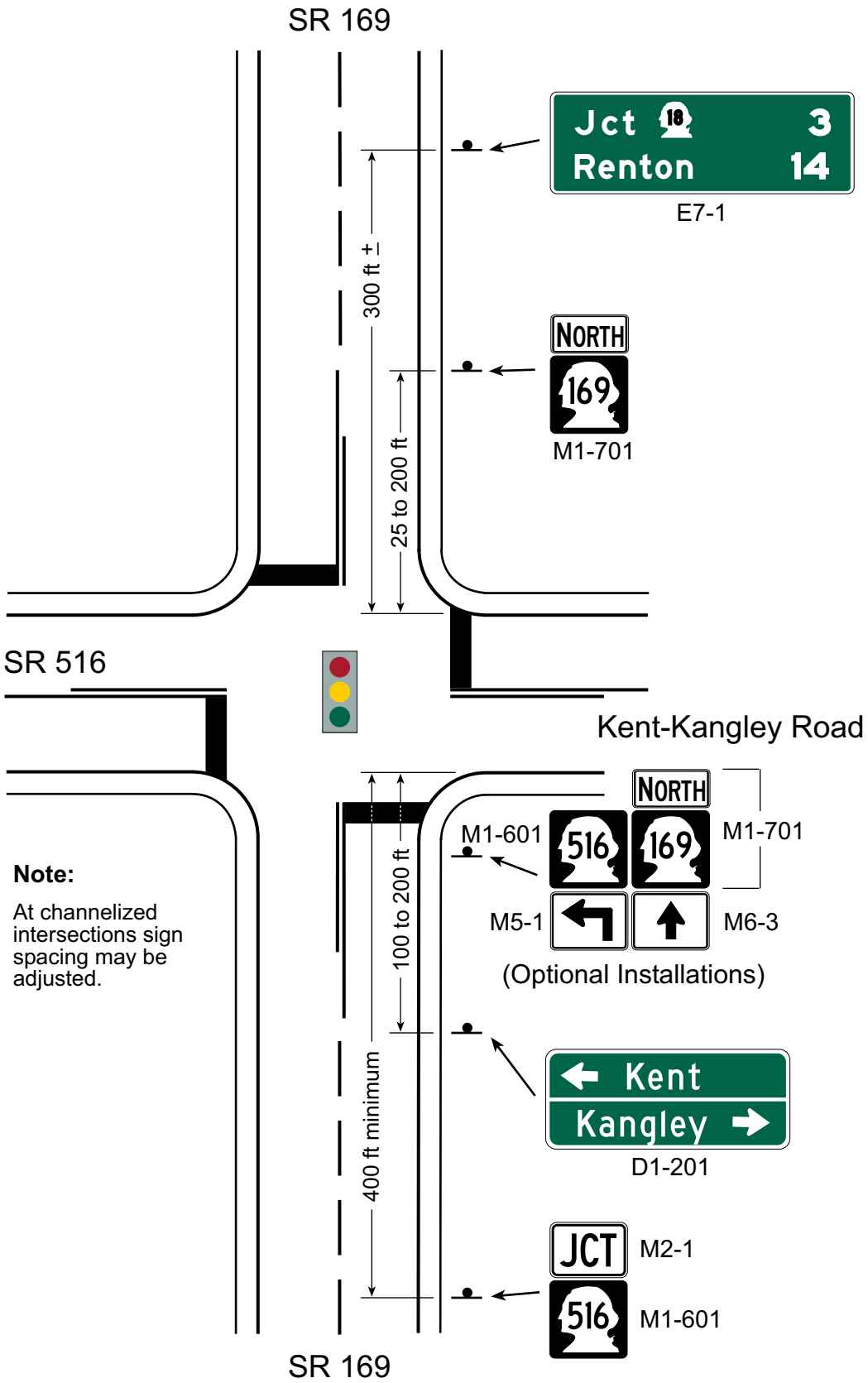
Appendix 2-12-2 Reduced School Speed Zone Signing at School Property Line



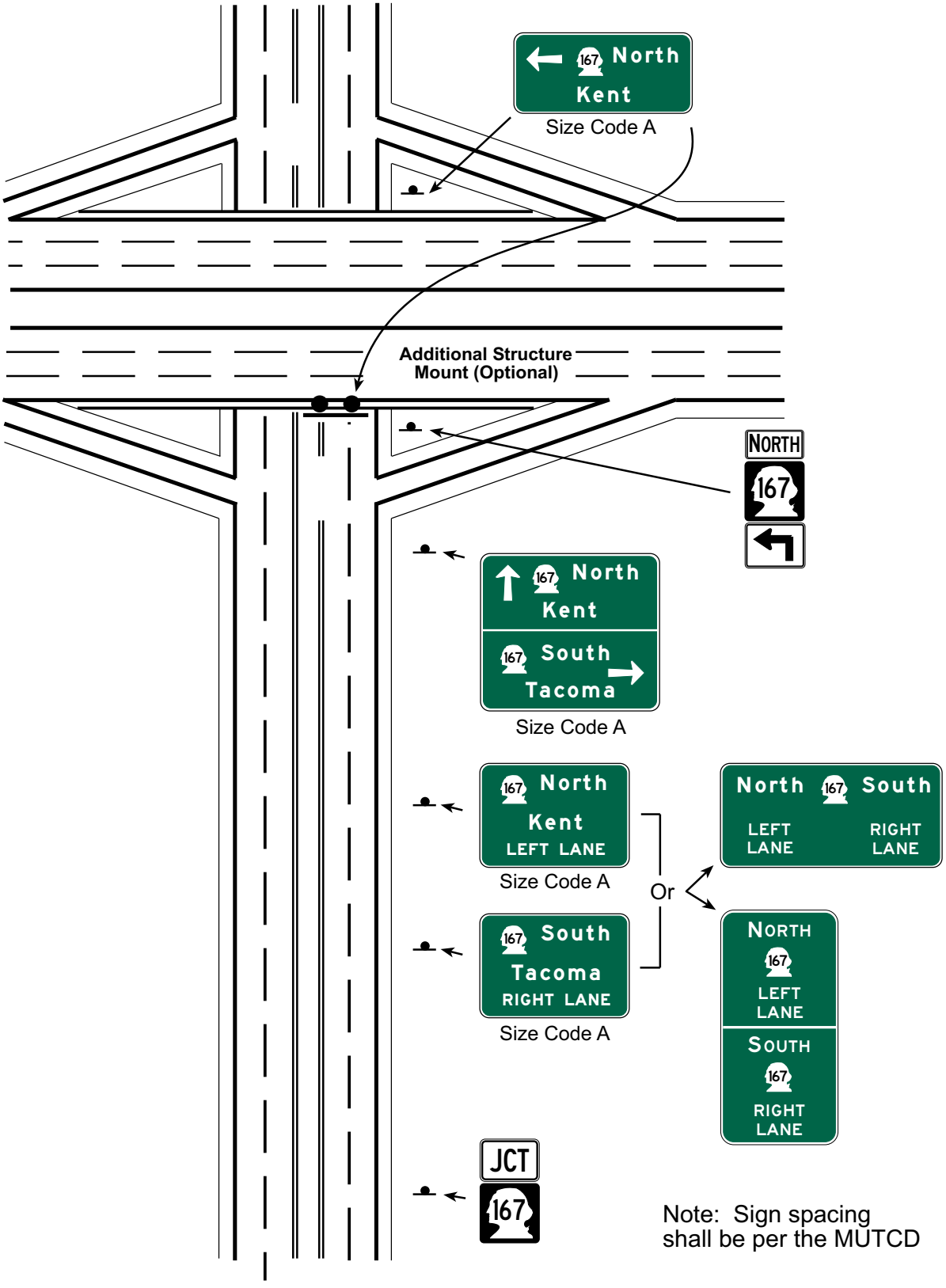
*** Sign legend determined by School District**

Sign Code	Sign Legend
S5-1	WHEN FLASHING
S5-101	WHEN CHILDREN ARE PRESENT
S4-101	WHEN FLAGGED
S4-1	8:30 A.M. to 5:00 P.M.
S4-5	SCHOOL DAYS X:XX A.M. to X:XX P.M.
S4-5A	SCHOOL DAYS X:XX A.M. to X:XX A.M. SCHOOL DAYS X:XX P.M. to X:XX P.M.

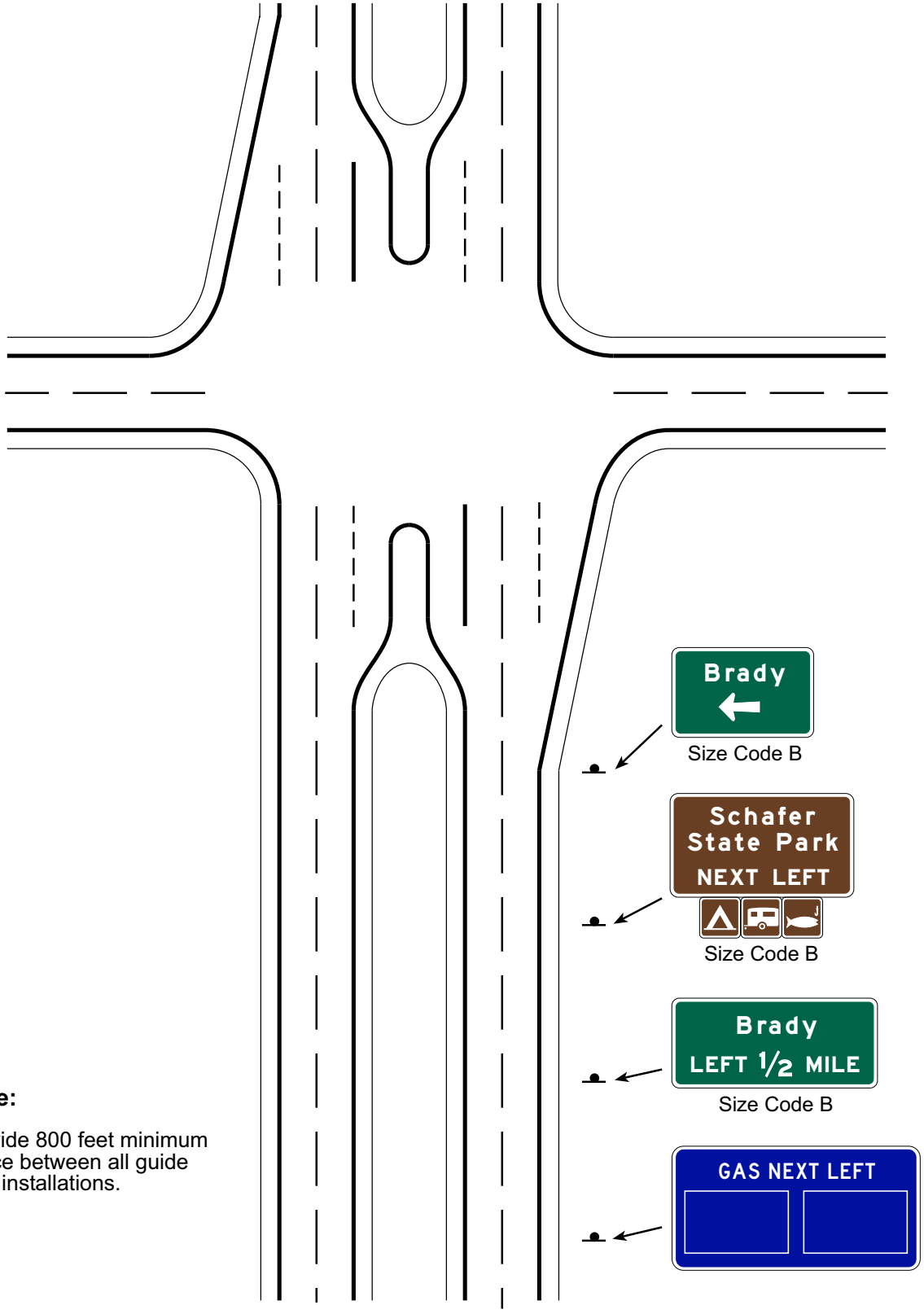
Appendix 2-13 Route Intersection Guide Signing



Appendix 2-14 Crossroad Interchange Approach Guide Signs



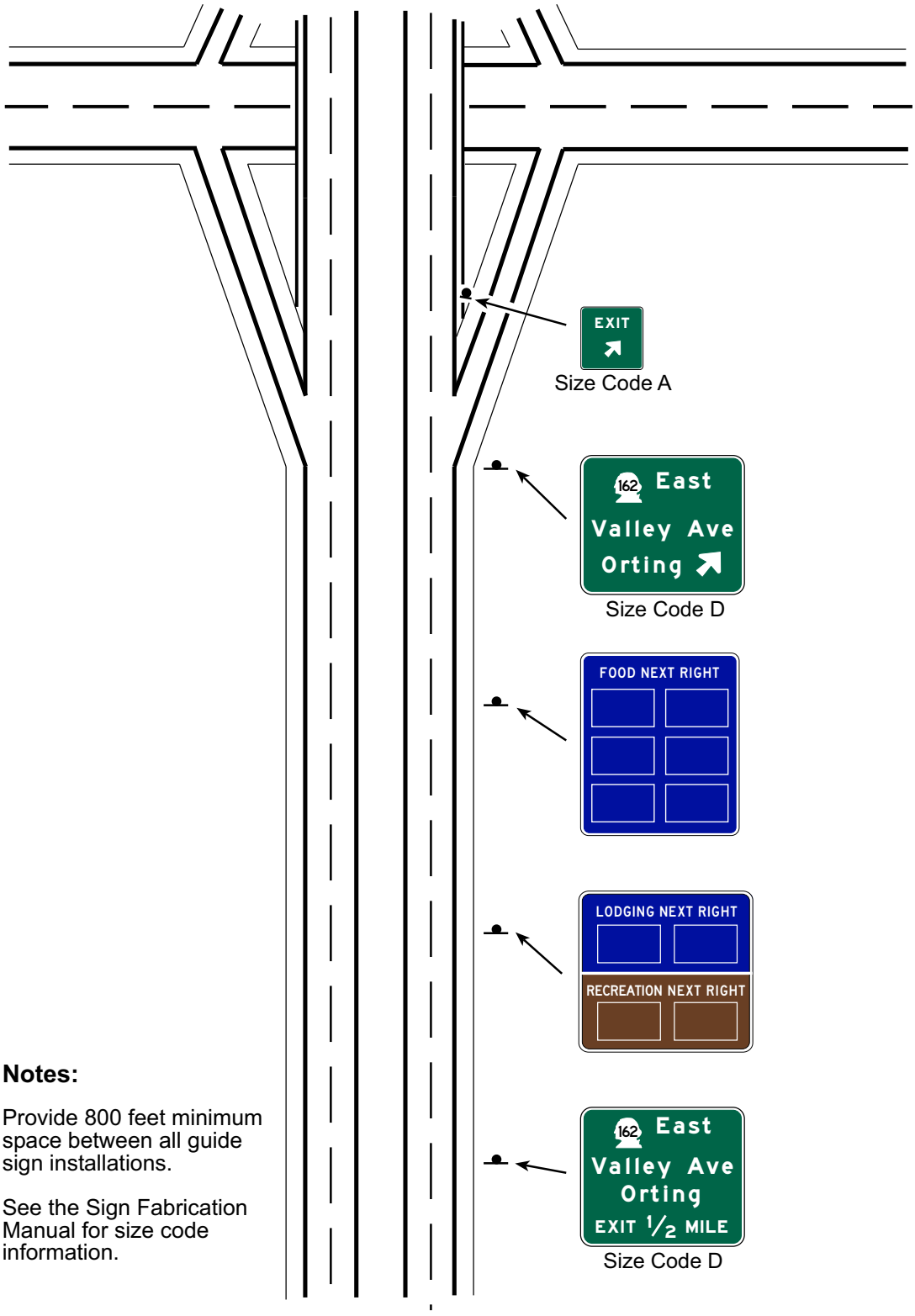
Appendix 2-15 Expressway Intersection Approach Guide Signs



Note:

Provide 800 feet minimum space between all guide sign installations.

Appendix 2-16 Expressway Interchange Approach Guide Signs

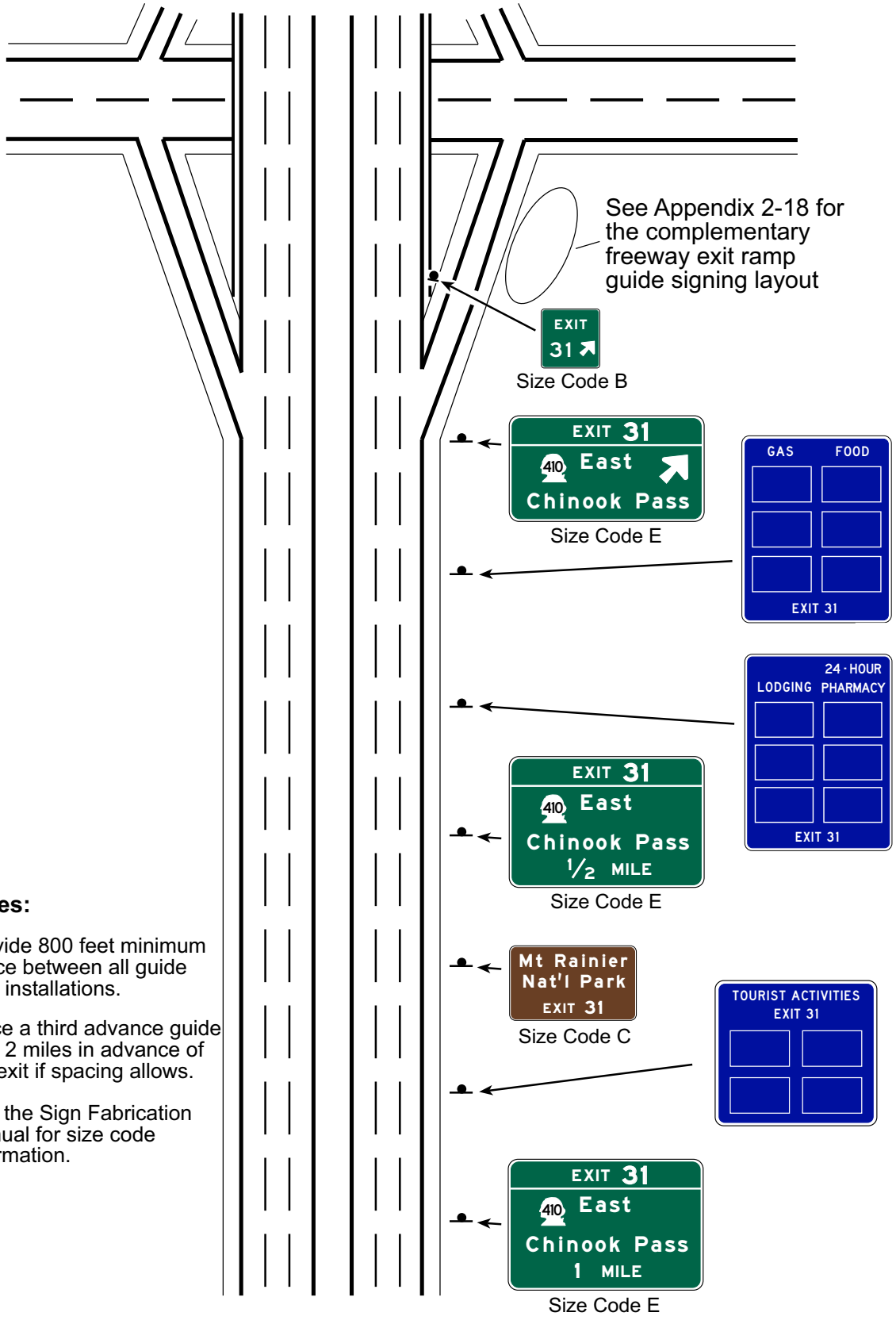


Notes:

1) Provide 800 feet minimum space between all guide sign installations.

2) See the Sign Fabrication Manual for size code information.

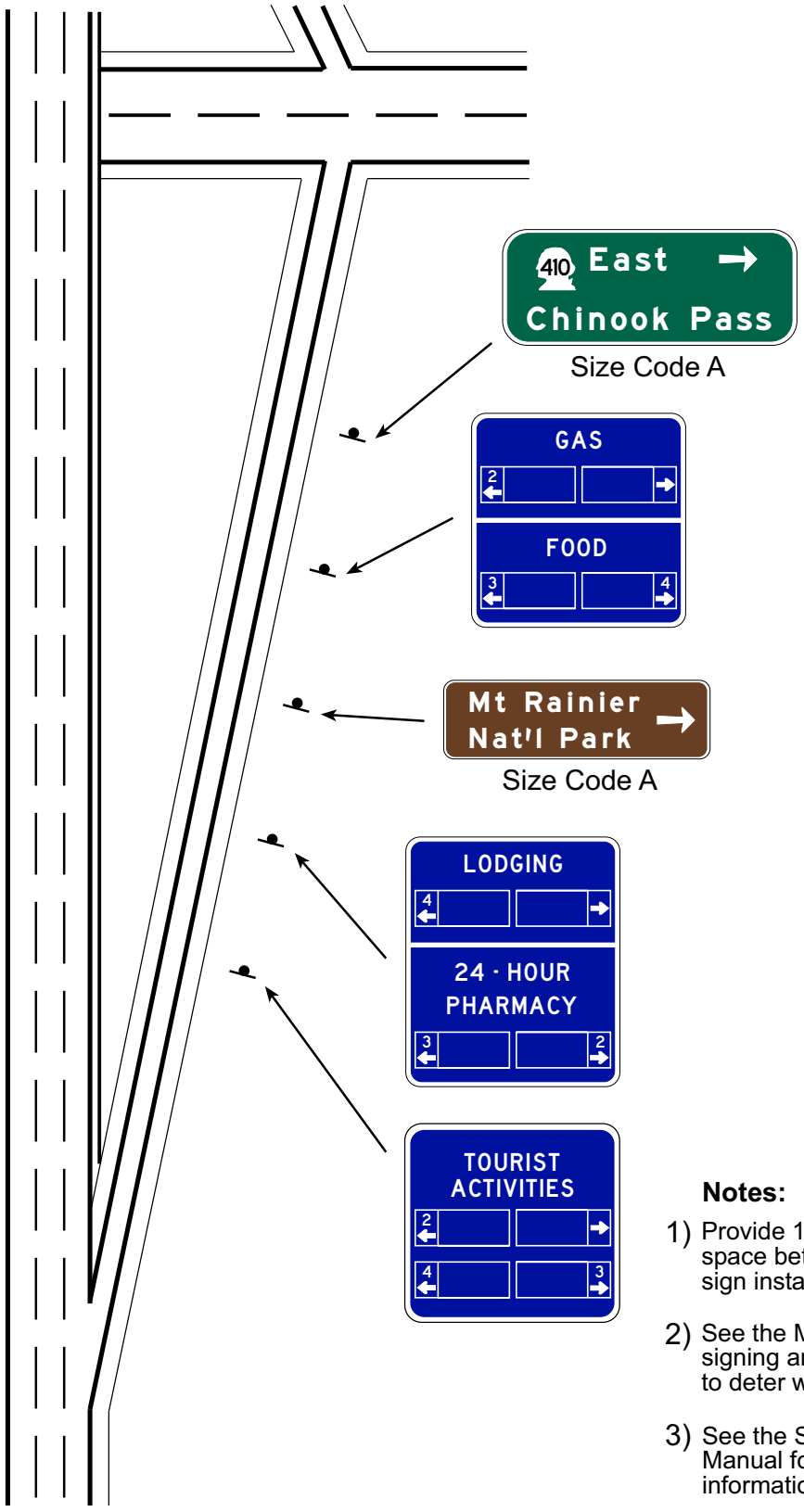
Appendix 2-17 Freeway Interchange Approach Signing



Notes:

1) Provide 800 feet minimum space between all guide sign installations.
2) Place a third advance guide sign 2 miles in advance of the exit if spacing allows.
3) See the Sign Fabrication Manual for size code information.

Appendix 2-18 Freeway Exit Ramp Guide Signs



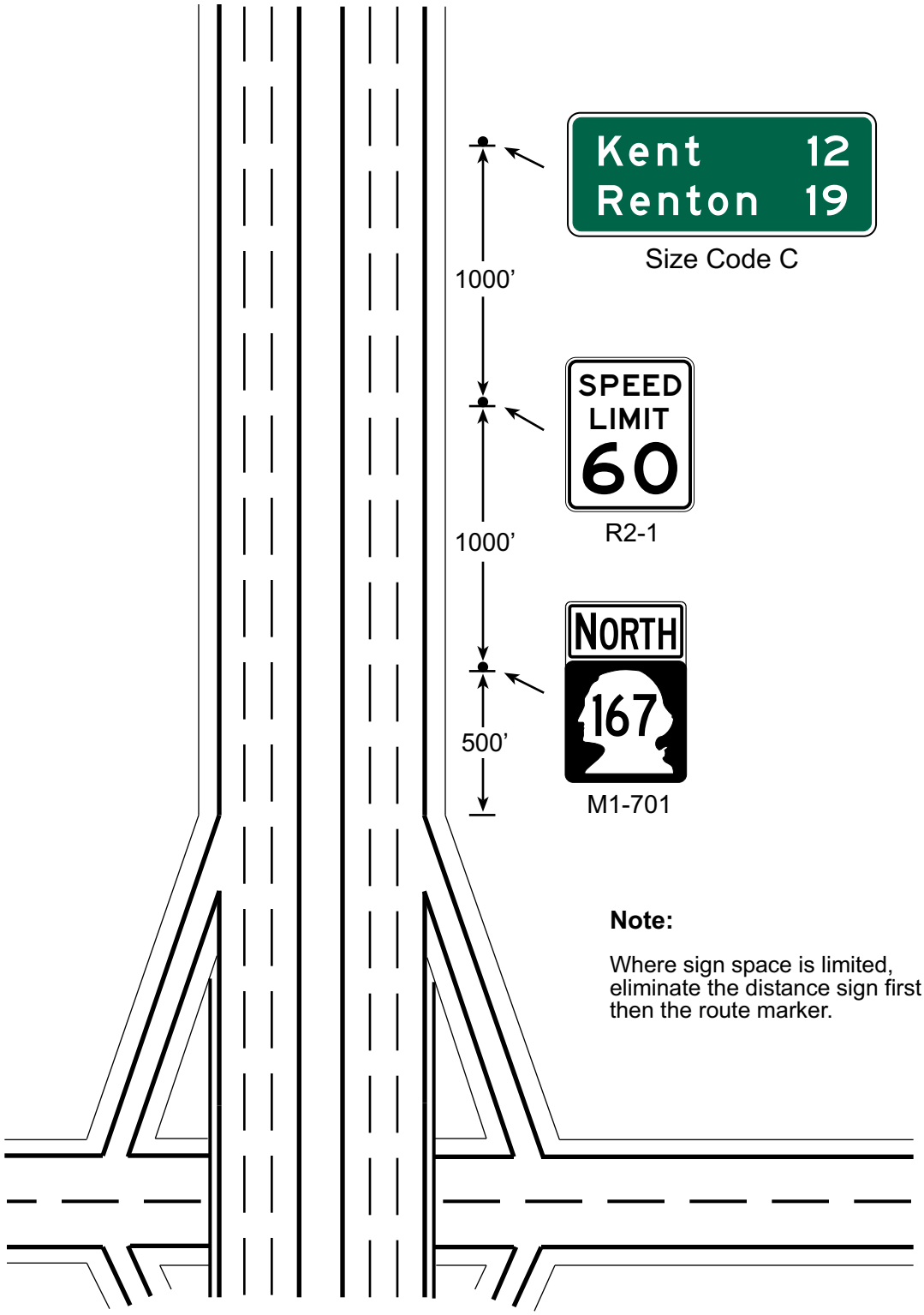
Notes:

1) Provide 100 feet minimum space between all guide sign installations.

2) See the MUTCD for regulatory signing and marking examples to deter wrong-way entry.

3) See the Sign Fabrication Manual for size code information.

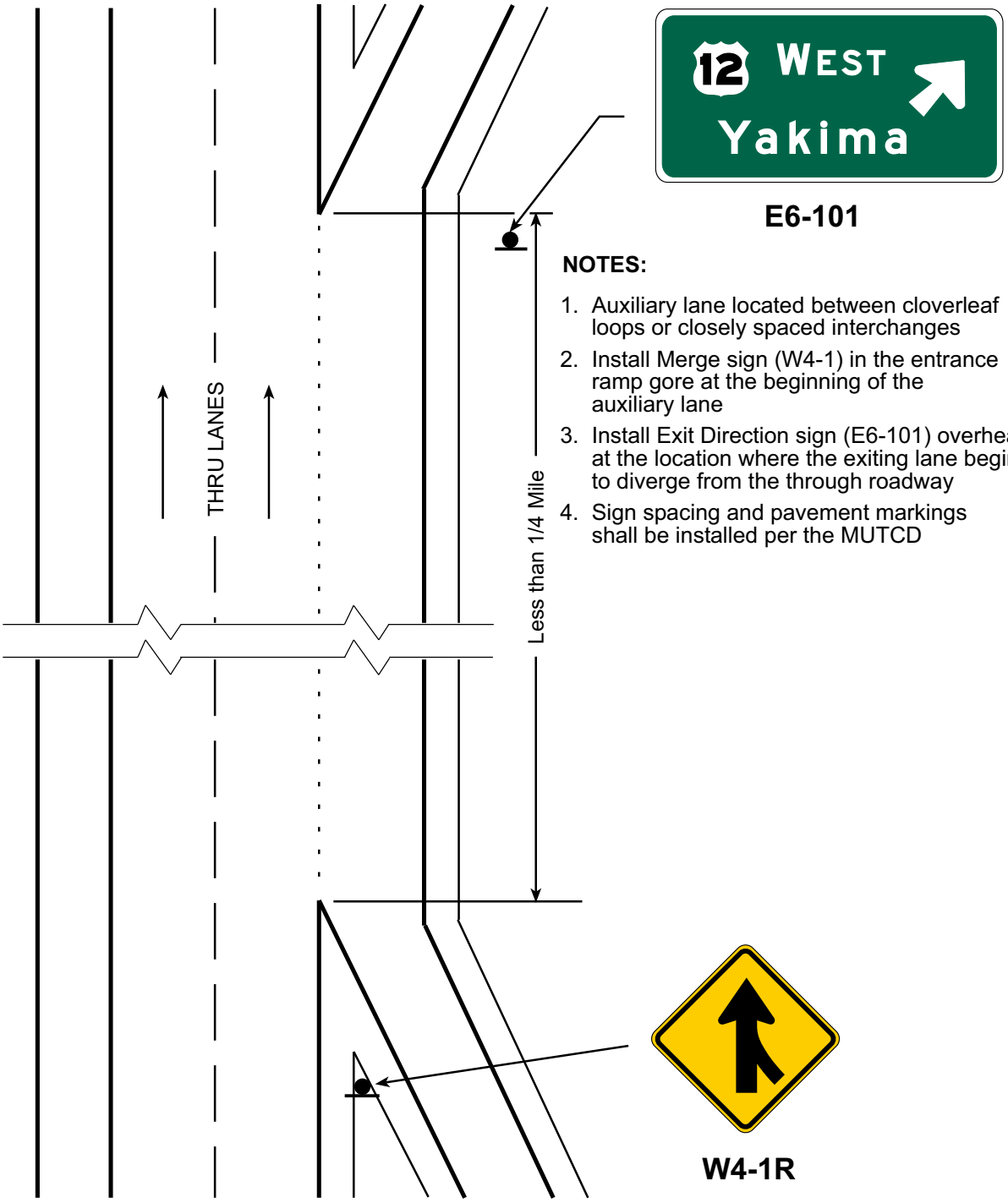
Appendix 2-19 Freeway Post Interchange Signs



Note:

Where sign space is limited, eliminate the distance sign first then the route marker.

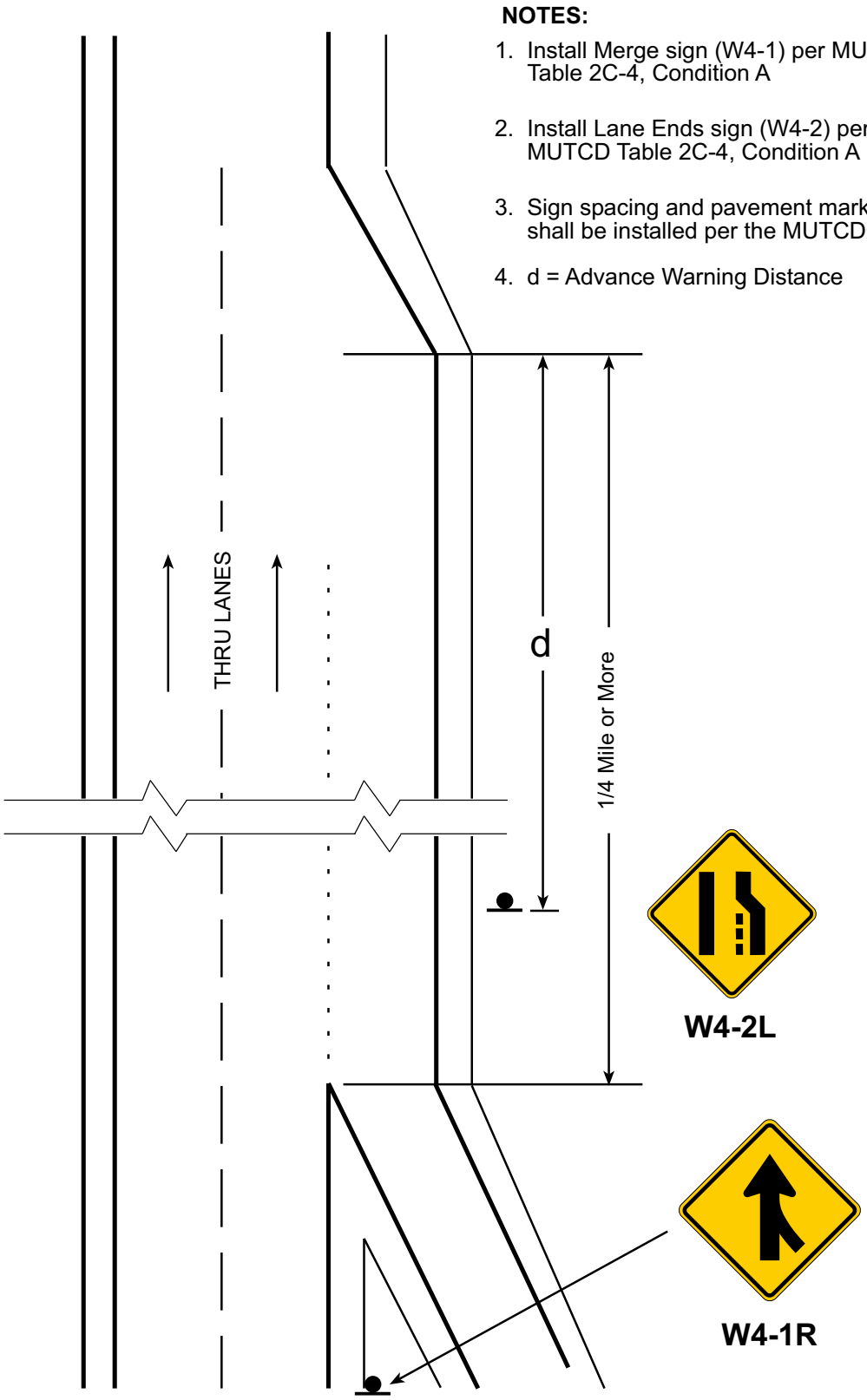
Appendix 2-20 Auxiliary Freeway Lane Less than ¼ Mile Long



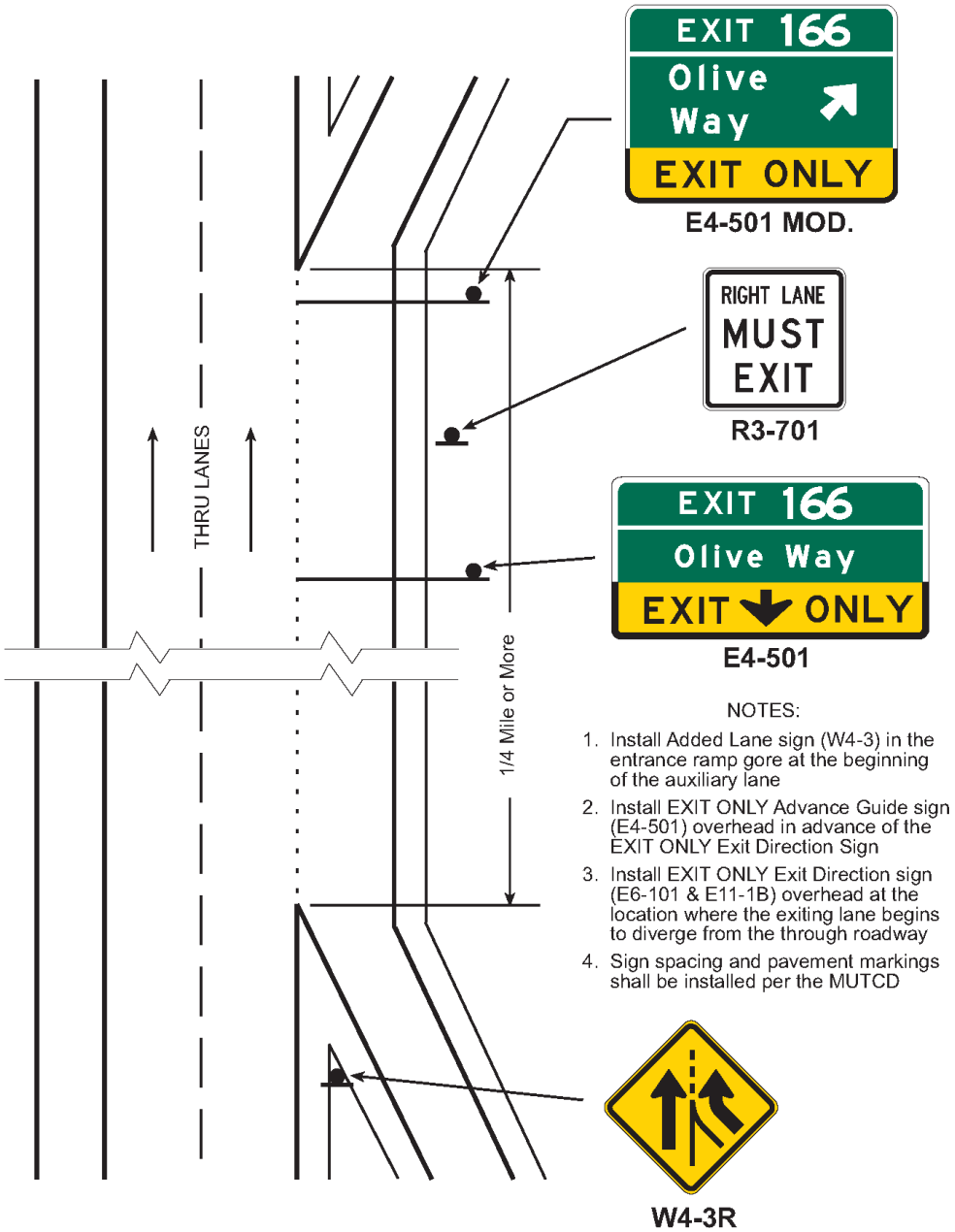
NOTES:

1. Auxiliary lane located between cloverleaf loops or closely spaced interchanges
2. Install Merge sign (W4-1) in the entrance ramp gore at the beginning of the auxiliary lane
3. Install Exit Direction sign (E6-101) overhead at the location where the exiting lane begins to diverge from the through roadway
4. Sign spacing and pavement markings shall be installed per the MUTCD

Appendix 2-21 Parallel On Connection More Than ¼ Mile



Appendix 2-22 Auxiliary Freeway Lane 1/4 Mile or More in Length



NOTES:

1. Install Added Lane sign (W4-3) in the entrance ramp gore at the beginning of the auxiliary lane
2. Install EXIT ONLY Advance Guide sign (E4-501) overhead in advance of the EXIT ONLY Exit Direction Sign
3. Install EXIT ONLY Exit Direction sign (E6-101 & E11-1B) overhead at the location where the exiting lane begins to diverge from the through roadway
4. Sign spacing and pavement markings shall be installed per the MUTCD

Appendix 2-23 Supplemental Guide Sign Criteria

CRITERIA FOR SELECTING TRAFFIC GENERATORS AS DESTINATIONS ON SUPPLEMENTAL GUIDE SIGN

Type of Generator	Specific Criteria	Major Metro Area[1]	Urban Area[2]	Rural Area
Airports - (Destination name only, not symbol)	Regularly Scheduled Commercial Flights Per Day	35	20	15
	Distance from Interchange (miles)	5	5	5
	Paved &Lighted Runway ≥ 2,500 ft long[3]	-	-	-
Colleges, Universities, and Branch Campuses	Must Be Accredited. Total Enrollment , full & part time students:	4,500	2,500	1,000
	Distance from Interchange (miles)	5	5	5
Regional Shopping Centers	3 Major Department Stores; 500,000 sq ft of Leasable Space; Minimum 9,000 Daily One Way Trips[4]	-	-	-
	Distance from Interchange (miles)	1	1	1
Industrial Parks	500,000 sq ft of leasable space[5]	-	-	-
	Distance from Interchange	5	5	5
Ports/Port Districts	Served by two or more Transportation Modes (Water, Highway, Rail, Air)			
	Distance from Interchange	5	5	5
Event Venues	Annual Attendance	300,000	250,000	200,000
	Distance from Interchange (miles)	2	2	2
Major Recreation Areas	Annual Attendance (open to public)	300,000	250,000	100,000
National Parks	Sign from Major Junctions; Case by Case			
State Parks[6]	Distance from Interchange (miles)	15	15	15
USFS Facilitiess (Campgrounds, HQ's)	Distance from Interchange (miles)	1	1	10

[1] Population greater than 50.000
[2] Population 5,000 - 49,999
[3] See section 2.15(1) for additional criteria
[4] See WAC 468-95-025 for additional criteria
[5] Leasable space can be a mix of manufacturing, service, and warehouse facilities
[6] Per RCW 47.36.290

Appendix 2-24 Signing to Amtrak

E3-101

a

E4-301

E1-1

b

E6-101

c

E4-301

Appendix 2-25 Application for Historic/Cultural Sign

Name of Organization _____

Organization Address _____ _____ _____

Mailing Address (if different) _____ _____ _____

Name of authorizing Official (Include title, e.g., Director, Trustee, etc.)
_____

Address of Authorizing Official _____ _____ _____

Telephone # _____

email address _____

Has your organization been granted *non-profit* status (IRS 501 (c)(3)) Y N

Please provide the following information about your organization:

- **What are your visitation hours and when are you open to the general public (note any seasonal variations to schedule of operation)?**
  _____
  _____
- **Is the facility easily accessible to all visitors, including ADA features-Y N**
- **Is the facility readily visible from the highway-Y N**
- **If not, how far is your facility from the state highway on which the sign is being requested** _____
- **Is the road serving your facility a two-lane, all-weather road- Y N**
- **Please indicate the name or number of the road, street or highway serving your facility**_____
- **Please describe where you would like the sign to be located. Be specific, include the state highway number and milepost, or distance to the nearest important intersection or junction**
  _____
  _____
  _____
- **Please answer the following questions for a Historic site: Is your site included in the *Washington Heritage Register* - Y N Is there an interpretive center or guided tour- Y N Has your facility been approved by the Heritage Resource Center of the Washington State Historical Society - Y N**

Sign approved Sign disapproved Reason for disapproval _____

_____
_____
_____

_____ _____
Chair, Review Committee **Date**

Appendix 2-26 Adopt-a-Highway/Trail Signs for Volunteer Groups

Multi-Lane Highway (55 mph or greater)

I6-904
(Optional)

I6-906
48”x48”

* - Message may be modified to read: WILDFLOWERS, TREE PLANTING or as specified.

Two Lane Highway (All Speeds) & Ramp Sections

I6-904
(Optional)

I6-906
36”x36”

* - Message may be modified to read: WILDFLOWERS, TREE PLANTING or as specified.

Trail Sections

I6-906
36”x36”

NOTE: Volunteer Names can be overlayed if needed.

Appendix 2-27 Adopt-a-Highway/Trail Signs for Business Sponsored Groups

Multi-Lane Highway (55 mph or greater)

I6-904
(Optional)

I6-906
48"x48"

* - Message may be modified to read: WILDFLOWERS, TREE PLANTING or as specified.

Two Lane Highway (All Speeds) & Ramp Sections

I6-904
(Optional)

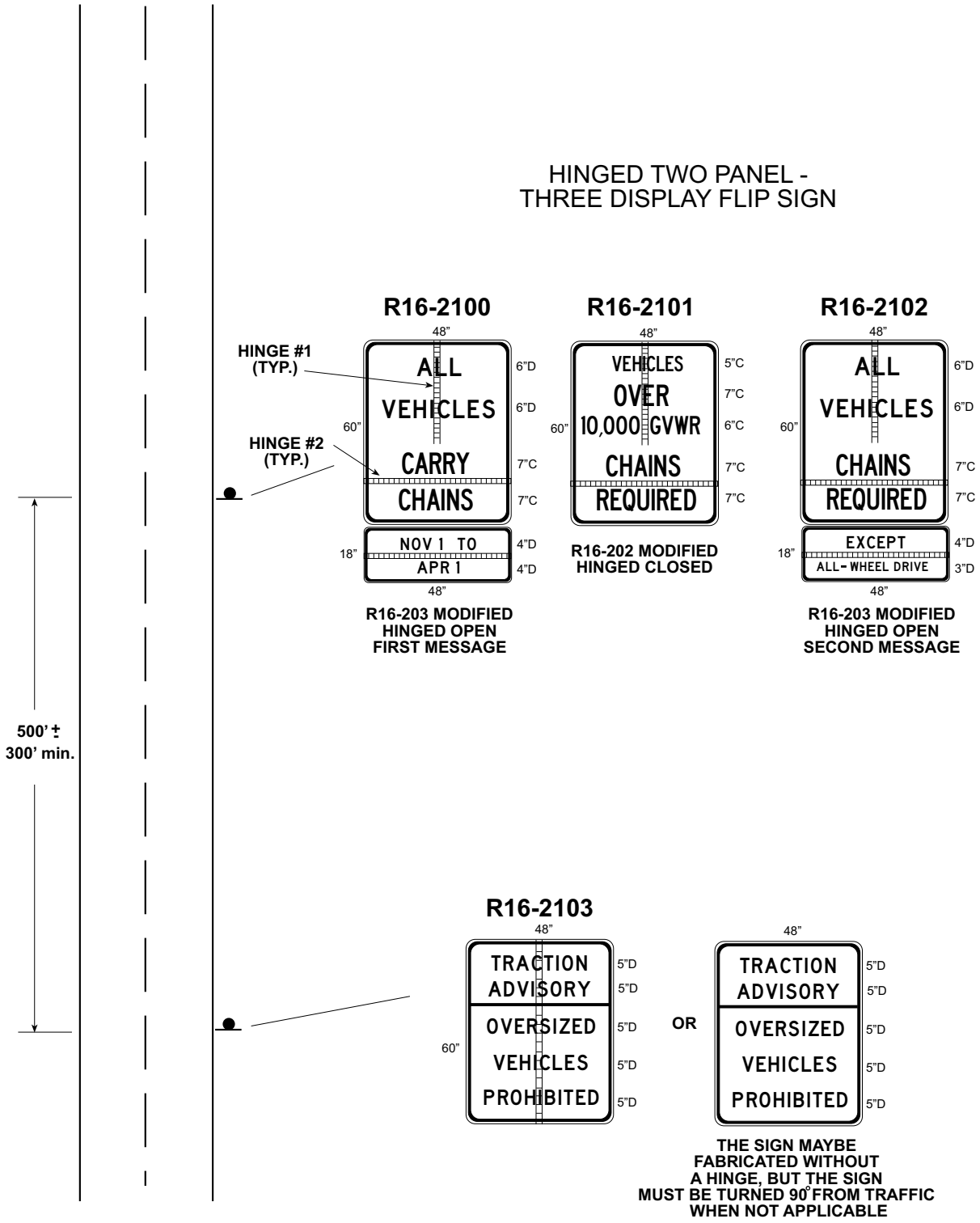
I6-906
36"x36"

Trail Sections

I6-906
36"x36"

NOTE: Sponsor Names can be overlayed if needed.

Appendix 2-28 Traction Device Requirements for Snow Prone Areas



Chapter 3 Delineation and Markings

3-1 General

Delineation is the pavement markings, guideposts, and raised pavement markers used on and adjacent to the roadway to define vehicular travel paths. The MUTCD, *Design Manual*, and *Standard Plans* provide delineation placement guidelines.

The *Roadway Delineation Practices Handbook*, published by FHWA, discusses specialized materials and delineation treatments for unique applications and situations. This handbook does not establish policies or standards but is only a reference document.

3-2 Pavement Markings

Pavement markings are classified as either longitudinal or transverse. Materials typically used for each are paint for longitudinal markings and durables for transverse markings. Durable markings include thermoplastics, Meythl Methacrylate, tape, etc. Durable markings are generally used in locations with higher ADT, high truck traffic and/or areas with increased turning radius. Approved sources for durable materials are listed in the General Special Provisions. A purchase contract is available for the purchase of paint. New durable materials are continually being evaluated.

A. **Intersection Channelization –** The MUTCD has a provision that allows pavement markings to be extended through an intersection where design or visibility conditions make it desirable to provide control through the intersection. These markings are only installed as the result of a traffic engineering analysis that considers horizontal curvature and other visibility conditions. For statewide uniformity, the dotted line used for this extension is applied as a 2-foot stripe with a 4-foot gap between stripes.

   Multilane approaches may provide exclusive or shared lanes for turning and through vehicles. At most intersections through traffic must share a lane with one direction of turning traffic. To minimize delay, through traffic should normally be combined with right-turning traffic unless opposite approach geometrics are unfavorable. An offset centerline and minor widening may help accomplish the proper lane assignments.

   Stop lines can be included at signalized intersections with crosswalks but are to be included at signalized intersections without crosswalks. At nonsignalized intersections, stop lines are necessary on the stop sign control approaches when crosswalks are not included. Including the stop line at stop sign control locations having marked crosswalks is optional.

B. **Interchange Off Ramps –** At either a parallel or a tapered deceleration lane, the MUTCD allows the application of an optional dotted extension of the main line right edge line through the ramp opening. The dotted line is a 2-foot stripe with a 4-foot gap.

For statewide uniformity, these optional dotted extensions should only be installed where the exit ramp is located on a horizontal curve, except for locations with continuous illumination, and at locations with prevalent foggy periods. They are generally not needed at ramps exiting from tangent sections. These markings are only to be installed as a result of a traffic engineering analysis.

C. **Uncontrolled Pedestrian Crossing/Supplemental Treatments for Marked Pedestrian Crossings.**

Refer to the *Traffic Manual* chapter.

No Passing Zone Marking – No passing zones are to be established and marked on horizontal and vertical curves in accordance with the MUTCD.

State law, in the Rules of the Road RCW 46.61.100 – RCW 46.61.165, identifies several situations with a statutory no passing zone distance such as ". . . when approaching within 100 feet of or traversing any intersection or railroad crossing . . ."or". . . the view is obstructed upon approaching within 100 feet of any bridge, viaduct, or tunnel" However, state law does not imply a need to mark no passing zones for such situations.

3-3 Guideposts

Guideposts, discussed in the MUTCD as delineators, are light retroreflecting devices mounted at the side of the roadway to indicate roadway alignment. They are effective aids for night, wet, or other reduced visibility driving conditions and are intended to guide rather than warn motorists.

Guidepost installation and spacing requirements are included in the *Standard Plans* and the *Design Manual*. The field spacing for guideposts shall be determined from Exhibit 3-1. Approved sources for guideposts as well as reflective materials are listed in the General Special Provisions.

3-4 Barrier Delineation

Barrier delineation is the extension of guideposts through an area of guardrail or concrete barrier. Spacing is the same as for guideposts.

Guardrail is delineated by mounting guideposts on guardrail posts as shown in the *Standard Plans*.

Concrete barrier is delineated by placing reflective devices on the face of the barrier about 6 inches down from the top. When concrete barrier is placed immediately adjacent to the traveled lane, such as in construction zones, delineator spacing should be a maximum of 40 feet on tangents and 20 feet through curves.

3-5 Vacant

3-6 Raised Pavement Markers

As described in the *Design Manual*, raised pavement markers are extensively used in western Washington to simulate lane lines and to supplement painted pavement markings.

Maintenance of raised pavement markers is discussed in the *Maintenance Manual*.

A. **Right Edge Lines –** The general use of raised reflective pavement markers to supplement, or in lieu of, right edge lines is strongly discouraged. At night, such markers can be easily mistaken for lane lines.

The State Traffic Engineer has approved the use of reflective markers to supplement right edge lines in these locations:

- On the taper in lane reduction sections, such as from four lane to two lane.
- Through sections with reduced lane width, such as narrow structures.
- At the gore of exit ramps.

B. **Recessed Markers –** Recessed reflective markers and recessed lane lines appear to be an effective way to supplement centerline and lane line delineation in areas requiring regular snow plowing.

The details for installation of the recessed marker are contained in the *Standard Plans*.

Not generally allowed, recessed markers and lines may be installed on bridges with Bridge Preservation approval. Currently, several alternative methods are being considered for this application to minimize the impact on bridge decks.

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Chapter 4 Multimodal Planning, Design, and Operational Considerations

4-1 Introduction

WSDOT Vision

Washington travelers have a safe, sustainable, and integrated multimodal transportation system

Washington's Transportation Plan envisions an integrated system safely connecting people and communities – fostering commerce and economic opportunity for all, operating seamlessly across boundaries, and providing travel options to achieve an environmentally and financially sustainable system. Achieving a complete transportation system requires us to provide a variety of transportation options to all users. Not only will such a system serve everyone, it will function more efficiently. The benefits are significant and wide- ranging such as a cleaner environment, a stronger economy and a more mobile and healthy population.

Multimodal Transportation Systems

A transportation network that accommodates multiple modes of travel for the movement of people and goods including, but not limited to, walking, rolling, bicycling, using public transit, and driving.

Transportation system integration requires all partners to pull from a larger, multimodal toolbox to consider solutions that can best serve the interests of communities and the traveling public. Highways and streets are a community asset where access to transit facilities and services are found; bicycle and pedestrian connections are complete; and access to major employment, education, social service and residential destinations are a priority. The roadway system needs to feel safe for all users and it should both benefit and respond to the needs of people and communities around it.

Chapter 4 of the *Traffic Manual* is intended to expand the toolbox of strategies and complement the *Design Manual*, AASHTO, NACTO, FHWA polices and guides.

4-2 Background

Washington State's population is projected to grow more than 20 percent during the next 20 years. In Spokane and Clark counties, the population is expected to grow to more than 500,000 people and Central Puget Sound is expected to add another million people in the coming decades.[1] This population growth will likely be accompanied by a number of challenges including:

- Addressing a greater backlog of public infrastructure maintenance needs
- Serving a larger number of people who are over 65 years old
- Serving an increasing percentage of the population with disabilities
- Helping a growing number of people facing health and economic inequality
- Responding to the needs of a more urbanized population and the transportation issues associated with suburbanized poverty
- Putting greater effort into the need to address climate change

The 2050's will see an increasingly diverse population, which will bring both cultural richness as well as the challenges providing a transportation system that provides for needs of road users in an equitable manner. All of these trends challenge us find the best use of the broad array of transportation services and systems, both public and private that are available to the public.

4-3 Policy

4-3.1 United States Department of Transportation

23 CFR § 652.5 states, "the safe accommodation of pedestrians and bicyclists should be given full consideration during the development of Federal-aid highway projects, and during the construction of such projects. The special needs for the elderly and the handicapped shall be considered in all Federal-aid projects that include pedestrian facilities. Where current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort shall be made to minimize the detrimental effects on all highway users who share the facility. On highways without full control of access where a bridge deck is being replaced or rehabilitated, and where bicycles are permitted to operate at each end, the bridge shall be reconstructed so that bicycles can be safely accommodated when it can be done at a reasonable cost. Consultation with local groups of organized bicyclists is to be encouraged in the development of bicycle projects."

It is the policy of the United States, as described in 49 U.S.C. §70101 to maintain and improve the condition and performance of the National Multimodal Freight Network to ensure that the network provides a foundation for the United States to compete in the global economy.

Chapter 53 of Title 49 of the U.S. Code establishes the authority for FTA. It incorporates the Urban Mass Transportation Act originally enacted in 1964 and states that "it is in the interest of the United States, including its economic interest, to foster the development and revitalization of public transportation systems that (1) maximize the safe, secure, and efficient mobility of individuals; (2) minimize environmental impacts; and (3) minimize transportation-related fuel consumption and reliance on foreign oil."

[1] Washington State Public Transportation Plan

4-3.2 WSDOT Executive Orders

Executive Order 1090.00 *Advancing Practical Solutions*: Practical Solutions uses tools, data analytics, performance measures, and stakeholder input to (1) seek lower-cost approaches and efficiencies in expanding and operating the multimodal transportation system to reduce travel demand and the need for building costly new infrastructure, identify, evaluate, analyze, and manage risk to WSDOT's strategic objectives, and identify and implement agency efficiencies. See *Design Manual* Division 11 for guidance on implementing Practical Solutions.

Executive Order 1113 *Sustainability*: This policy directs WSDOT's actions in a manner that helps Washington's economy, environment, and communities prosper now and for generations to come. To sustain prosperity, it is essential that WSDOT address current needs while preserving the ability of future generations to meet their needs. WSDOT employees are directed to take actions that sustain economic, environmental, and societal prosperity for current and future generations through a focus on energy efficiency, pollution reduction, and enhanced resilience.

WSDOT Safety Goal is Zero Fatalities and Serious Injuries by 2030

WSDOT is committed to multimodal safety as identified in Washington State's Strategic Highway Safety Plan.

The Washington Department of Transportation (WSDOT) and Washington Traffic Safety Commission (WTSC), along with dozens of partners, collaborated to create the Target Zero Strategic Highway Safety Plan (SHSP). Target Zero is a statewide, data-driven effort to reduce fatalities and serious injuries to zero by the year 2030. We will do this by developing strong leadership in organizations that directly affect highway safety, and using partnerships to develop and implement innovative, data-based solutions based on a safe systems approach. Our goal is zero deaths and serious injuries, because every life counts. For more information about the Washington Strategic Highway Safety Plan visit the Target Zero website : TargetZero.com

4-3.3 State Multimodal Transportation Plans

- WSDOT Strategic Plan
- Washington Transportation Plan
- Washington State Strategic Highway Safety Plan (Target Zero)
- WSDOT Active Transportation Plan
- ADA Transition Plan
- Statewide Human Services Transportation Plan (HTSP)
- Washington State Public Transportation Plan
- Highway Systems Plan
- Freight System Plan
- Washington State Ferries Long Range Plan
- Washington State Rail Plan
- Washington Aviation Systems Plan

4-4 Equity and Transportation

Transportation is essential for healthy, thriving communities. Safe, reliable, affordable transportation opens doors to economic and social opportunities for many people. However, not all people have the same access. Equity refers to the distribution of benefits and costs or burdens across race, economic status, disability status and other characteristics and whether that distribution is fair in the context of past and current disparities. Transportation equity focuses on transportation system effects in an effort to understand where costs and burdens are unfairly distributed. It reflects the input of an inclusive process involving the people who will be affected. This is the starting point for transportation decisions and investments that create a more just system that works for all.

WSDOT has a number of tools to support analysis of existing data to use when considering equity on transportation projects. Some programs and projects will require collection of additional data. Existing data sources include:

WSDOT Application for Local Planning and Community Accessibility (ALPACA) provides demographic mapping tools for race/ethnicity, age, disability, and limited English proficiency.

United States Environmental Protection Agency EJSCREEN: For more information visit the Environmental Justice Screening and Mapping Tool. EJSCREEN is an environmental justice mapping and screening tool that provides EPA with a nationally consistent dataset and approach for combining environmental and demographic indicators.

Did you know?

Communities with poverty rates higher than the state average also have the highest numbers of households that lack access to a personal vehicle and are therefore more likely to rely on walking, bicycling, and transit for their transportation needs. However, studies show a long pattern of investment inequity in lower-income neighborhoods.

"Children who grow up in walkable communities fare better economically, controlling for a wide range of economic factors as well as the related characteristics of those neighborhoods." – Kids Raised in Walkable Cities Earn More Money As Adults, CityLab.

The cost of transportation and housing are inextricably linked and also play a role in traffic safety and health equity. For example, housing within walking distance of a main street or neighborhood shopping district can allow for the replacement of daily car trips with walking trips.

The 2020 Active Transportation Plan update included equity criteria (race, poverty, disability) in its location evaluation methodology. A GIS-based analysis of state right of way developed for the plan is available and should be consulted.

Office of Superintendent of Public Instruction (OSPI) Report Card. This webpage has information about student demographics, percent of children eligible to receive free and reduced-price meals and student population size for all public schools in Washington.

The primary guide for community engagement is the WSDOT Community Engagement Plan. The WSDOT *Environmental Manual* Chapter 458 and Social and Community Effects webpage provide guidance for engagement under NEPA and SEPA. The Washington Environmental Health Disparities Map provides an interactive tool based upon census data that combines public health and pollution measures to aid in understanding effects of transportation in the context of overall environmental health. The Washington Tracking Network maintained by the Washington State Department of Health provides census based information on variables such as household income, personal vehicle ownership, and other information relevant to equity analysis.

4-5 Multimodal Planning

Transportation facilities should provide for reasonable safe movement of people, goods, and services by multiple transportation modes, including motorized vehicles, bicycling, walking, transit, and others. WSDOT is moving towards the Safe Systems approach to roadway safety. This is a paradigm shift, a change in the way we understand transportation for all road users and identify solutions.

When evaluating the transportation system performance, the old paradigm considered motor vehicles as the main and dominant transportation mode, giving little consideration to other modes and the effects on those movements. The new paradigm is multimodal and comprehensive. Current WSDOT policies recognizes non-auto travel demands, and a wide range of economic, social and environmental effects, including vehicle ownership costs, parking costs, health effects, and the benefits of providing independent mobility for everyone regardless of mode. Speed management is a tool for the goal of reducing the incidence and severity of crashes for people using all modes.

When planning for motor vehicle and transit modes we generally think about complete systems. We want to provide travel that does not have a high probability of a crash. Such concepts apply equally well to all modes including freight, transit, and active transportation planning, though in practice we often pay more attention to isolated elements of a network like specific intersections.

In evaluating movements for all modes consider the larger areas people are likely to use. Look at where schools, grocery stores, and other services are located relative to where people live. Also consider active transportation access to intermodal connections. It is useful to take the perspective of travelers who don't own motor vehicles and can't always make use of transit, walking, or biking. The Active Transportation Plan provides methodologies for understanding network quality and connectivity and associated performance measures.

Ideally, network improvements would be considered that help increase the active transportation and/or transit mode share. Where improvements are specific to a given facility, however, it is still necessary to understand how that facility interacts with the broader network. When changes to a facility reduce utility of the broader active transportation network, consider on and off-system investments that restore network connectivity and functionality. Changes that increase roadway width, posted or operating speed, and/or motor vehicle volume increase the potential for crashes that can be serious or fatal for people using active transportation. At the planning stage, potential changes to crash exposure and mobility because of new design and future operations need to be considered. Planning actions that help remove or mitigate barriers to active transportation should be identified. Increasing mode share for active transportation and transit is considered a form a transportation demand management and can be considered to supplement or replace congestion mitigation. Mode share increases for active transportation modes occurs when road users feel reasonably safe and secure on the transportation systems.

There is not one single approach to optimizing to meet the needs of all road users on the highway system. Keys to multimodal planning include:

- Put safety first to support elimination of fatalities and serious injuries on all public roads and to reduce the severity of the crashes that may occur (e.g., everyone should to get home safely).
- Learn and understand existing and future contexts.
- Being mindful of project context beyond the immediate footprint.
- Collaborate with colleagues, subject matter experts, and stakeholders.
- Engage communities. For example: listen to priorities, discuss constraints, educate, find forums to engage, and review the Regional Transportation Plans and other relevant plans.
- Look for opportunities on all projects to improve mobility and accessibility for all modes. For example, roadway lanes can be re-purposed to add pedestrian and bicycle facilities. Safety does not need to be at the expense of increased mobility when all road users are factored in.
- Considering performance measures beyond vehicle peak hour analysis. Designing for the peak vehicle hour can lead to overbuilding facilities. Consequences of overbuilding highways can include reduced safety performance, higher maintenance costs, and increased stormwater runoff, as well as the creation of barriers to greater active transportation use that otherwise could reduce the peak load. The Exhibit 4-1 provides examples of common metrics used versus ones that are often not used.

Exhibit 4-1 Performance Metrics Examples

PERFORMANCE FACTORS CONSIDERED AND OVERLOOKED	
Usually Considered	**Often Overlooked**
Travel Time (reduced congestion)	Induced travel impacts
Project Cost	Downstream and upstream congestion
Environmental Impacts	Effects on to other modes especially active transportation
Crash History	Construction traffic delays
Property	Public health
	Effects on land use
	Statewide safety goals
	Future operations and maintenance
	Department's strategic vision and goals

4-5.1 Community Engagement

WSDOT communications are an integral piece of our agency's work and how we accomplish our mission to provide and support safe, reliable and cost-effective transportation options to improve livable communities and economic vitality for people and businesses. Our commitment to inclusion requires interaction and/or coordination with community and advocacy groups, chambers of commerce and downtown associations, tribes; local, state, and federal government agencies, other stakeholders, and the general public. Our agency communication philosophy includes these key points:

- Everyone is a communicator
- Engage early, often
- Be accountable, transparent
- Use all the tools
- No surprises, clearly state your intent
- A consistent brand is important

WSDOT resources to help include the *Communications Manual*, Visual Engineering Resource Group, and WSDOT Community Engagement Plan. FHWA also has published a guide called Public Involvement Techniques for Transportation Decision Making.

4-5.2 Multimodal Transportation Analysis Tools

Balancing the demands on the transportation system within a multimodal framework requires effort to identify affordable and effective solutions. WSDOT has various tools available to assist with this effort, which include but are not limited to:

Design Manual Chapter 320 - Traffic Analysis. Traffic Analysis is either "operational" or "planning" in nature. Traffic Analysis are generally examines areas such as corridors or larger geographic areas. Outcomes of Traffic Analysis include identification of multimodal needs in a corridor and effects of land use changes. These studies typically do not reach the level of providing intersection control and geometric design recommendations. Intersections are defined by Intersection Control Evaluations.

Design Manual Chapter 1300 – Intersection Control Type. Intersection Control Evaluations (ICE). ICE is a data-driven, performance-based framework used to objectively screen alternatives and identify an optimal geometric and control solution for an intersection. ICE studies can include more than one intersection or be applied on an entire corridor as needed. ICE policy is intended to be flexible, adaptable, and provide a transparent multimodal decision making process.

Design Manual Chapter 1100 – Practical Design. Practical Design is our approach to achieving the WSDOT mission. This is how we plan, design, build, operate and maintain the state's transportation system. Our goal is to identify and solve problems as quickly and inexpensively as possible. This approach uses performance-based and data-driven decision making with early community involvement to guide the development and delivery of transportation investments. Practical Solutions strategies include:

- Lowest lifecycle cost to preserve the system in a state of good repair
- Target Zero strategies for safety
- Transportation System Management and Operations (TSMO)
- Mobility management;[2] and
- Capital project investment

[2] Mobility management includes Transportation Demand Management (TDM) strategies such as programs and services that help encourage transportation alternatives, reduce reliance on the private automobile for travel, and reduce vehicle miles traveled (VMT) and greenhouse gas emissions. A good example of mobility management strategies can be found in the San Diego's Mobility Management Guidebook. WSDOT Transportation Demand Management website is another resource

Traffic Manual Chapter 12 – Multimodal Transportation Impact Analysis. If highway or intersection capacity is measured only for automobiles, then mitigation required to address "deficiencies" will only add automobile capacity in the form of vehicle travel or turn lanes, which may compromise the viability and safety of pedestrian, bicycle, and transit modes. Widening a street may not be feasible from a physical or economic standpoint, and it might not be desirable from a practical design or land use standpoint, either. Chapter 12 provides guidance to measure transportation effects across the modes.

Safety Analysis Guide - The purpose of this guide is to provide guidance to WSDOT staff regarding expectations for safety analysis. This guide defines the focus, scale, and scope of safety analyses across the different WSDOT program areas as well as safety analysis outside the typical program areas.

4-5.3 Multimodal Transportation Documentation

Every project has a unique land use and transportation context. Understanding and documenting the project's context is critical to successful application of state and WSDOT goals and defining multimodal transportation needs. Context should be viewed as both a constraint and an opportunity. WSDOT *Design Manual* Chapter 1102 provides guidance on how to define land use and transportation context and documentation requirements for the Basis of Design. The WSDOT Context and Modal Accommodation Report (CMAR) is available for determining the existing and future multimodal context.

Sources of information to assist with documentation include resources listed in Section 4-3.3 and those listed below:

- Stakeholder and/or community engagement
- Local and regional plans and/or studies
- Local land use plans
- Local design standards
- Local transit routes, plans, and/or studies
- WSDOT *Design Manual*
- WSDOT Corridor Sketches
- WSDOT planning studies
- Truck Freight Economic Corridor Maps
- Freight and Goods Transportation Map (FGTS)
- Freight Systems Plan
- Functional Classification Maps
- National Highway System Map
- WSDOT GeoPortal Map
- WSDOT Traffic GeoPortal

Definition of Context

"Context refers to the environmental, economic, and social features that influence livability and travel characteristics. Context characteristics provide insight into the activities, functions, and performance that can be influenced by the roadway design. Context also informs roadway design, including the selection of design controls, such as target speed and modal priority, and other design decisions." WSDOT *Design Manual* Chapter 1102.

How to document multimodal decisions

The multimodal assessment can be incorporated into existing studies (Traffic Impact Analysis, Intersection Control Evaluations, Basis of Design, Practical Design, Context and Modal Accommodation Report, Sustainable Safety Analysis) or other project documentation versus a standalone evaluation. Each of these forms includes multimodal questions or spaces for information you will need to consider.

- WSDOT Bicycle & Pedestrian Count Portal
- WSDOT Active Transportation Plan
- Public Transit Authority Map
- Airport Mapping Application

4-6 Active Transportation

Effective active transportation networks lead to more people walking and bicycling by creating routes that are safe, efficient, seamless, and easy to use. Years of research confirm the public health benefits of active travel modes like walking and biking. Organizations like the Centers for Disease Control and Prevention and the National Institutes of Health, among others, have long advocated for Americans to increase physical activity to reduce avoidable chronic conditions associated with inactivity. Providing well-designed and managed facilities for people walking and rolling also provides important information for drivers to understand the mix of uses present in a corridor.

Pedestrian & Bicyclist Safety

In 2015–2017, 20 percent of all traffic fatalities in our state, and 20 percent of all traffic serious injuries, were people walking or biking. These figures continued to climb in 2018. At 109 fatalities, pedestrian deaths reached their highest number in more than 30 years. Compared to 2012–2014, the 2015–2017 figures show a 41 percent increase in fatalities for people who walk and bike, and an 11 percent increase in serious injuries.

Source: Washington Strategic Highway Safety Plan

4-6.1 Pedestrian Facilities

Pedestrian travel is a vital transportation mode. It is used by everyone at some point in each trip and is a critical link to everyday life for many. *Design Manual* Section 1510 outlines WSDOT polices regarding pedestrian facilities.

When evaluating pedestrian facilities in urban core, urban, suburban, and rural town/community population centers contexts consider the following:

- Local agency road standards, criteria, and guidelines
- Motor vehicle traffic volume, traffic speeds, number of travel lanes; the Level of Traffic Stress index developed for the Active Transportation Plan incorporates these elements
- Safety considerations: observed crashes, near miss data, pedestrian and bicycle volumes, safety analysis, opportunity for speed management, injury minimization policy
- Land use consideration: Presence of current or future planned destinations, context, opportunity to support latent pedestrian demand, demographics indicating higher number of disabled people and/or people reliant on active transportation/transit
- Multimodal connectivity: Transit usage, presence of transit stops, other modal connections, modal mix, roadway design, active transportation facilities connected to the particular segment in question
- Consider demographics of the population within the walk shed of the location. Give special consideration to equity, age, disabilities, car ownership, and income. These area characteristics can affect reliance on active transportation facilities and public transportation services.
- Stakeholder and community input
- Other considerations: Maintenance, other factors

A. Sidewalk Width

Sidewalk width should be sufficient to facilitate easy movement by pedestrians and may vary depending on the character of an area. At a minimum, sidewalk widths must meet the contextual needs of the pedestrian access route. Where the sidewalk is not buffered from motor vehicle traffic, the preferred total width for a curb-attached sidewalk is at least 6 feet in residential areas and at least 8 feet in commercial areas. Additional width should be provided as needed in commercial areas for frontage zones and in locations where large volumes of pedestrian traffic can be expected based on context. In locations where sidewalks are constructed so that they are immediately adjacent to roadways and building faces, the walkway should include at least 2 feet of width for shy distance from walls, railings and fixed objects while also providing the necessary width for easy travel by the expected pedestrian, including those who use wheelchairs or other mobility devices.

Curb-attached sidewalks and buffer areas should be considered on all new and reconstructed state facilities and incorporated whenever possible in population centers.

B. Sidewalk Buffer

In general, separation between pedestrian and motor vehicle traffic is desirable. The optimal width of a buffer zone varies depending on the character of an area and the traffic conditions on the adjacent roadway. Increased buffer width can reduce traffic stress for pedestrian's providing a sense of safety and comfort and reducing crash exposure. Greater separation from traffic is desirable where there are higher vehicle volumes and/or higher speeds.

Where curb-attached sidewalk is provided, at least a 3 foot buffer is required. Where an at grade pedestrian facility is separated from motor vehicle traffic by a swale or ditch a buffer zone of at least 4 feet or wider is recommended. Buffers should be maximized on higher speed, higher volume roadways. A buffer zone 7 feet wide will allow for installation of curb ramps, street lights, and signs outside the pedestrian access route. The buffer should be widened to accommodate the space occupied by any objects placed there, and still provide 2 feet clear to both the roadway and the sidewalk.

On roadways without curbs, buffer widths equal to or greater than the clear zone appropriate for the roadway are desirable.

Wider buffers also provide space to manage driveway slopes, making it easier to comply with cross slope limits that facilitate the preservation of the pedestrian access route at driveway crossings and prevent the need to drop sidewalks to grade at every driveway crossing. Buffer areas are frequently used for storage of snow removed from adjacent roadways in climates where snow accumulation is common. If the buffer area is used for snow storage, the buffer width should be scaled accordingly, bearing in mind that people who rely on pedestrian access continue to do so during the winter.

Rural Buffer

Suburban Buffer

Urban Buffer
Source: NACTO

C. Multipurpose sidewalk buffers

During planning and design consider buffer areas that serve multiple purposes such as stormwater management, clear zone, bike parking, bike paths, snow storage, or hardscape buffer areas. *Design Manual* Chapter 301 discusses maintenance agreements between state and local agencies.

Urban stormwater management buffer

Surburban stormwater management buffer

Urban hardscape buffer
Source: NACTO

4-6.2 Pedestrian Crossings at Uncontrolled Locations

Uncontrolled pedestrian locations occur where a sidewalk or pedestrian path intersects a roadway where no traffic control exists such as a stop sign or traffic signal. This locations can be at intersections or midblock locations.

The focus of this section is crossings without intersection control such as a traffic signals or stop signs. Many of the design considerations for uncontrolled crossings can be incorporated into locations with controls as well; controls may need to be increased based on traffic volumes and speed.

Between 2015-2017, over half (54%) of all pedestrian and bicyclist fatalities and serious injuries occurred while the person was crossing the roadway. By focusing on pedestrian crossing needs and understanding crossing patterns agencies can take advantage of a significant statewide safety need and improve quality of life and transportation access for pedestrians of all ages and abilities. Bicyclists in crosswalks are defined in state law as pedestrians; their transportation needs are also addressed through crossing improvements.

A. Federal Law

The *Manual on Uniform Traffic Control Devices for Streets and Highways*, or MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public travel. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F.

B. State Law

Legal crosswalks exist at all intersections, whether marked or not, per RCW 46.04.160. Marked crossings at other locations are called mid-block crossings and can occur at schools, commercial areas, parks, transit stops, or other areas where pedestrians need to cross the roadway. See *Design Manual* Chapter 1510 for additional discussion on marked and unmarked crossings.

C. Agency Application

Designated crosswalks provide guidance for pedestrians and in conjunction with other measures help alert road users to a pedestrian crossing across a roadway. There are many factors to consider when deciding whether a marked pedestrian crossing is recommended at a specific location and what type of treatment is appropriate. Because every situation is unique, it is impossible to prescribe a "one size fits all" evaluation process that would work in every situation. The study process and criteria here are presented as guidance. Consult the WSDOT Action Plan for Implementing Pedestrian Crossings Countermeasures at Uncontrolled Locations for additional discussion. The final decision to install pedestrian crossing infrastructure is subject to review and approval of the Region Traffic Engineer.

D. Studies

WSDOT requires an engineering study to determine whether a crosswalk should be provided and the treatment needed. Implementation of a marked crosswalk at an uncontrolled location shall require approval from the Region Traffic Engineer or designee in accordance with *Design Manual* Chapter 1510.

WSDOT uses engineering studies to determine where Pedestrian Signals or Pedestrian Hybrid Beacons may be used on State Highways.

Engineering studies are recommended for updating existing marked uncontrolled crossings.

An engineering study by WSDOT is not required for systems installed by local jurisdictions. Local agencies will need to comply with all applicable DOT permit approval processes.

E. Study Components

The engineering study should include:

- Location description and physical data
- Establish location context and modal priorities. See *Design Manual* Chapter 1102 and 1103 respectively.
- Review state, regional, and local plans
- Establish crossing need and patterns
- Identification of crossing treatments or countermeasures
- Stakeholder and community outreach
- Recommended action

F. Location Description and Physical Data

The following items are not an exhaustive list but can be used as guide to begin a study.

- Traffic volume, traffic speeds, number of travel lanes, destinations, transit or public transportation usage, and roadway classification. Also consider the Level of Traffic Stress index developed for the Active Transportation Plan, which incorporates as most of these elements.
- Roadway geometrics and visibility
- Traffic control and lighting
- Pedestrian/bicyclist safety data including crash severity and frequency
- Pedestrian/bicyclist volumes (noting that volumes may be low due to the lack of appropriate facilities, not lack of need or demand)
- Known pedestrian/bicyclist crossing activity in dark or night time conditions
- Proximity to adjacent enhanced crossings
- Proximity to transit stops, other intermodal connections such as ferry landings and rail stations, trails/shared-use paths, or other pedestrian/bicyclist generators (employment centers, schools, parks, restaurants, bars, businesses, health services, etc.)
- Land use context and future land use changes, growth, or development patterns
- Demographics of the population within the walk shed of the location
- Pedestrian/bicyclist delay or suitability of gaps
- Consistency with local agency plans that include the location as a part of their pedestrian/bicycle network

G. Establish crossing need

After data collection is complete the next step is assessing the pedestrian/bicyclist need at the location, as well as the suitability of the location based on roadway, traffic, and adjacent land use characteristics. Pedestrian crossing needs may exists if any of the following are indicated:

- Pedestrian/bicyclist crash and near miss history
- Crash types and contributing factors
- Known pedestrian/bicyclist crossing activity especially in dark or night time conditions
- Proximity to adjacent enhanced crossings
- Proximity to transit stops, trails/shared-use paths, or other pedestrian/bicyclist generators (employment centers, schools, parks, restaurants, bars, businesses, health services, etc.)
- Land use context and future land use changes, growth, or development patterns
- Demographics of the population within the walk shed of the location. Give special consideration in communities where there are higher numbers of people over 65, people with disabilities, and areas of lower income.
- Pedestrian/bicyclist delay or suitability of gaps
- Walking desire lines or biking patterns
- Consistency with state or local agency plans that include the location as a part of their pedestrian/bicycle network

H. Safety Data Discussion

Pedestrian crash data are the most commonly used statistic for evaluating safety. However, the frequency and accuracy of pedestrian and bicyclist crash data are generally low and research has found that crashes are underreported. Therefore using crash data as the sole method by which crossings are evaluated is not usually practical. Surrogates for crash data include roadway speeds, number of lanes, vehicle volumes, population density, and population demographics such as age and ethnicity. The Level of Traffic Stress developed for the Active Transportation Plan can serve as a proxy in the absence of crash data.[3] FHWA guidance on determination and use of pedestrian risk factors can be found in the following FHWA documents:

- Systemic Pedestrian Safety Analysis
- Synthesis of Methods for Estimating Pedestrian and Bicyclist Exposure to Risk at Area wide Levels and on Specific Transportation Facilities

[3] Contact Active Transportation Division to obtain this information

I. Collaboration with Stakeholders

Collaboration is a priority so improvements are consistent with state and local plans, goals, and overall network connectivity. Contact local agencies and communities affected by the project to help understand local context early to help aid in evaluating the project site.

J. Determine pedestrian crossing needs or countermeasures

This step of the engineering study is to evaluate the crossing based on the roadway and traffic characteristics. These characteristics relate to the FHWA guidance found in Exhibit 4-2 and 4-3. Characteristics to consider include: Traffic volumes, posted speed, number of lanes (total and number that would need to be crossed consecutively without an intermediate pedestrian refuge), presence of median, motorist and pedestrian sight distance, proximity to nearby enhanced crossings, ADA compliance of existing features, illumination, and presence of on-street parking.

K. Identify Countermeasures Options - FHWA Pedestrian Crossing Treatment Guide[4]

Once the need for a pedestrian crossing is established and the location is identified, the next step is to select the crossing treatment. This section presents countermeasures FHWA suggests to consider for various roadway conditions. Exhibit 4-2 is a baseline guide for evaluating countermeasure options for roadway conditions such as vehicle volumes, speeds, and roadway configuration. Each matrix cell indicates possibilities that may be appropriate for designated pedestrian crossings. In all cases, the countermeasures, when implemented, should follow MUTCD and other relevant AASHTO, FHWA and state policies. Follow department policy and guidance if conflicts arise with use of this table. See Section 4-6.3 for supplemental RRFB guidance.

Changes made for speed management to minimize serious-injury and fatal collisions by reducing posted and operation speeds will change crossing conditions and control measures.

[4] Exhibit 4-2 was adapted from FHWA Guide for Improving Pedestrian Safety at Uncontrolled Locations, 2017.

Exhibit 4-2 Application of pedestrian crash countermeasures by roadway feature

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	● 2 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6 7 9	○ 5 6 7 9	○ 5 6 ● 9
3 lanes with raised median (1 lane in each direction)	● 2 3 4 5 7 9	● ● 5 7 9	○ ● 5 ● 9	○ 3 4 5 7 9	○ ● 5 ● 9	○ ● 5 ● 9	○ 4 5 7 9	○ ● 5 ● 9	○ ● 5 ● 9
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	● 2 3 4 5 6 7 9	● ● 5 6 7 9	○ ● 5 6 ● 9	○ 3 4 5 6 7 9	○ ● 5 6 ● 9	○ ● 5 6 ● 9	○ 4 5 6 7 9	○ ● 5 6 ● 9	○ ● 5 6 ● 9
4+ lanes with raised median (2 or more lanes in each direction)	● ● 5 7 8 9	● ● 5 7 8 9	○ ● 5 ● 8 9	○ ● 5 7 8 9	○ ● 5 ● 8 9	○ ● 5 ● 8 9	○ ● 5 ● 7 8 9	○ ● 5 ● 8 9	○ ● 5 ● 8 9
4+ lanes w/o raised median (2 or more lanes in each direction)	● ● 5 6 7 8 9	○ ● 5 ○ 6 7 8 9	○ ● 5 ○ 6 ● 8 9	○ ● 5 ○ 6 7 8 9	○ ● 5 ○ 6 ● 8 9	○ ● 5 ○ 6 ● 8 9	○ ● 5 ○ 6 ● 7 8 9	○ ● 5 ○ 6 ● 8 9	○ ● 5 ○ 6 ● 8 9

Given the set of conditions in a cell,

\# Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB) and Pedestrian Signals**

**Refer to Chapter 4, 'Using Table 1 and Table 2 to Select Countermeasures,' for more information about using multiple countermeasures.*

***It should be noted that the PHB and RRFB are not both installed at the same crossing location.*

This table was developed using information from: Zegeer, C.V., J.R. Stewart, H.H. Huang, P.A. Lagerway, J. Feaganes, and B.J. Campbell. (2005). Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines. FHWA, No. FHWA-HRT-04-100, Washington, D.C.; FHWA. Manual on Uniform Traffic Control Devices, 2009 Edition, (revised 2012). Chapter 4F, Pedestrian Hybrid Beacons. FHWA, Washington, D.C.; FHWA. Crash Modification Factors (CMF) Clearinghouse. http://www.cmfclearinghouse.org/; FHWA. Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE). http://www.pedbikesafe.org/PEDSAFE/; Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.; Thomas, Thirsk, and Zegeer. (2016). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington, D.C.; and personal interviews with selected pedestrian safety practitioners.

L. Addressing crossing characteristics

Exhibit 4-3 shows the specific crossing characteristics that each countermeasure may address. For example, the addition of Pedestrian Hybrid Beacons has been consistently shown to improve motorist yielding by 90 percent or greater, when compared with no traffic control or warning type devices. This table is from FHWA Guide for Improving Pedestrian Safety at Uncontrolled Locations, 2017 and WSDOT's Action Plan for Implementing Pedestrian Crossings Countermeasures at Uncontrolled Locations.

Exhibit 4-3 Safety issues addressed per countermeasure

Pedestrian Crash Countermeasure for Uncontrolled Crossings	Crossing Characteristic Addressed				
	Conflicts at crossing locations	Excessive vehicle speed	Pedestrian conspicuity & visibility	Driver not yielding to pedestrians in crosswalks	Separation from traffic
Crosswalk visibility enhancement	✓	✓	✓	✓	✓
High-visibility crosswalk markings*	✓		✓	✓	
Parking restriction on crosswalk approach*	✓		✓	✓	
Improved nighttime lighting*	✓		✓		
Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line*	✓		✓	✓	✓
In-Street Pedestrian Crossing sign*	✓	✓	✓	✓	
Curb extension*	✓	✓	✓		✓
Raised crosswalk	✓	✓	✓	✓	
Pedestrian refuge island	✓	✓	✓		✓
Pedestrian Hybrid Beacon	✓	✓	✓	✓	
Road Diet	✓	✓	✓		✓
Rectangular Rapid-Flashing Beacon	✓		✓	✓	✓

*These countermeasures make up the STEP countermeasure "crosswalk visibility enhancements". Multiple countermeasures may be implemented at a location a part of crosswalk visibility enhancements.

M. Using Multiple Countermeasures

Exhibit 4-2 provides baseline countermeasure considerations for various roadway conditions. Not all of the countermeasures listed in the matrix cell should necessarily be installed at a crossing. WSDOT staff should also review crossing characteristics discussed in Exhibit 4-3, the surrounding land development context, pedestrian travel patterns, and countermeasure effectiveness when considering what countermeasure(s) are best suited for the crossing. Apply practical solutions approach to determining appropriate treatments within the context of the project or program.

N. Multi-lane and high volume roads

At multi-lane roadway crossings where vehicle daily traffic volumes are in excess of 10,000 vehicles, a marked crosswalk alone is typically not sufficient.[5] Under such conditions, more crossing improvements are also needed to reduce pedestrian crash potential. Examples of more substantial treatments include a refuge islands, a pedestrian signal, and RRFB (rectangular rapid flashing beacon). Refer to the symbols used in Exhibit 4-1 for when a marked crosswalk should be paired with one or more of the other countermeasures described. Advance stop lines and "Stop Here for Pedestrian" signs shall be used in advance of all crosswalks with more than two or more through lanes in one direction. See MUTCD 3B.16 for guidance and IS-23 for additional Pedestrian Crossing Details.

O. Sight Distance

See *Design Manual* Chapter 1320 for establishing site lines at roundabouts and Chapter 1510 for establishing sight lines at other crossings.

P. Existing Crossings

Improving existing crossings that are not part of a new construction and alternations can be challenging for many reasons such as the natural or built environment, funding, and resource availability. The goal is to reduce the potential for, and the severity of crashes while also using the Department's limited resources strategically. For example, Exhibit 4-2 does not suggest considering Rectangular Rapid Flashing Beacons (RRFB) for three lane (1 lane in each direction with a two-way left-turn lane) roadways without medians, traffic volumes over 15,000 ADT, and speeds in excess of 35 mph. If the crosswalk will remain in place a RRFB does improve conspicuity so it still may be a practical solution until such time the roadway is reconstructed or additional funding is secured.

Q. Increasing conspicuity of crossing

To further increase visibility of pedestrian crossings, consider integrating multiple countermeasures or enhancing existing ones. Examples include:

- Doubling up signs (left and right) or adding retro-reflective strips to sign posts can enhance existing measures.
- RRFB are often installed in conjunction with advance stop markings and signs.
- Road diets or pavement reallocation present opportunities for adding pedestrian refuge islands and curb extensions at key crossing locations. Consider roadway geometry and the MUTCD when integrating multiple countermeasures.

[5] Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations, FHWA, 2005

4-6.3 Pedestrian and Bicycle Beacons on State Highways

A. Rectangular Rapid Flash Beacons

At some uncontrolled crossings, particularly those with four or more lanes, and posted speeds above 25 mph it can be difficult to achieve compliance with laws that require drivers to yield to pedestrians. One type of device proven to be successful in improving driver yielding compliance at crossings is the rectangular rapid flash beacon (RRFB). RRFBs are a pedestrian crossing sign combined with an intense and rapid flashing beacon that is only activated when a pedestrian is starts it. Unlike pedestrian signals or hybrid beacons, these devices provide immediate service to pedestrians meaning there is little or no wait times. Studies indicate that pedestrians can become impatient when experiencing delays.[6]

RRFBs are considerably less expensive to install than mast-arm mounted pedestrian signals and are considered a practical crosswalk improvement solution. They can also be installed with solar-power panels to eliminate the need for a power source. RRFBs should be consistent with the WSDOT standard plan sheet library for Rectangular Rapid Flashing Beacon (RRFB) Details & Pedestrian Crossing Details (IS-22 & IS-23). They are usually implemented at high-volume pedestrian crossings, but may also be considered for school crossings, priority bicycle route crossings or locations where bike facilities/trails cross roads at mid-block locations. RRFBs must be in accordance with FHWA's Interim Approval (IA-21), issued on March 20, 2018. WSDOT has already resubmitted, and received approval from FHWA, to use the RRFB.

Exhibit 4-4 below describes the conditions under which RRFBs, alternate beacons, and advance beacons should be used. Installation on roadways with a posted speed greater than 40 mph requires a crossing study with approval from the Region Traffic Engineer. At any location type marked as "Optional" or "Not required", RRFB's or other pedestrian beacons may be installed by the local jurisdiction, but the local jurisdiction is responsible for all costs and materials for installation, maintenance, and repairs. A crossing study by WSDOT is not required for systems installed by the local jurisdiction.

Exhibit 4-4 Use of RRFB's on State Highways

Roadway Type	Posted Speed Limit (MPH)	RRFB/Alternate Beacon at Crossing [1]	Advance Beacons [2]
All roadway lane configurations	≥40	Required	Optional
	35	Optional	Optional
	≤30	Not Required	Not Required
Roundabouts	Any Speed	Contact HQ Traffic Office	
Regional Trail Crossing	Any Speed	Contact HQ Traffic Office	

Notes:

1. ADT should be considered as part of the decision.
2. Advance beacons are required when driver sight distance is not met for the crossing.

[6] 2016 *Highway Capacity Manual*, Chapter 19

B. Pedestrian & Bicycle Beacon Placement

The locations of the primary and advance beacons varies with the configuration of the roadway. Beacons shall be placed as shown in the IS-23 details (available on the IS-22 web page at www.wsdot.wa.gov/Design/Standards/PlanSheet/IS-22.htm.

Where Advance Circular Beacons are installed due to crosswalk sight distance, they shall operate continuously. All other advance beacons shall be pedestrian activated with the beacons at the crossing.

If advance circular beacons are used, then use a minimum 8-inch displays for roadways with a posted speed limit of 35 MPH or less and 12-inch displays for roadways with a posted speed limit of 40 MPH or higher. Exhibit 4-5 provides guidance on where to place beacons based upon roadway lane configuration.

Exhibit 4-5 Beacon Placement on State Highways

Roadway Configuration			Required Placement			
Traffic Direction	Number of Lanes in One Direction	Median Present [1]	Right Shoulder	Left Shoulder	Median [1]	Overhead
One-way	Two	N/A	X	X		
	Three	N/A	X	X		X
Two-way	One	N/A	X	X		
	Two	Yes	X		X	
		No	X			X
	Three or More	Yes	X		X	X
		No	X			X
Roundabout Approach	Two	N/A	X	[2]	X[2]	
	Three	N/A	X	[2]	X[2]	X

Notes:

1. Median includes open medians, median islands, pedestrian refuge islands, and roundabout approach splitter islands.
2. For one-way roundabouts approaches, the left side beacon shall be installed on the left shoulder, since no splitter island is present.

4-6.4 Roadway Bicycle Facilities

WSDOT is the steward of a multimodal transportation system and this system includes facilities for bicyclists and users of mobility assistive devices and encourages bicycle use on and interconnecting with its facilities. Bicycle facilities or improvements for bicycle transportation are included in WSDOT's project development and highway programming processes.[7] When choosing the bicycle facility keep in mind that lower stress facilities attract more users, in particular the "interested but concerned" potential users because bicycle facilities decrease exposure to moving motor vehicle traffic.

Designing for current, confident riders does less to support mode shift than designing for people of all ages and abilities.

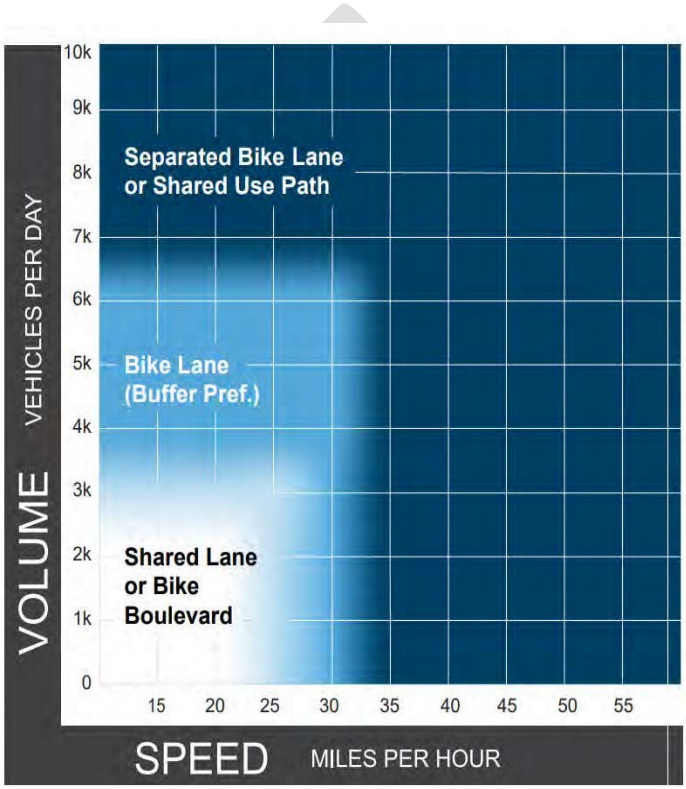
[7] WSDOT *Design Manual* Section 1520.01

A. Urban Context

Generally, the higher the speed and volume of a road, the more protected or separated the recommended bikeway will be. Shared lanes or bicycle boulevards are recommended for the lowest speeds and volumes; bike lanes for low speeds and low to moderate volumes; and separated bike lanes or shared use paths for moderate to high speeds and high volumes.[8]

Use the Exhibit 4-6 from the FHWA 2019 Bikeway Selection Guide to help determine the type of bike facility to include on projects in the urban core, urban, suburban, and rural town/community center context. *Design Manual* Chapter 1515 discusses shared use path design. The NACTO Urban Bikeway Design Guide provides additional information. For discussion of intersection designs, consult the NACTO bikeway intersection supplement and research-based contextual guidance.

Exhibit 4-6 Preferred bikeway type for urban core, urban, suburban, and rural town context



Notes:

1. The chart assumes operating speeds are similar to posted speeds. If they differ, use operating speed rather than posted speed, or use treatments to bring operating speed down.
2. Advisory bike lanes may be an option where traffic volume is <3K ADT.
3. The Bikeway Selection Guide includes a discussion of alternatives if the preferred bikeway type is not feasible.

[8] FHWA 2019 Bikeway Selection Guide

B. Rural Context

The bicyclist type often assumed to be present on roadways in rural areas is the recreational bicyclist, who often fits the highly confident or somewhat confident user category. Based upon context and demographics, however, rural bicyclists may be riding out of necessity and should not be assumed to be highly skilled or confident. Paved shoulders, and shared use paths are appropriate bikeway types on rural roadways. Shared lanes are a last resort under conditions of extremely low traffic volume and are undesirable for high-speed roadways. Shoulder width is an important consideration to accommodate these bicyclists based on traffic volumes and posted speeds in the rural context.[9] See *Design Manual* Chapter 1520 for more information on accommodating riders in rural areas. The Level of Traffic Stress analysis in the Active Transportation Plan (2020 Update) includes analysis specific to low-volume, high-speed rural roads and should be consulted for additional information.

State highways can act as both a barrier and an opportunity for walking and bicycling especially in rural communities and transitions between rural and urban areas. Look for opportunities to increase active transportation connections and access from communities to activity centers such as schools, parks, or scenic areas. This could include adding shoulders to highways or providing a separated shared-use path, especially along rural roads with higher speeds. This is especially true for locations that attract larger volumes of bicyclists due to scenic views or for routes that serve as key bicycle connections between destinations or between segments of a regional trail.[10] Below is an example on State Route 903 where a separated multiuse path connects a school complex with the City of Cle Elum.

[9] FHWA 2019 Bikeway Selection Guide
[10] FHWA 2019 Bikeway Selection Guide

C. Shoulder Rumble Strips

Rumble strips are milled grooves or rows of raised pavement markers placed perpendicular to the direction of travel, or a continuous sinusoidal pattern milled longitudinal to the direction of travel, intended to alert inattentive drivers to a potential lane departure. The sinusoidal pattern can be used when a low noise design is desired. Rumble strips including those placed on the shoulder are considered a proven safety countermeasure by FHWA and can reduce fatal and injury crashes on two-lane rural highways by 36 percent.[11] Although rumble strips are a proven roadway safety feature they can affect other users of the roadway, particularly bicyclists. WSDOT serves all roadway users, therefore designs should consider safety purpose and assume the potential presence of active transportation users regardless of the level of usage. Additional information to determine level of bicycle usage include:

- Local transportation maps. These maps may be generated at the regional level in a Metropolitan Planning Organization or Regional Transportation Planning Organization such as bike map for Thurston Regional Planning Council in Thurston County, WA.
- WSDOT Bicycle and Pedestrian Count Portal
- Active Transportation Division's State Bicycle and Pedestrian Coordinator is a good resource for information on how a particular segment fits into the statewide active transportation network.
- Local bicycle groups. Note: When meeting with local bicycle groups include discussion of project needs, safety data, and why rumble strips are being considered. Be open to discuss how to balance all competing and complementary uses of the transportation systems. Also, it is helpful to become familiar with what national advocacy groups are recommending to their membership. Once such National advocacy organization is Adventure Cycling Association has a website regarding rumble strips and recognizes WSDOT practices for being bicycle friendly.
- Design accommodations for bicyclists should consider within the context, volumes, and adjacent land use:
  - The design, spacing and placement of rumble strips on roads with signif-icant bicycle traffic and if appropriate how other safety strategies such as wide edge lines, improved curve signing, or speed management if appro-priate for context and land use might work to address the crash potential for all users.
- Adjusting rumble strip dimensions[12]
- Reduce width. For example consider 5 to 6 inch wide rumble strips instead of 12 and 16 inches. If used check for any documentation requirements in the *Design Manual*.
- Reduce depth. For example consider ⅜ inch grooves instead of ½"

[11] FHWA, Rumble Strips and Rumble Strips Website
[12] NCHRP Report 641 Guidance for Design and Application of Shoulder and Centerline Rumble Strips

- Place rumble strips on edge line. The practice allows the placing the edge line pavement markings over the rumble strip. This improves nighttime marking visibility, particularly in wet conditions, by better positioning the marking optics on the back side of each rumble. This practice can also increase the longevity of the markings, particularly within the rumble, due to reduced wear from tires and added protection from plowing activity.
- Re-purpose roadway pavement surface if shoulder widening is not possible. Consider narrowing lane width to increase shoulder width to be at least 4' of usable shoulder or 5' along barrier.
- Providing gaps in periodic cycles to allow opportunities to move across the pattern without riding on the grooves. See Standard Plan M-60.20 for examples of different gap patterns. For highways that allow cyclists this should be considered customary practice.
- Providing gaps before and through intersections, manholes, and other objects within the roadway.
- Discontinue next to barriers and on downhill side of grades.

Other considerations include effects to future pavement preservation and most specifically bituminous surface treatments. Although it is preferred by the biking community to place rumble strips on the white edge line the rumble strip may be filled in by future bituminous surface treatment. To plan for countermeasures longevity consult with pavement management plans. If the roadway is to be resurfaced in the near future consider the following:

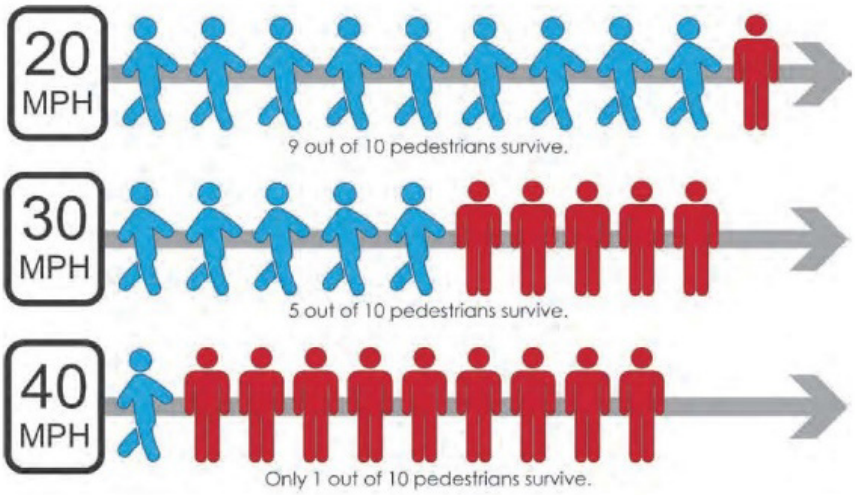
- Incorporate into future resurfacing project; or
- Delay the rumble strip installation until after roadway is resurfaced.

Consult the Standard Plans (rumble strips) or Plan Sheet Library (rumble stripes) for patterns and construction details. Also, see *Design Manual* Chapter 1600 for further information and design guidance. NCHRP Report 641 Guidance for Design and Application of Shoulder and Centerline Rumble Strips is a good reference.

4-6.5 Active Transportation Design Considerations

1. **Design to reduce speeds –** Speed affects severity of pedestrian crashes. As vehicle speeds increase pedestrians and bicyclists who are struck by a driver are more likely to die or serious injury. Also see the Washington State Strategic Highway Safety Plan, Target Zero, Pedestrian & Bicycle section speed management strategies for consideration. Exhibit 4-7 illustrates the effect of speed on pedestrian survivability.

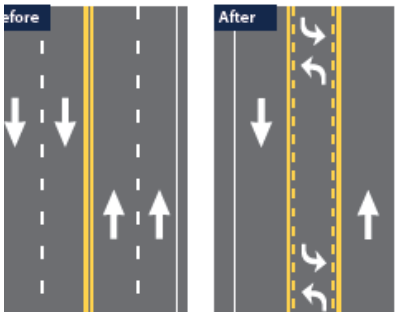
Exhibit 4-7 Effect of operating speeds on survivability odds of impact



Roundabouts

Reduce Curve Radii and provide bulb outs

Right Sized Roads and Intersections
Source: FHWA



2. **Improve crossings –** The most common action that a pedestrian takes before a fatal or serious injury crash is crossing the road. Improve crossings by increasing sight lines, crossing conspicuity, or providing design features that address identified conflicts, exposure to crashes and ADA issues.

Parking Restrictions
Source: Peter Lagerwey

Pedestrian Traffic Signal
Source: Fehr & Peers

Pedestrian Refuge Islands

Rapid Flashing Beacon

Edge line medians
Source: Transpo Group

Lighting
Source: PedSafe

3. **Reduce conflicts –** Reducing conflicts for both drivers and active transportation users reduces exposure to crashes. Intersections that reduce or simplify conflict areas such as roundabouts or protected intersections should be considered first when traffic control changes are considered.

Roundabout

Leading Pedestrian Interval

Protected Intersection
Source: NATCO

4. **Network Connectivity –** A fundamental concept of transportation is network connectivity: connecting people to where they want to go. Motorists can rely on having access to a complete network. However, this is not the case for pedestrians and bicyclists. Lack of connected infrastructure creates conflict zones with drivers, and higher potential for crashes. Disconnected street networks, highway or railroad barriers, high-crash or uncomfortable intersections, and difficult midblock crossings must be addressed to improve network connectivity and reduce crash exposure. Appropriate treatments along roadways vary widely based on context. Often times the first place to examine system gaps and opportunities are local plans and maps.

5. **Separate active transportation users from drivers –** Exposure to moving motor vehicle traffic can be stressful for people walking and riding bicycles which affects both the appeal of active transportation options and actual trip safety. Comfort and exposure to crashes are closely related. Higher comfort facilities lower crash exposure by locating higher speed heavier vehicles further from lower speed and lighter active transportation. Improved connectivity and comfort for active transportation users benefits all roadway users by providing visibility and predictability, leading to better perception and reaction within the roadway environment.

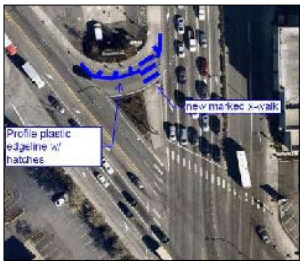
Multi-Use Path
Source: FHWA

Bike Lane Buffer
Source: FHWA

Pedestrian Buffer
Source: FHWA

6. **Low cost countermeasures –** These projects offer opportunities to improve conditions for other roadway users using low cost measures especially in urban and rural town contexts where budget constraints would otherwise prevent installation of an improvement. Considerations could include updating older pedestrian crossing signs, replacing/enlarging school zone beacons, adding painted bulb-outs at intersections, and/or narrowing wide lanes to allow wider shoulders or bike lane buffers. There also may be opportunities to partner with other organization efforts such as signal replacement program, etc. that may allow for more cost effective solutions that benefit more roadway users and WSDOT programs. Examples of some low cost countermeasures are below.

Painted buffers



Painted bulb-outs

Low Cost Roundbouts

Bike Lane Buffers
Source: FHWA

Leading Pedesrian Interval

Multidiciplinary Scoping Meeting

Pavement Re-allocation
Source: Fehr & Peers

Add Pedestrian Crossing Signs

7. **Work Zones –** Public entities are responsible for maintaining pedestrian facilities under Title II of the ADA, including maintenance of their accessibility features, construction and maintenance activities often temporarily disrupt these facilities. When this occurs, provide access and mobility for pedestrians through and/or around work zones. Address this in the temporary traffic control plans if the project occurs in a location accessible to pedestrians. The designer is required to determine pedestrian needs in the proposed work zone during the public input process and through field visits. Also consider accessibility for adaptive bicycles and tricycles, which may be larger and have a different turning radius; users may not be able to dismount to get through a work zone. For more information see the following:
   - *Design Manual* Chapter 1510
   - *Traffic Manual* Chapter 5
   - WSDOT work zone website

Positive Protection
Source: Rideshark

Modular Ramps
Source: Road & Bridges

Audible Devices
Source: Empco-Lite

4-6.6 Countermeasure Descriptions

A. Advance Stop Line and Stop Here for Pedestrians Sign

A multiple threat crash results when a driver in one lane stops to let a pedestrian cross, blocking the sight lines of a driver in the other lane of a multi-lane approach, who then advances through the crosswalk and hits the crossing pedestrian. Advanced stop lines is one way to mitigate this concern.

If advance stop lines and 'Stop Here for Pedestrians' R1-5b/R1-5c signs are used in advance of a crosswalk, they should be placed together and 20 to 50 feet before the nearest crosswalk line; motor vehicle parking should be prohibited in the area between the stop line and the crosswalk. The MUTCD requires R1-5 signs when stop lines are used in advance of a crosswalk with an uncontrolled multi-lane approach. WSDOT has a Standard Plan M 24.60-04 that provides a typical detail for a stop line. Also see IS-23 for additional Pedestrian Crossing Details.

Advance stop lines and "Stop Here for Pedestrian" signs shall be used in advance of all midblock crosswalks with more than two or more through lanes in one direction.

B. Bicycle Treatments

Green Bicycle Lane Extensions
Source: AASHTO

Green Bicycle Boxes. A green bicycle box is helpful for routes that are also used as freight routes in order for drivers to better see bicyclists by situating them ahead of drivers at intersections.

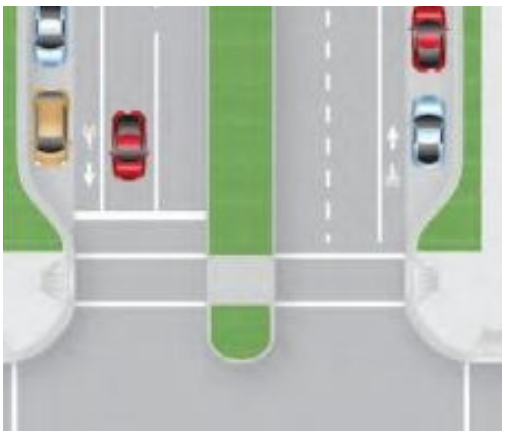
Bicycle signals can be used to improve truck and bicycle safety at intersections by separating the turning and allowing for increased conflict point management. Allowing for independent or early movement of bikes, given their much smaller size increases visibility and allows for necessary maneuvers such as lane changing to occur without higher speed vehicles at intersections.

Protected bike lanes. Protected bike lanes are defined by their separation from the sidewalk and the roadway. Protected bike lanes that are part of a freight network, can provide higher visibility and predictability, information for all travelers. If a protected bike lane cannot be accommodated, a buffered bike lane with vertical separators is recommended.

See *Design Manual* Chapter 1520 for further information and guidance.

C. Curb Extensions

Curb Extension
Source: PedSafe



Known also as curb bulbs and bulbouts, curb extensions extend the curb face to the edge of the nearest driving lane. The curb extension takes the place of a parking lane or shoulder at an intersection or midblock location. They are most commonly applied at intersections where they are intended to reduce the exposure to pedestrian by reducing crossing distance, slowing right-turning vehicles, increasing the line of site between motorists and pedestrians; and providing more space for landscaping or stormwater management, among other features. Curb extensions are also seen in mid-block situations to slow vehicle speeds and reduce crossing distances at mid-block crossings. Curb extensions can affect bicyclist mobility; that design needs to take this into consideration. The description for alternative to pedestrian refuge islands in this section provides an example on how to accommodate bicycles. Also see *Design Manual* Chapter 1510 for additional guidance.

D. Enhancements at Marked Crosswalks

Pedestrian visibility and driver compliance can be increased at locations with marked crosswalks with high visibility pavement markings, advanced stop bars and with warning signs, in-street pedestrian crossing signs, illumination, curb extensions, and/or tighter curb radii.

E. High-Visibility Crosswalk Markings

High-visibility crosswalk markings make it easier for drivers to see the crosswalk, not just the pedestrian. When a decision has been made to use crosswalk markings, see Standard Plan M-15.10 for the typical longitudinal pattern known as a ladder bar crosswalk markings. This style of crossing marking is considered high-visibility.

F. In-street Pedestrian Crossing Sign

In-street signs are placed in the middle of the road at a crossing and are often used in conjunction with refuge islands. These signs may be appropriate on two-lane or three-lane roads with speed limits of 30 mph or less. MUTCD Section 2B.12 In-Street and Overhead Pedestrian Crossing Signs contains additional information about these signs. WSDOT does not have a policy for when and where to install in-street pedestrian crossing signs at uncontrolled locations. For additional information regarding the benefits of in-street pedestrian signs along with many other crossing enhancements see Oregon Department of Transportation Report 778, Safety Effectiveness of Pedestrian Crossing Enhancements.

In-street sign
Source: AASHTO

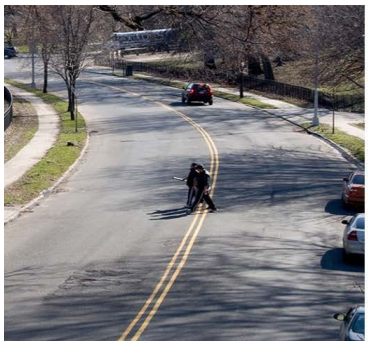
G. Illumination

In Washington state, the highest number of crashes between motorists and pedestrians tends to occur during November through February, when there is more hours of darkness and less visibility because of weather. The *Design Manual* Chapter 1510 notes that illumination of pedestrian crossings and other walkways is an important design consideration because lighting increases the likelihood of a pedestrian's being seen at night as well as a personal sense of security. Illumination provided solely for vehicular traffic is not always effective in lighting parallel walkways for pedestrians. For additional information regarding lighting and illumination see *Design Manual* Chapter 1510 and PedSafe Lighting and Illumination website.

H. Pedestrian Refuge Islands

A pedestrian refuge island is typically constructed in the middle of a street at an intersection or midblock locations. It provides a place for pedestrians to stand and wait for a gap in traffic or for drivers to stop. Whereas medians can vary in width, and composition, the minimum width of an island or median to be considered a pedestrian refuge is six feet.

Pedestrian Reguge Island (before/after)
Source: NACTO



Pedestrian refuge islands are considered a proven safety strategy by FHWA with an expected 56 percent reduction in pedestrian crashes. Washington State Strategic Highway Safety Plan, Target Zero, recommends refuge islands at pedestrian crossings to reduce crash potential.[13]

This countermeasure is highly desirable for midblock pedestrian crossings on roads with four or more lanes. Some key points are that pedestrian refuge islands minimize the exposed crossing distance; reduce the conflict area; allows pedestrians time to decide to cross one direction at a time; and minimize the effects on vehicular traffic. See *Design Manual* Chapter 1510 for accessibility Criteria for Raised Medians and Traffic Islands. Also see MUTCD Sections 3B.10—Approach Markings for Obstructions, 3B.18— Crosswalk Markings, and 3B.23—Curb Markings that provide information regarding use of signs and markings when raised medians or traffic islands are installed. See Standard Plan F-45.10 for dimensions and examples of median cut-through.

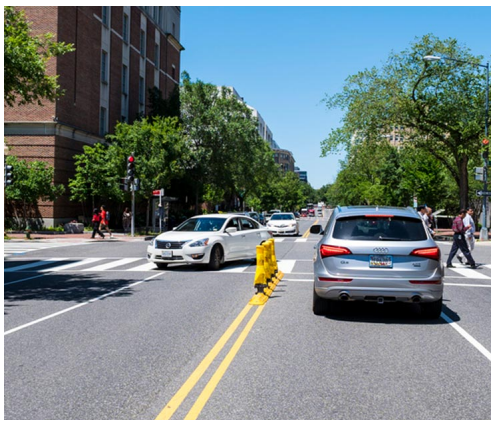
I. Pedestrian Refuge Islands (Alternatives)

A median is the portion of the roadway separating the traveled lane portions of opposing directions, or turn lanes. Medians may be depressed, raised, or flush with the road surface. Medians less than six feet and not raised do not qualify as a pedestrian refuge. However, they still provide benefits by narrowing the roadway, providing additional and more visible delineation, and contributing to speed management could be considered a low cost modification.

Edge line pedestrian medians can be considered at midblock locations or intersections where turn lanes need to remain. They can also be used in combination with pedestrian refuge islands to shorten the pedestrian crossing distance. These islands differ from medians and pedestrian refuge islands in that they align with the edge of the travel lane and have a bike lane behind them.

[13] Washington State Strategic Highway Safety Plan, 2019

Low Cost Median
Source: IIHS



Edge line Median
Source: Transpo Group

J. Pedestrian Signals including Pedestrian Hybrid Beacons (PHBs) and Half Signals

In some locations drivers may need to come to a complete stop to allow pedestrians to cross a roadway. A pedestrian traffic signal or PHB may be the preferred countermeasure.

These are candidate treatments for crosswalks across roads with three or more lanes that generally have traffic volumes above 9,000 vehicles. Refer to Exhibit 4-2 for other conditions where Pedestrian Signals and PHBs should be considered and MUTCD Sections 4C.05 Pedestrian Volume warrants and 4F-pedestrian hybrid beacons for their application. Currently the FHWA does not recommend half signals (see Sections 4C.05 and 4C.06 of MUTCD) nor placing PHB's at intersections (see Section 4F.02 of MUTCD). Pedestrian signals and PHB's can be used at roundabout intersection crossings and one- way approaches to intersections such as freeway exit ramps.

Currently, WSDOT prefers the use of pedestrian signals or rectangular rapid flashing beacons (RRFB) over PHB's due to maintenance and compatibility with existing systems. If a pedestrian traffic signal or PHB is being considered also examine the feasibility of a raised crosswalk or roundabout at the study location or adjacent intersection. Roundabouts slow driving speeds, provide refuge areas for pedestrians. For more information regarding roundabouts with pedestrians and bicyclists see FHWA Roundabouts with Pedestrians & Bicycles Brochure and WSDOT *Design Manual* Chapter 1320.

K. Rapid Flash Beacon (RRFB)

RRFB's are active (user-actuated) or passive (automated detection) amber LEDs that use an irregular flash pattern at mid-block or uncontrolled crossing locations. They significantly increase driver yielding behavior. See Section 4-6.3 for additional guidance on use of RRFB on State Highways.

L. Road Reallocation for All Modes (Also called Road Diets)

A road reconfiguration, also called a road diet, is a technique in transportation planning whereby the number of motor vehicle travel lanes and/or effective width of the road is reduced in order to achieve systemic improvements. FHWA considers road diets a proven safety strategy to reduce severe crashes. See Section 4-9 for more detailed discussion of roadway relocation.

M. Roundabouts

A roundabout is a type of circular intersection, but is quite unlike a neighborhood traffic circle or large rotary. Roundabouts have been proven safer and more efficient than other types of circular intersections. FHWA identified roundabouts as a Proven Safety Countermeasure because of their ability to substantially reduce the types of crashes that result in injury or loss of life. Roundabouts are designed to improve safety for all users, including pedestrians and bicycles. They also provide significant operational benefits compared to conventional intersections. Benefits of roundabouts to walkers and bikers include:

Less conflict: Roundabouts have fewer conflict points. A single lane roundabout has 50% fewer pedestrian-vehicle conflict points than a comparable stop or signal controlled intersection. Conflicts between bicycles and vehicles are reduced as well.

Shorter, setback crossings: Pedestrians cross a shorter distance of only one direction of traffic at a time since the entering and exiting flows are separated. Drivers focus on pedestrians apart from entering, circulating and exiting maneuvers.

Lower Speeds: Traffic speed any road or intersection is important for everyone, and especially non-motorized users. Lower speeds is associated with better yielding rates, reduced vehicle stopping distance, and lower risk of serious injury or fatality. Also the speed through a roundabout is more consistent with comfortable bicycle riding speeds.

Also see Section 4-8.6 and *Design Manual* Chapter 1310.

N. Raised Crosswalks

Raised crosswalks function as an extension of a sidewalk and allow a pedestrian to cross the street without moving down to street level. The elevated crossing draws attention to the crosswalk. Drivers slow down to cross the raised pedestrian crosswalk. It offers particular benefits for pedestrians using mobility assistance devices such as wheelchairs or walkers; consider land use, transit access and destinations that indicate potential for larger numbers of these users.

Raised Crosswalk
Interstate 35 off-ramp in Austin, Texas
Source: Google

FHWA suggests a raised crosswalk is typically a candidate treatment on two-lane or three-lane roads with speed limits of 30 mph or less and traffic volumes below 9,000. FHWA also suggested raised crossings are generally avoided on truck routes, emergency routes, and arterial streets. NACTO on the other hand suggests speed tables may be used on collector streets and/or transit and emergency response routes with vehicle operating speeds between 25 mph and 45 mph. Coordinate with emergency services and transit agencies when considering raised crossings.

See MUTCD Section 3B.25—Speed Hump Markings for additional information about markings that can be used alongside raised crosswalks.

O. Tighter Curb Radii

Tighter curb radius
Source: PedSafe

Tighter curb radii can increase sight lines between driver and pedestrian, shorten the crossing distance time to reduce exposure, bring crosswalks closer to the intersection, shortening crossing distances, and reduce speeds of right-turning drivers. The appropriate radius should be determined for each corner on a case by case based on the design vehicle for each right turn movement. Some key points are that each leg of an intersection may have a different design vehicle; that WSDOT policy provides flexibility when choosing the intersection design vehicle. The purpose for this policy is to balance user needs and avoid the unnecessary expense of oversizing intersections. Considerations include frequency of the design vehicle and effects on other design users, specifically pedestrian crossing distance and times, and bicycle turning and through movements. Consider providing more protected intersection treatments for pedestrians and bicyclists to mitigate turning conflicts. See *Design Manual* Chapter 1310 and Section 4-8 of this chapter for discussing about accommodating design vehicles and compound curves for right turn lanes.

Compound right turn curves provides a path that accommodates larger design vehicles and provides a tighter curb radii.

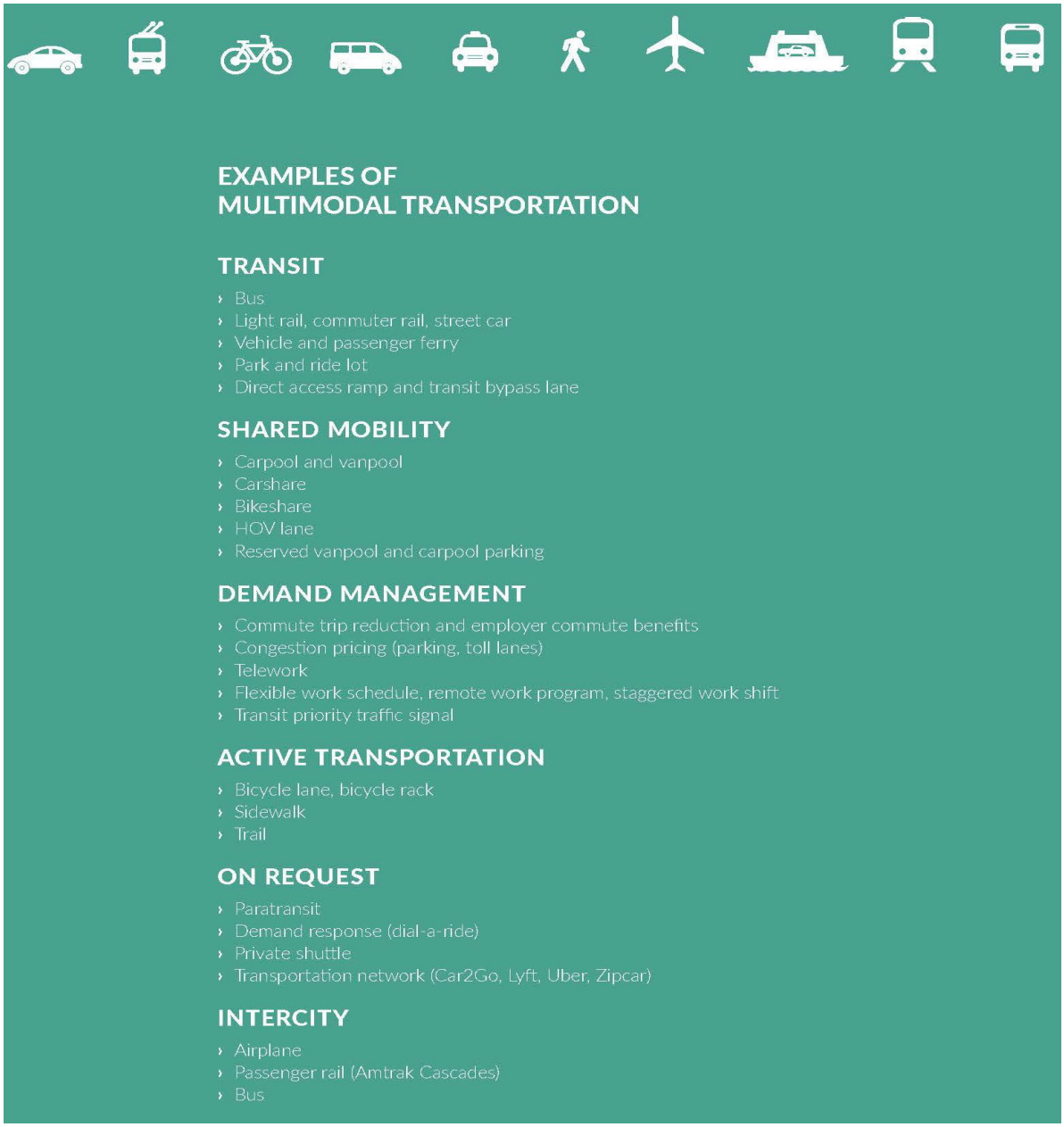
4-6.7 Active Transportation Resources

1. WSDOT Active Transportation Plan (2020 Update)
2. *Design Manual* Chapter 1103 Practical Design
3. *Design Manual* Division Chapter 15 Pedestrian & Bicycle Facilities
4. WSDOT Action Plan for Implementing Pedestrian Crossing Countermeasures at uncontrolled locations
5. Washington State Strategic Highway Safety Plan (Target Zero)
6. FHWA Office of Safety website
7. National Association of City Transportation Officials (NACTO).
8. NCHRP Research Report 926, Guidance to Improve Pedestrian and Bicyclist Safety at Intersections, 2020.
9. PEDSAFE Pedestrian Safety Guide and Countermeasure Selection System
10. PEDSAFE Bicycle Safety Guide and Countermeasure Selection System
11. FHWA's Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts, 2016
12. FHWA Guide for Scalable Risk Assessment Method for Pedestrians and Bicyclists
13. FHWA Bikeway Selection Guide
14. FHWA Resource Guide for Separating Bicyclists from Traffic
15. FHWA Toolbox of Countermeasures and Their Potential Effectiveness for Pedestrian Crashes
16. FHWA Small Town and Rural Multimodal Networks
17. FHWA's Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
18. FHWA's Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts, 2016.
19. FHWA's Small Town and Rural Multimodal Networks (2016)
20. FHWA Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities
21. ITE Design Guidelines for Accommodating Pedestrians & Bicyclists at Interchanges, 2016.
22. ITE, Implementing Context Sensitive Design Handbook, 2017.

4-7 Public Transportation

The need for public transportation in Washington continues to grow in many different ways. Washington is a diverse state with various public transportation markets such as urban and rural, commuter and off-peak, regional and local; and services, such as fixed-route, on-demand, bike/pedestrian facilities, telework, demand management tools and more. The figure below provides examples of different types of public transportation.

Public Transportation Definition
Public Transportation includes a broad array of transportation services and systems, public and private, that are accessible and available to the public and do not involve a single person in a motorized vehicle.



Washington's economy benefits demonstrably from public transportation's contribution to access, mobility and capacity of the transportation system. Delays on state highways, which are only a portion of the transportation system, cost Washington citizens and businesses over $800 million in 2014.[14]14 By increasing the person-carrying capacity of our roadways, public transportation supports the speed and reliability of freight movement critical to our statewide economy, and reduces crash potential by lowering the amount of vehicles on the roadway.

Primary Goal of Public Transportation
Baseline needs of transit capital projects on urban WSDOT right-of-way can relate to travel time and reliability of service. It may also be to provide access to key destinations, such as schools, hospitals, recreational destinations, or places of business.

Public transportation also benefits the financial well-being of individuals in Washington State. For example, a person who lives in Seattle can save up to $11,000 a year by simply switching from driving to riding the bus.[15] Transit is also important to support growth; space is currency as the transportation system strains from traffic demands. Transit will increase in importance as communities, transit agencies, local agencies, and WSDOT examine ways to maximize the efficiency of the existing transportation system. Exhibit 4-8 illustrates the space needed for different transportation modes.

Exhibit 4-8 Illustration of 200 people using different transportation modes and illustrates the space usage by different transportation modes

200 people in 177 cars

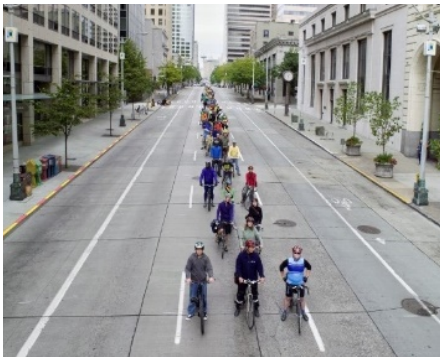
Source: ISS

200 people in 3 Buses

Source: ISS

200 people on bikes

Source: ISS



200 People on one light rail train

Source: ISS

[14] The 2015 Corridor Capacity Report
[15] Washington State Public Transportation Plan

A robust public transportation network can also support the development of compact, walkable, bikeable communities with lower infrastructure demands and can create hubs of activity that support local economies.

4-7.1 Traffic Operations Role in Public Transportation

WSDOT plays an important role in transit service as state routes affects the quality and safety of transit services. Transit routes often span many jurisdictions and one of our roles is to facilitate project development and coordinate with stakeholders.

Leading through Collaboration

All transportation partners in Washington state work together to provide a system of diverse and integrated public transportation options.

People throughout the state use these options to make transportation choices that enable their families, communities, economy and environment to thrive. Public transportation also ensures the reliability, travel time, and sustainability of the integrated transportation system, including WSDOT owned right of way and facilities.

WSDOT plays an important role to help integrate station connections with the surrounding transportation network such as highways, local roads, communities, and park and ride lots. A complete trip from origin to destination typically involves one or more connections at either end. These connections are an important aspect of transit, and can make the difference between efficient and inefficient service. This is often referred to as first-mile and last-mile access. Improvements to transit access could include looking for off-system solutions such as sidewalk connections into neighborhoods, commercial areas, public facilities, regional trails, or other strategies developed in coordination with project stakeholders. Off-system solutions are supported by Practical Design. See *Design Manual* Chapter 1100.

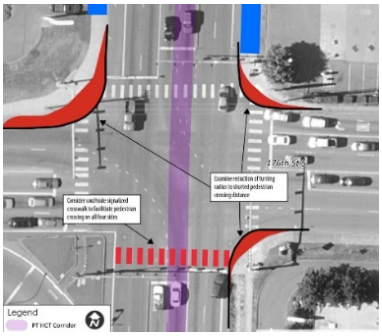
WSDOT also reviews those facilities directly supporting transit stops and stations such as sidewalks, pathways, and lighting around transit stops and stations. Adding appropriate improvements to projects supports local and regional transit services. Contact transit agencies as part of the project scoping and look for cooperative partnerships to improve transit services.

Section 4-7.2 provides examples of ways to improve public transportation on WSDOT, local agency, or developer projects.

4-7.2 Public Transportation Design Considerations

Extend biking and walking routes
Source: WSP

Improved Intersections
Source: WSP



Storm drainage
Source: Metro

Pedestrian Lighting
Source: Riverside Transit Agency

Fix old Infrastructure
Source: National Complete Streets Coalition

Placemaking
Source: National Complete Streets Coalition

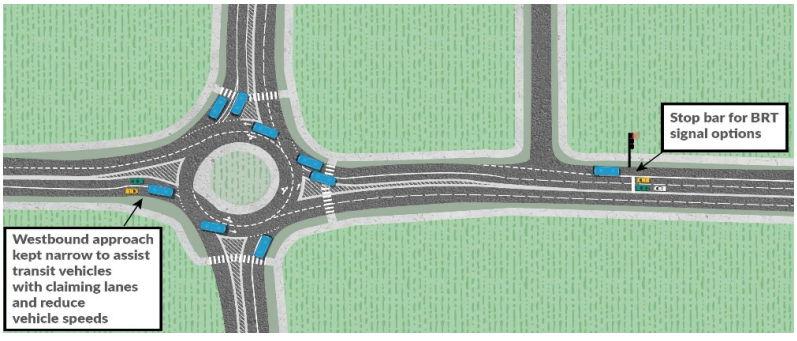
Bike Storage
Source: King County Metro

Enhanced crossings
Source: FHWA

Complete transit stops
Source: National Complete Streets Coalition

Traffic Signal Queue Jump

Roundabout Queue Jump



4-7.3 Bus Travel Time and Reliability and Bus Rapid Transit Considerations

Transit agencies in Washington are implementing Bus Rapid Transit (BRT) and other bus speed and reliability treatments on WSDOT roads. Treatments such as transit signal priority (TSP), Business Access and Transit (BAT) lanes, and bus queue jumps are part of creating effective bus service, which increases the person-carrying capacity of WSDOT facilities in a cost-effective manner meeting WSDOT's strategic vision.

What is Bus Rapid Transit?

BRT can best be described as a combination of facility, systems, and vehicle investments that convert conventional bus services into fixed-facility transit service, greatly increasing their efficiency and effectiveness to the end user.

1. **Partnership**

   Consider public transportation agencies as partners working toward common goals. While mindful of core issues such as safety and ongoing operating costs, work with transit agencies to support the WSDOT overall mission and vision. BRT projects differ from private development projects in that the former generate vehicle trips while the later reduce vehicle trips.

2. **Issue Resolution**

   Identify process to navigate issues as they arise to minimize effects on scope, schedule, and budget. This would be a multi-agency process and should include all involved WSDOT offices, which may include one or more WSDOT regions, HQ Traffic, and the Regional Transit Coordination Division (in central Puget Sound).

3. **Practical Solutions**

   Follow the intent of *Design Manual* Practical Solutions Section 1100 in defining the project purpose and context. Work with the transit agency to define baseline needs and measures, such as transit travel time, transit reliability, transit priority, pedestrian access to stations, connectivity between transit routes, and safety. Contextual needs should include examination of existing general purpose vehicle travel, impacts to active transportation travel/safety, existing/planned land use.

What are baseline needs for transit projects?

- Reducing transit travel time
- Increasing transit reliability
- Improving transit connections
- Improving transit priority
- Improving pedestrian and bicycle access to stations
- Enhancing system identity
- Increasing travel comfort
- Enhancing safety & security

4. **Performance Measures.**

   Identify key performance measures that will guide the collaborative selection of alternatives. *Design Manual* Chapter 1101 provides guidance on defining baseline needs, performance metrics, and contextual needs. When considering performance metrics consider transportation measures beyond vehicle based capacity analysis. Also see Section 4-5.

5. **Traffic and Intersection Control Analysis Coordination and Quality Control**

Traffic analysis and intersection control evaluations including BRT systems include complicated traffic interactions. Amplified coordination should be conducted between the department, transit agency, consultant team(s), and other affected agencies. Coordination is necessary to communicate expectations, reduce misunderstandings, and promote efficiency and quality control. This helps reduce unexpected issues, delays, and extra costs.

Example QA/QC process
The Protocol for Vissim simulation can be adapted to for corridor and intersection evaluations and Region traffic offices should require that the transit agency's consultant to prepare a plan prior to beginning a traffic study or intersection control evaluation.

6. **Design Considerations**

- Many of the active transportation design considerations mentioned in Section 4-11.4 and 4-12.2 of this section apply to Bus Rapid Transit (BRT).
- BRT systems may run in a dedicated pathway separate from the general purpose lanes of traffic. As such, they are expected to run independent of other traffic. At intersections, however, the BRT system must interact with general traffic.
- BRT vehicles may need priority or pre-emption at signalized intersections.
- Roundabouts have shown efficiencies, serious and fatal injury crash reductions, and travel time improvements when applied as corridor improvements. This may allow for narrower cross sections between intersections that can be re-allocated for other modes. Roundabouts may be signalized or metered to allow for transit priority. Concerns expressed by transit agencies include roundabouts do not provide bus priority, create long walking distances, or cost more than preferred traffic signal improvements. Contact HQ Traffic Operations for design and operations modeling assistance.
- Pedestrian and bicycle crossings are an important aspect of BRT designs, especially for connecting to other BRT routes, light rail, or other public transportation or bike share systems. Additional crossings may be necessary at median stops. The Traffic Impact Analysis and ICE should include pedestrian and bicycle access design to BRT stops. Contact HQ Traffic Operations for design assistance. Bike lanes running on the same roadways also require consideration to reduce conflicts with buses and transit users.
- BRT vehicles dimensions vary and their turning radii can affect intersection design and interaction with general traffic. For example, an articulated bus typically has a tighter turning radius than the 40 foot coaches. It is important for the designer to check with local transit agency to get information to use in modeling swept paths. AutoTURN default inputs may not always represent coach turning movements.
- BRT projects at the core are people moving projects. Look for opportunities to increase the number, and improve the safety and convenience, of active transportation facilities on and adjacent to BRT routes including first and last mile connections.

7. **Operations and Maintenance**

- Identify infrastructure elements and agency maintenance responsibilities. Responsibilities should be included in an inter-governmental agreement.

4-7.4 Public Transportation References

1. Statewide Human Services Transportation Plan (HSTP)
2. Washington State Public Transportation Plan
3. Transportation Demand Management Strategic Plan
4. Statewide Public Transportation Directory
5. Transit Street Design Guide, NACTO
6. Pedestrian Safety Guide for Transit Agencies, FHWA
7. Manual on Pedestrian and Bicycle Connections to Transit, FTA
8. TCRP Report 183, A Guidebook on Transit-Sup portative Roadway Strategies, TRB
9. TCRP Synthesis 117, Better On-Street Bus Stops, TRB
10. TCRP Report 207, Fast-Tracked: A Tactical Transit Study, TRB

4-8 Freight Transportation

Freight Economics
On a per capita basis, Washington is the second-most trade-dependent state in the nation, behind Michigan, with total imports and exports valued at $126.8 billion. - 2017 Washington State Freight System Plan

Every day, people stop by a store to pick up what they need. Virtually every business and household depend on freight delivery for shipping and receiving goods – in many cases multiple times a day. The growth of ecommerce has increased the simplicity of purchasing products and masks the details of a complicated system that permits and sustains such activity. Freight transportation and goods movement involves a complex and dynamic network of logistics and supply chains. Freight logistics relies on the multimodal transportation system in Washington. As a result this multimodal system is vital to the economy of the state and country in many ways. It underpins the national and state economies, supports national defense, directly sustains hundreds of thousands of jobs, and delivers the daily necessities of life to residents.

As the population grows freight traffic or distribution of products will grow to and adapt as the ways to order and deliver goods and services changes. Freight traffic in Washington State is expected to grow by about 30 percent by 2035.

How WSDOT designs highways could have an effects on freight mobility? This section will cover two concepts: 1) background on the freight network in Washington State and; 2) Examples of design considerations when dealing with freight as part of the multimodal network.

4-8.1 Freight Transportation System

The following is an introduction to the various freight networks in Washington State. These networks will help define modal priorities and context for the project. See *Design Manual* Chapter 1102 for context determination guidance.

A. National Multimodal Freight Network (interim)

In 2016, USDOT established the interim National Multimodal Freight Network (NMFN).[16] This network, when finalized, is intended to inform freight transportation planning and funding processes. NFMN maps for Washington State are available from the USDOT.

B. National Highway System

The National Highway System (NHS) is considered the backbone of the nation's economy, as well as being critical to its defense and mobility networks. The NHS is an important component of the eligibility criteria for the Nationally Significant Freight and Highway Projects Program for highway or bridge projects. A total of 4,556 centerline miles are designated as NHS routes in Washington, including 3,577 miles of state highways and 979 miles of local roads. Subsets of the NHS include:

- Intermodal Connectors. These highways provide access between major intermodal facilities and the other four subsystems making up the National Highway System. There are 87 designated NHS intermodal connectors in Washington, some of which are freight-related. Port intermodal connectors are the most common type of freight intermodal connector representing 45 percent of all NHS intermodal connectors in the state.
- Strategic Highway Network. The Strategic Highway Network (STRAHNET) is a designated national network that is important to national strategic defense and used for emergency mobilization and peacetime movement of military vehicles. This 63,000-mile network provides defense access, continuity, and emergency capabilities for defense purposes. This network is a component of the NHS.

C. National Highway Freight Network

In 2015, USDOT established the National Highway Freight Network (NHFN) in consultation with WSDOT and other partners to strategically direct federal resources and policies toward improved performance of highway portions of the U.S. freight transportation system. Components of the NHFN include:

- Primary Highway Freight Systems (PHFS) is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. The network consists of 41,518 centerlines miles, including 37,436 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads.

[16] U.S. Department of Transportation. Interim National Multimodal Freight Network. www.transportation.gov/administrations/office-policy/interim-national-multimodal-freight-network

- Non-Primary Highway Freight Systems (non-PHFS). These highways consist of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 9,843 centerline miles of Interstate, nationwide, and will fluctuate with additions and deletions to the Interstate Highway System.
- Critical Rural Freight Corridors (CRFC). These are public roads not in an urbanized area which provide access and connection to the PHFS and the Interstate with other important ports, public transportation facilities, or other intermodal freight facilities. Nationwide, there are 4,412 centerline miles designated as CRFCs.
- Critical Urban Freight Corridors (CUFC). These are public roads in urbanized areas which provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities. Nationwide, there are 2,213 centerline miles designated as CUFCs.

D. Freight and Goods Transportation System

The Freight and Goods Transportation System (FGTS) is a Washington-specific designation system, separate from the national designation. FGTS truck corridors classifies all highways, county roads, and city streets by reported annual gross truck tonnage, ranging from T-1, with the highest tonnage, to T-5, with the least tonnage. Corridor classification and maps can be found at the WSDOT FGTS website.

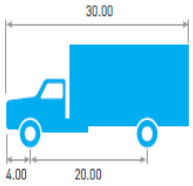
E. Truck Freight Economic Corridors

The designations were built on the FGTS classification by considering resiliency and first-mile and last-mile connectivity. A truck freight economic corridor designation helps inform how freight connectors are being used by industry, and inform future planning efforts to identify the needs and opportunities for improving those connectors. The Truck Freight Economic Corridors include the following components:

- High volume truck corridors: T-1 and T-2 freight corridors (as defined in the FGTS) carrying at least 4 million tons of gross truck tonnage per year.
- Alternate freight routes: routes that serve as alternatives to primary cross-state freight routes during severe weather or other disruptions to increase freight system resiliency.
- First-mile or last-mile connector routes: routes that connect freight intensive land uses to high volume and alternate routes. These routes provide important freight linkage to strategic national defense facilities, significant intermodal facilities, warehouse districts, industrial land and distribution centers, and agricultural processing centers.

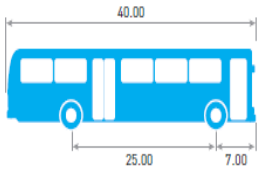
4-8.2 Types of Trucks

Trucks and buses come in a variety of sizes. These sizes and overall dimensions are dictated by the type of transit route or goods, materials, being transported. Trucks typically range from 8.5- to 10.0-feet wide, and with permits can be even wider.



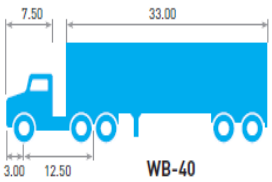
SU-30

The American Association of State Highway and Transportation Officials (AASHTO) has classified the most common sized trucks on United States roadways based either on the overall length of the vehicle (buses and single unit trucks) or vehicle wheel base (tractor-trailers). The classifications include but are not limited to:

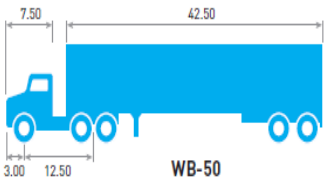


CITY-BUS

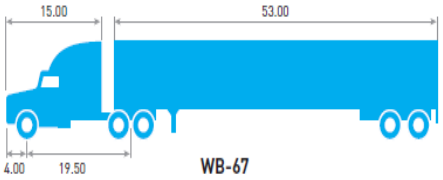
- SU-30: 30.0-foot, single unit vehicles typical of most local delivery vehicles.
- WB-40 and WB-50: small tractor trailers with wheelbases in the 40.0-foot and 50.0-foot range.
- WB-67: 67-foot wheelbase long haul trucks, sometimes called the interstate design vehicle that has an overall length on the order of 74.0-feet.



WB-40



WB-50



WB-67

Transit agencies operate a wide variety of city buses. For purposes of determining the swept path contact transit agencies affected by the project to city bus dimensions and turning specifications.

Other vehicles include various emergency vehicles, and public works maintenance trucks.

The figure on this page shows the typical dimensions of the most commonly used AASHTO design vehicles. Additional information on these and other design vehicles can be found in the AASHTO Policy on Geometric Design of Highways and Streets.

4-8.3 Design for" versus "Accommodate"

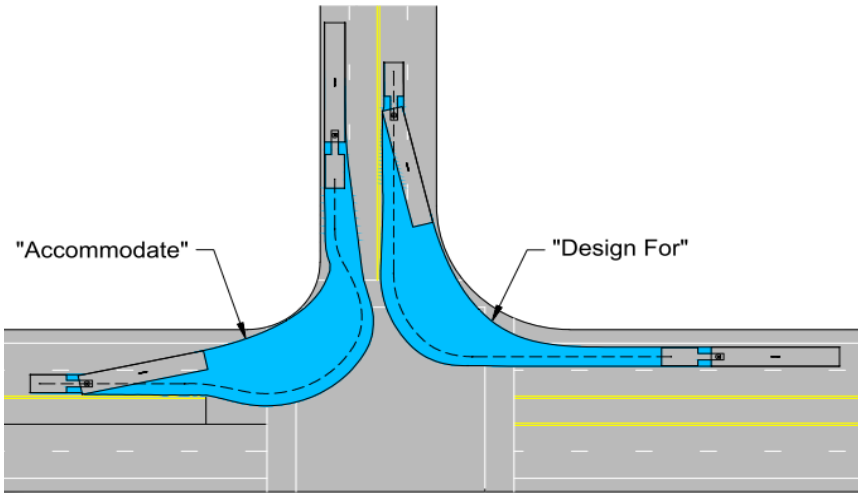
Selection of design vehicles is discussed in *Design Manual* 1103 and 1310. In selecting the appropriate design vehicle, many factors such as the number and type of trucks, functional classification of the highway, transit use, pedestrians and bicyclist shall be considered. See *Design Manual* Chapter 1102 for guidance on defining project context.

The concept of design vehicle involves providing a path for the vehicle that is free of encroachments upon other lanes, and facilities such as sidewalks. The Design Vehicle is the largest typical vehicle that will commonly use the street. It is acceptable for the design vehicle to use all of the first lane, and part of the second lane of the receiving street. In multilane roundabouts, it is considered "designing" for large trucks for them to take both lanes to navigate the roundabout.

Providing a design that accommodates a vehicle means that some level of encroachment upon other lanes is inevitable for the vehicle to make a particular movement. The accommodated vehicle is the largest vehicle that will rarely use the street. It is expected to use mountable elements, and may enter the lane adjacent to its lane of origin. The decision to design or accommodate will be based upon the context of the highway/ intersection under consideration. A balanced design approach takes into consideration more than just the amount of room required by the design vehicle. For example:

- What is the intended operating speed of the facility?
- What is the context? Designing for the largest but rare vehicle may result in an overdesigned intersection that is not compatible with other modes.
- How does the design affect pedestrians and bicyclists? For example, large turning radii at intersections increase the speed of drivers making the turns, and the time it takes to cross the road for pedestrians. So, designing for a large design vehicle will increase speeds and travel distances for all users, thereby increasing crash potential for all road users without proper consideration of the potential effects.

Designing for vs. Accomodating
Source: City of Seattle



4-8.4 Oversize-Overweight and other unique vehicles

Planning for freight does not end with selecting a standard design vehicle. Other types of freight traffic may be affected by a highway or intersection project. For example if the highway is near a port then accommodating very long loads such as wind turbine blades may be necessary. Identifying vehicle types includes reviewing the surrounding land use, transit plans, community input. Contact the Rail, Freight, and Ports Division and Commercial Vehicle Services to obtain information on how a unique freight could possible effect the project site.

Truck with Wind Turbine
Source: Washington Public Ports Association

4-8.5 Emerging freight delivery modes

Bicycle delivery in urban areas represents another freight delivery mode that may be a factor. Cargo bicycles and tricycles are wider than a traditional two-wheeled bicycle. In some locations a freight corridor may provide the only feasible connection for the active transportation network.

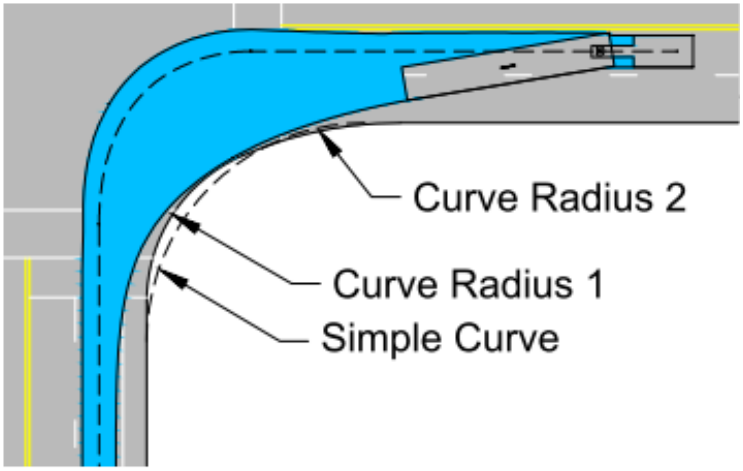
4-8.6 Design Considerations

A. Multi-centered Corners (Compound Curves)

When trucks turn, particularly tractor-trailers, they sweep a path that can best be simulated by a series of curves. A simplified approach shown by the figure to the right would use two or three compound curves to best match the pathway of the truck. By using this approach, the full swept path of the design vehicle can be designed for and larger vehicles checked for accommodation, if appropriate, while still minimizing the amount of roadway surface. Minimizing roadway surface also manages crossing distances, signal pole arm lengths, maintenance, improves distance vehicles travel through the intersection, and reduces project cost. These designs also allow for a tighter radius corner, which will help promote speed reduction for drivers of smaller vehicles making the turn. This figure illustrates this. Also see Section 4-6.6 and *Design Manual* Chapter 1310.

Compound Curve

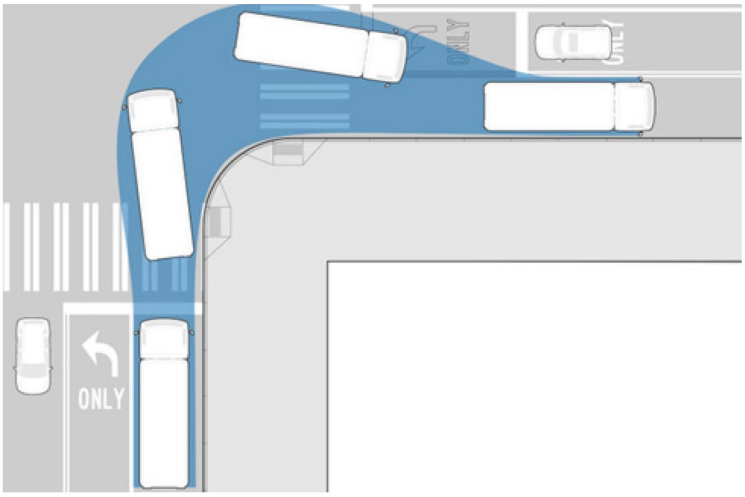
Source: City of Seattle



B. Setback for Stop Bar Placement

Signalized intersections can be striped to improve the overall geometry for turning trucks without compromising traffic engineering requirements. Stop bar location on both the street a truck is turning from, as well as the cross street approach the truck driver is turning into, can have a dramatic effect on the accommodation of truck driver turning movements. Moving back the STOP bar can also assist pedestrian crossing movements and allow for a relatively small curb radii.

Mountable Curbs



C. Mountable Curbs

Mountable curbs can provide a means for a large truck to more easily navigate while making a turn. These types of curbs are mostly useful for at driveways, intersections, medians, or splitter islands. Use at intersection corners; however, should only be considered on a limited basis and must be carefully designed to minimize trucks from overrunning pedestrian areas. Mountable curbs are also used at roundabouts. Standard Plans Section F has several mountable curb options including Standard Plan F-10.18 that is specific to roundabouts.

Mountable Curbs

D. Left Turn Medians

Left turning vehicles are generally more controlled than right turning vehicles due to a greater number of vehicle-to-vehicle conflicts. Goods movement and livability concerns focus heavily on median nose treatments. Medians can provide pedestrian refuge, especially for large intersections. Full curb medians are most effective for pedestrian safety, but reduce the turning area for large vehicles. They also can be easily damaged if a truck's rear wheels run over them. Mountable and painted treatments are sometimes used, but can introduce conflicts between pedestrians and trucks. Truncating the median nose prior to the crosswalk is another option, but will not provide pedestrian refuge.

E. Bicycle Treatments

Bike boxes, bicycle signals, and protected bike lanes can be helpful for routes that are also used as freight routes. See Section 4-6.6 for further information.

Green Bicycle Boxes – A green bicycle box is helpful for routes that are also used as freight routes in order for drivers to better see bicyclists by situating them ahead of drivers at intersections.

F. Roundabouts

User perspectives regarding roundabouts are generally very context-sensitive. For pedestrians and bicyclists, roundabouts can be particularly effective in creating a more comfortable operating environment for all roadway users. Motorists benefit from roundabouts where delays and crash severities are substantially reduced and safety improved compared to stop-control or signal-control. Even if there are peak times when motorists are delayed at a roundabout, the peak hour delay needs to be considered with respect to the overall daily delay benefit. Truck drivers can similarly benefit from reduced delays, particularly where the cost of coming to, and accelerating from, a full stop can be eliminated; but care in design is necessary to all for a roundabout design that accommodates large vehicles.

Roundabouts can require more right-of-way than typical intersections at the immediate junction, but less right-of-way upstream due to the ability to reduce turn lane lengths or eliminate turn-lanes. Specific considerations regarding roundabouts are in *Design Manual* Chapter 1320 Roundabouts.

Interchange Ramp Terminal

Outside Truck Apron

Source: Google

Multi-use path and Supersize truck bypass

Source: Google

G. Work Zones

Effective temporary traffic control strategies allow all road users to successfully maneuver through or around work areas while still permitting needed work to be completed efficiently and economically. Chapter 5 provides a detailed work zone discussion. The following are examples of work zone traffic management techniques that address commercial vehicles:

Road Narrowing and Restricting Vehicle Clearance
If a construction or maintenance project is narrowing the roadway or restricting the vertical clearance, WSDOT Commercial Vehicle Services needs to be contacted in advance.

Work Zone Queue Warning System. At 65 MPH, it may take fully loaded semi-tractor and trailers at least 7 seconds and 500 feet to stop per the Work Zone Safety Consortium. It is critical for drivers of large truck to anticipate queued traffic and get slowed down in advance. Queue warning systems have reduced associated collisions up to 45 percent per the FHWA supported Work Zone Safety Consortium report. Examples of queue warning systems include Truck Mounted PCMS and Smart Work Zone Systems.

Portable Transverse Rumble Strips. Portable transverse rumble strips serve to increase driver alertness by providing both an audible warning and physical vibration as the vehicle's tires cross over them.

See the Work zone policy and guidance website for additional information and examples.

Rumble Strips

Source: PSS Inovations

Truck Mounted PCMS

Source: Trafcon

4-9 Road Reallocation (aka Road Diets)

Benefits of Roadway reallocation

Four to three lane roadway conversions have documented crash reductions from 19 to 47 percent according to FHWA

Wide street crossings can be major impediments to pedestrian access, connectivity, and increase crash potential; therefore, an effective countermeasure for pedestrians is a "road diet." A roadway reallocation known as a road diet offers several high-value improvements at a low cost when applied to traditional undivided highways. The primary benefits include reduced crossing distance, space for separated travel, mobility, and access for road users and a "complete streets" environment to accommodate a variety of transportation modes. FHWA considers road diets a proven safety countermeasure due to proven effectiveness in reducing fatalities and serious injuries.

What about traffic volume?

FHWA advises roads with traffic volumes of 20,000 or less are good candidates for road reallocations. However, City of Seattle has successfully implemented projects on roads greater than 20,000 vehicles per day. Reports on City of Seattle's road diets are available on their reports & studies website.

The key is to understand the purpose and need for intervention, understand community priorities, and communicate tradeoffs such as increased side street delays. Often communities are willing to trade some additional peak hour congestion for safer more livable roads.

Lane diets involve reducing the width of the travel lanes and road diets involve removing one or more lanes of traffic and, in some cases, reducing the width of the travel lanes. The excess space is converted into space for pedestrians or cyclists, such as wider sidewalks, curb extensions, medians, pedestrian refuge areas, or bicycle facilities. In rural and suburban areas lane diets or narrowing can reduce intersection crash potential by reducing traffic speeds and improving conspicuity of intersections.[17]

Road diet benefits include a crash reduction of 19 to 47 percent of all crashes, all severities according to FHWA's Road Diets/Roadway Reconfiguration webpage. Road diets also result in reduced vehicle speed differential, improved mobility and access for all road users, and integration of the roadway into surrounding uses that results in an enhanced quality of life. A key feature of a road diet is that it allows reclaimed space to be allocated for other uses, such as turn lanes, bus lanes, pedestrian refuge islands, bike lanes, sidewalks, bus shelters, parking, or landscaping. Other road diet benefits include:

- Reduced rear-end and left-turn crashes due to the dedicated left-turn lanes
- Reduced right-angle crashes as side street motorists cross three versus four travel lanes
- Fewer lanes for pedestrians to cross
- Opportunity to install pedestrian refuge islands, bicycle lanes, on-street parking, and/or transit stops
- Traffic calming and more consistent speeds
- A more community-focused, "Complete Streets" environment that better accommodates the needs of all road users

[17] FHWA Report HRT-08-063

A road diet can be a low-cost safety solution when planned in conjunction with a simple pavement resurfacing project, and the reconfiguration can be accomplished at no additional cost. An example is provided Section 4-9.C where a roadway was simply re-striped after a chip seal application.

Road diets or lane diets are not appropriate for all roadways. Careful analysis to help determine the feasibility needs to be done up front utilizing traffic count data, existing and future traffic volumes, type of road, and the need and purpose of the project to determine whether the street or road is suitable for a road or lane diet.

FHWA's Road Diets/Roadway Reconfiguration webpage states a number of strategies may be considered to reconfigure the street to reduce vehicle and pedestrian crashes, while simultaneously increasing vehicle flow and reducing vehicle speeds.

Road Diet Plus

The Road Diet Plus is borne from the convergence of the standard road diet, the safety advantages of the modern roundabout, and the throughput advantages of the modern roundabout in a corridor. La Jolla Blvd in San Diego is an example of a Road Diet Plus. Priorities for this 23,000+ ADT corridor were livability, economic development, and traffic calming. Results included higher retail sales, lower noise, reduced traffic speeds, 90 percent drop in crashes, and spurred new development.

Source: January 10, 2018 article from Public Square.

A similar concept can be applied to state highway interchanges to reduce the need to widen structures and to provide the opportunity to reallocate space for other purposes.

A. Design Considerations

When converting a four-lane road into a two-lane road with a two-way left turn lane, medians or pedestrian refuge areas may be placed at intersections or mid-block pedestrian crossing locations.

The practitioner should determine the types of vehicles that primarily use the street before reducing the lane widths.

A best management practice may be considered for utilizing mountable curbs on narrower lanes to accommodate larger vehicles.

B. Roadway Reallocation References

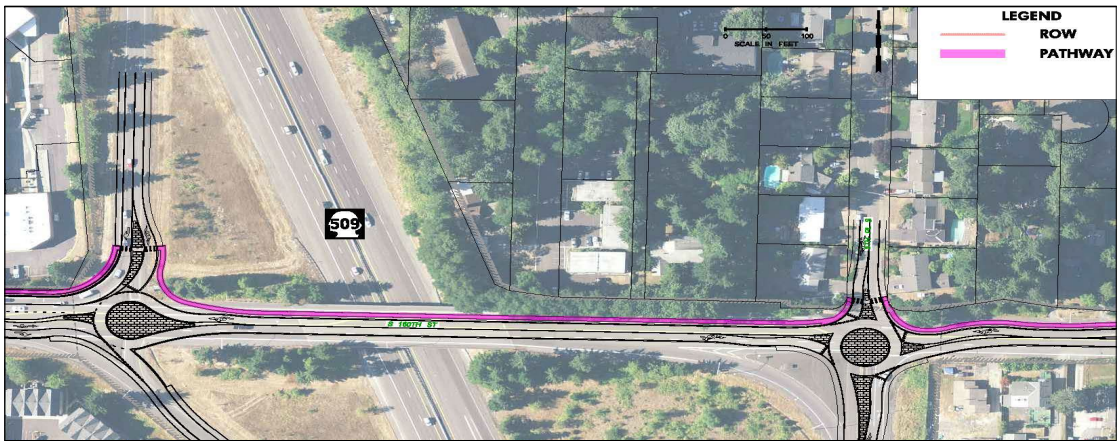
1. AASHTO, A Policy on Geometric Design of Highways and Streets
2. FHWA, Road Diets/Roadway Reconfiguration Guide
3. NACTO, Urban Street Design Guide

C. Roadway Reallocation Examples

Roadway Resurfacing Road Diet Before
Capital Mall Blvd, Olympia WA

Roadway Resurfacing Road Diet After
Capital Mall Blvd, Olympia WA

Highway Road Diet Plus
Concept SR 509 at 160th Ave



Road Diet Plus (Before)
La Jolla Blvd, San Diego CA
Source: Dan Burden and San Diego Union Tribune

Road Diet Plus (After)
La Jolla Blvd, San Diego CA
Source: Dan Burden and San Diego Union Tribune

Before
SR 4, Cathlamet WA

After
SR 4, Cathlamet WA

Before
SR 500, Camas WA

After
SR 500, Camas WA

Intersection Lane Narrowing (Diet)
Yelm Hwy SE, Lacey WA

Chapter 5 Work Zone Traffic Control

5-1 General

Effective temporary traffic control strategies allow all road users to successfully maneuver through or around work areas while still permitting needed work to be completed efficiently and economically. The following goals apply to work zones:

- Give safety highest priority for both highway workers and traveling public
- Manage congestion to maintain mobility through and/or around work zones
- Be cost effective with resources taxpayers and legislature entrust to us.

Work zone traffic control planning needs consideration early, as it greatly impacts *how* and *what* work is completed. Work zones are interdependent with design, construction, maintenance, and traffic operations; what happens to one affects the others. The better we understand these interactions, the more successful and cost effective projects will be.

There is no "cookbook" solution to all work zones; solutions require innovation, adaptation, and ingenuity. Work zone design and operation is as much art as science.

Properly mitigating work zone impacts to all road users is a critical component in the successful design, construction, maintenance, and operation of a fully functional highway system and is required by federal regulations and state policy.

Road users include, but are not limited to:

- Pedestrians, including those with disabilities
- Bicyclists
- Motorists, including motorcyclists
- Commercial Vehicle Freight operators, including oversized/overweight permitted vehicles
- Transit operators and users

5-2 Federal and State Laws Applicable to Work Zones

Work zones are subject to numerous federal laws, state laws and codes, and standards that are critical to understand:

A. Federal Laws

23 CFR Part 630 J focuses on work zone **standards**, **policy**, and **processes**:

- The *Manual on Uniform Traffic Control Devices* (currently 2009 MUTCD) is the national standard for traffic control on all public roads
- States shall develop policy to systematically consider and manage work zone impacts
- All **significant** projects shall have Transportation Management Plans unless the Federal Highway Administration (FHWA) grants an exception based on the State's ability to show a specific project will not have sustained work zone impacts.
- States shall perform a work zone process review at least every two years

23 CFR Part 630 K focuses on work zone **design** and **implementation**:

- Maintain quality and adequacy of all temporary traffic control devices
- Manage work zone exposure and reduce the risk of fatal crashes or injuries to workers

Public Rights-of-Way Accessibility Guidelines (PROWAG) cover temporary work zone pedestrian facilities located within the public right-of-way and are recommended best practices at this time.

B. State Laws and Codes

Important Washington laws applicable to work zones are listed below and include a brief description in parenthesis:

- RCW 46.04.200 (Hours of Darkness definition)
- RCW 47.36.030 (Signs, signals, and banners over roadway requirements)
- RCW 47.36.200 (Motorcycles Use Extreme Caution sign requirements)
- RCW 47.48.010 (Roadway closure, restrictions, & reduced speed limit authority)
- RCW 47.48.020 (Roadway closure, restrictions, & reduced speed limit notification requirements)
- RCW 46.61.527 (Work Zone Traffic Fines)
- WAC 296-155-305 (Flagging Requirements, 4-Sign Requirement for ≥ 45 mph)

Washington has adopted the MUTCD; however, specific work zone-related MUTCD sections have been modified as listed below and include a brief description in parenthesis:

- WAC 468-95-017 (Traffic Control Devices & Engineering Judgement)
- WAC 468-95-045 (Speed Limit Signs & Radar Speed Display Signs)
- WAC 468-95-075 (Higher Fines Signs & Plaques)
- WAC 468-95-190 (Pavement Markings: Edge Line Requirements)
- WAC 468-95-205 (Supplemental Raised Pavement Markers)
- WAC 468-95-210 (Raised Pavement Markers Used As Broken Lane Lines)
- WAC 468-95-300 (Temporary Sign Spacing Table)
- WAC 468-95-301 (Maximum Channelization Device Spacing Table)
- WAC 468-95-3015 (Traffic Signal Display Requirements When Flagging)
- WAC 468-95-302 (Single Flagger In Center of Intersection Prohibited)
- WAC 468-95-305 (Motorcycles Use Extreme Caution Sign)
- WAC 468-95-306 (Motorcycles Use Extreme Caution Supplemental Plaque)
- WAC 468-95-307 (Abrupt Lane Edge Warning Sign)
- WAC 468-95-310 (Temporary Pavement Markings)

5-3 Work Zone Standards, Content & Resources

A. *Manual on Uniform Traffic Control Devices* (MUTCD)

Per federal code, the current revised 2009 MUTCD edition is approved by the Federal Highway Administration (FHWA) and recognized as the national standard for traffic control on all public roads. Part 6 of the MUTCD focuses on temporary traffic control.

B. PROWAG 2005

The PROWAG guidelines are currently recommended best practices for pedestrian facilities within public right-of way. When formally adopted by the Department of Justice, PROWAG will become enforceable standards.

C. WSDOT ADA Guide for Accessible Public Rights of Way

WSDOT, in collaboration with FHWA, developed the WSDOT ADA Guide for Accessible Public Rights of Way as a field guide reference to be used by professionals when evaluation accessible pedestrian features, including in work zones, reflecting PROWAG best practices.

D. WSDOT *Standard Specifications*

The WSDOT *Standard Specifications* are legal and enforceable language for WSDOT Contracts and when incorporated into local agency construction projects receiving FHWA federal funding. These specifications include requirement, measurement, and payment information and may specify work zone standards that exceed requirements in the MUTCD.

The following sections are the most relevant to work zones:

- 1-07.8 *High-Visibility Apparel*
- 1-07.23 *Public Convenience and Safety*
- 1-10 *Temporary Traffic Control*
- 8-23 *Temporary Pavement Markings*
- 9-34 *Pavement Marking Material*
- 9-35 *Temporary Traffic Control Materials*

E. WSDOT *Traffic Manual*

This chapter focuses on **work zone traffic operation strategies** and the Transportation Operations component of the Transportation Management Plan. This chapter is not an all-encompassing, comprehensive work zone guide; other manuals apply as well.

F. WSDOT *Design Manual* M 22-01

Chapter 1010 focuses on work zone design topics and Transportation Management Plans for construction projects. Chapter 1610 focuses on traffic barriers. Chapter 1620 focuses on impact attenuator systems.

G. WSDOT *Work Zone Traffic Control Guidelines for Maintenance Operations* M 54-44

The WSDOT M 54-44 Manual focuses on temporary traffic control for **maintenance**, **utility**, and **developer operations of 3 days or less**. The WSDOT M 54-44 Manual is not for use in WSDOT Contracts. Typical traffic control plans for use in projects can be found at the WSDOT Typical Traffic Control Plan Library as discussed below.

H. WSDOT *Work Zone Typical Traffic Control Plans*

The WSDOT Typical Traffic Control Plans library provides generic traffic control plans that have been furnished as a guide to be used with good engineering judgement. Typical traffic control plans may be modified or used with additional project-specific or site-specific traffic control plans for unique conditions or roadway configurations.

All WSDOT Typical Traffic Control Plans must be accepted prior to use in the field. Each WSDOT Region will determine personnel with acceptance authority.

I. WSDOT *Sign Fabrication Manual*

The WSDOT *Sign Fabrication Manual* assists sign fabricators by providing sign layouts for official highway signs, both permanent and temporary, depending on the sign's size.

All signs have a unique naming convention based on the MUTCD.

J. Quality Guidelines for Temporary Work Zone Traffic Control Devices

The 2017 Edition of the ATSSA *Quality Guidelines for Temporary Work Zone Traffic* is available for purchase and is used, per *Standard Specifications* 1-10.2(3), by the Engineer to determine signs and traffic control devices are acceptable, marginal, or unacceptable.

K. MASH-2016 & NCHRP-350 Hardware Eligibility Letters

Crashworthy eligibility letters for hardware devices, including work zone traffic control devices, meeting MASH-2016 crashworthy requirements is provided by the FHWA. In addition, archived NCHRP-350 letters are also available (link provided in paragraphs at top of each webpage).

There are five categories of devices:

- Longitudinal Barriers and Bridge Rails
- Barrier Terminals and Crash Cushions
- Sign Supports, Mailboxes, and Delineator Posts
- Luminaire Supports
- Work Zone Devices

5-4 WSDOT Region, Region Traffic Operations, and Headquarter Traffic Roles and Responsibilities

"WSDOT Region" includes all offices except the Region Traffic Operations. The following roles and responsibilities are typical guidelines. Each Region may further define or redistribute roles and responsibilities so verify responsibilities with each Region's Traffic Office:

A. Typical WSDOT Region Responsibilities

- Identify work zone safety and mobility impacts during scoping, Design, or major maintenance operations to develop a Work Zone Strategy Statement
- Develop a Transportation Management Plan (see *Design Manual* Chapter 1010)
- Develop and obtain approval for WSP Task Orders
- Implement work zones for individual projects, including appropriate impact mitigation strategies with respect to region mobility and coordination
- Coordinate with Freight Transportation, Commercial Vehicle Services, and Public Transportation divisions, and local agencies when applicable
- Inspect traffic control operations and modify when necessary to address site- specific conditions for safety and mobility

B. Typical WSDOT Region Traffic Operations Responsibilities

- Review and approve Transportation Management Plans & Work Zone Strategy Statements
- Review and accept traffic control plans during the project PS&E phase
- Provide assistance to Project Engineering Offices upon request
- Coordinate with Freight Transportation, Commercial Vehicle Services, Public Transportation divisions, and local agencies when applicable
- Collaborate with Construction, Maintenance, and Communications departments for scheduling, implementing, and notifying the traveling public of high-profile closures
- Approve/review work zone speed limit reductions and advisory speeds (Section 5-18)
- Perform work zone traffic analysis (Section 5-9) to determine closures, their permitted hours, and work with TDGMO to determine interim liquidated damages (Section 5-14)
- Perform periodic review of active work zones
- Perform FHWA work zone process reviews with HQ Traffic Operations, region Project Engineering Offices, Maintenance, other divisions, and other agencies as appropriate

C. WSDOT Headquarters Traffic Operations Responsibilities

- Develop and update work zone-related policy, standards, and guidance
- Provide traffic control training for agency employees
- Maintain a library of typical traffic control plans for Region use
- Provide work zone traffic analysis assistance upon request
- Lead the FHWA work zone process reviews with Region Traffic Operations
- Approve unique work zone speed limit reductions (Section 5-18)

5-5 Work Zone Principles & Considerations

1. **Guide all road users in a clear, positive, and safe manner** through or around work zones utilizing sufficient signage, delineation, and channelization. Work zones should be "self-explanatory" to road users the maximum extent feasible. Abrupt, unexpected changes in roadway geometrics should be avoided.

2. **Consistent and proper installation of temporary traffic control devices to optimize road user expectancy and compliance** which enhance work zone safety and improve mobility.

3. **Remove traffic control devices when they are no longer applicable**, otherwise they may be soon disregarded.

4. **Avoid placing traffic control devices that inhibit movement of other road users** unless accommodations are provided.
   - Maintain a clear temporary pedestrian accessible route of at least 48 inches in width or use 7-foot minimum mounting height when it is necessary to place traffic control signage within the limits of existing sidewalks

5. **Separate decision points**; avoid having road users react to two events at the same location.
   - Avoid lane closure tapers adjacent to merging on-ramp traffic due to conflicting merges
   - Avoid lane closure or lane shift tapers within limits of horizontal curves

6. **Consider positive protection devices whenever practical.** Positive protection devices enhance safety for both road users and workers by using physical barriers not easily penetrated by errant vehicles, such as transportable attenuators or temporary barriers.

7. **Design work zones to operate in a manner consistent with the desired target speed dependent upon desired mobility, operation, and safety objectives.**
   - Per MUTCD, drivers reduce their speeds only if they clearly perceive a need to do so
   - Avoid reductions greater than 10 mph below the existing speed limit unless a unique, restrictive condition is present. Work crews should also be present
   - Avoid "overdesigning" work zones (e.g. using a lane closure taper designed for 60 mph when a 45 mph work zone speed limit is posted)
   - All work zone speed limit reductions shall be approved per Secretary's Executive Order E 1060.02 and in compliance with Project Delivery Memo #19-01

8. **Manage adverse work zone impacts to road users overall while balancing the need to efficiently, economically, and safely complete work.**
   - Regions may decide to implement closures with high traffic impacts occurring over shorter durations (days) versus traditional methods with lower traffic impacts occurring occur over several months or years. In particular, these aggressive closure strategies are justified when there are substantial benefits that more than offset the adverse traffic impacts including significant reduction in working days, considerable cost savings during construction, and enhanced safety benefits for both road users and workers. For such closures, Region Administrator approval should be obtained.

9. **Maintain effective public relations starting early in Design and lasting throughout Construction phases for projects with high-impact closures.**
   - During planning, work closely with stakeholders and local agencies to understand their concerns and needs during these closures as well as obtaining their concurrence. This will aid in avoiding surprises with unplanned, lengthy delays.
   - Develop traffic closure, detour, and/or alternative route schematics for the public and media use to visually explain the limits of the closure and how to navigate through and around them.
   - Explain the anticipated work zone congestion and delays as well as what time of day they are expected.
   - Consider different outreach tools (news coverage, social media, WSDOT blogs)
   - Encourage alternative modes of transportation (carpools and public transit) and to delay trips to early morning/late evening hours to manage work zone congestion

5-6 Work Zone Mobility, Corridor, and Network Management

The traditional practice of only permitting closure hours with minimal traffic impacts is still desirable on many roadways, but is becoming increasingly less feasible or economical due to higher traffic volumes persisting later into the evenings and beginning earlier in the mornings on congested corridors. Per Secretary Executive Order E 1001.02, traffic delays should be minimized while the safety of workers and the traveling public be the highest priority. Thus, proactive work zone congestion management strategies are necessary to effectively complete work while still maintaining mobility and maintaining safety. Work zone mobility management should be a priority beginning early in Design and continuing throughout Construction.

First and foremost, it is important to understand actual work hours are significantly less than the closure hours. In other words, for work operations such as HMA paving, a permitted 5-hour closure may only result in 2.5 working hours. If not addressed, this may result in the project duration extending into two construction seasons, also known as "wintering over".

For the areas where reasonable duration of work shift is challenging to obtain, it may become necessary to select an extended closure duration resulting in congestion. Therefore, it is necessary to understand the following:

- When to avoid work zone congestion (Section 5-6.A)
- Work zone congestion management strategies (Section 5-6.B)
- Closure coordination along detours and alternative routes (Section 5-6.C)
- Detour route considerations (Section 5-6.D)

For detailed guidance for various extended closure strategies see the following:

- Extended Intermediate-Term Duration Closures (Section 5-7)
- Long-Term Duration Closures & Reconfigurations (Section 5-8)

A. When to Avoid Work Zone Congestion

Typical periods to avoid work zone congestion include certain times and events, such as the following:

- **During weekday AM/PM commutes & school hours**

  During weekday commutes there may be limited flexibility for alternative schedules or fewer discretionary trips, resulting in minimal traffic diversion and higher traffic impacts.

  Morning and evening commute periods vary significantly in time and duration depending on its specific location and are best determined by obtaining actual traffic volumes or conduct field observations. Be sure to take into account local operations such as work shift changes at major corporations, school and daycare traffic, or other events that generate traffic surges over a short duration.

  Without the availability of better data or information, then assume the following **weekday commute hours in congested, urban areas**:

  - AM Commute @ 4:00 a.m. to 10:00 a.m.
  - PM Commute @ 2:30 p.m. to 7:00 p.m.

Without the availability of better data or information, then assume the following **weekday commute hours in more rural areas**:

- AM Commute @ 5:00 a.m. to 9:00 a.m.
- PM Commute @ 2:30 p.m. to 6:30 p.m.

- **During Friday afternoons and Sundays on recreational routes**

  Recreational routes tend to experience much higher volumes on weekends, typically in the inbound direction Friday afternoons and the outbound direction on Sunday. Such roads include I-90 over Snoqualmie Pass, U.S. 2 over Stevens Pass, and SR109 between Ocean Shores and Aberdeen.

  Recreational periods vary significantly in time and duration depending on its specific location and are best determined by obtaining actual traffic volumes or conduct field observations.

- **During major regional special events**

  Major sporting events, concerts, fairs, etc. generate significant traffic volumes increases, typically up to two hours prior going towards the event (inbound) and up to two hours after existing the event (outbound). In contrast, all-day events tend to see increased volumes spread out over the day without the large "spikes" experienced with games or concerts.

- **During major statewide special events**

  Major special events can generate traffic across the state. Volumes on intrastate corridors such as Interstate 90 increase in one direction at the beginning of the weekend and then increase in the opposite direction at the end of the weekend.

- **During significant local special events**

  Significant local special events can generate large, but localized traffic impacts that need to be considered. Such events include runs, bike rides, or festivals.

B. Work Zone Congestion Management Strategies

When causing work zone congestion, detailed work zone traffic analysis needs to be performed by the Region Traffic Operations to determine anticipated delays and queues (Section 5-9) when determining closures, permitted closure hours, and working with TDGMO to determine the value of any interim liquidated damages.

The WSDOT Transportation Data, GIS & Modeling Office (TDGMO) can assistant Regions by providing work zone traffic analysis to help determine expected queuing and delays. Only TDGMO has the authority to determine the maximum interim liquidate damage values; Region Traffic Operations will assign the actual interim liquidated damage value for each closure based on the maximum allowable amounts determined by TDGMO (Section 5-14).

Based on the anticipated traffic impacts, additional work zone mobility, safety, and traffic demand management strategies may need to be considered:

- **Advanced Notification**

  Use Portable Changeable Message Signs (PCMSs) or Class A signs to provide notice at least one week notification in advance of closures with high traffic impacts.

- **Public Outreach**

  WSDOT Communications serves an invaluable role in reaching out to the general public and stakeholders. They serve as the "front-line" spokesperson for WSDOT by working with news media, utilizing social media, and responding to citizen inquires.

  Using their established relationships with various stakeholders (including local interest groups), it is valuable to obtain concurrence, or at least understanding, of high-impact closures during Planning and Design before projects go to Construction.

  During Construction, prior to the high-impact closures, WSDOT can collaborate with these stakeholders to help determine when high-impact closures occur to reduce adverse impacts as well as providing advanced notification.

- **WSDOT Traffic Management Centers (TMCs)**

  Utilizing their access to permanent variable message signs, Regional TMCs may provide advance notification for upcoming significant, high-impact closures and provide real-time information for major incidents and closure status. TMCs typically only provide supplemental messaging so critical messages (major incidents, silver alerts, blue alerts, etc.) can be displayed if necessary.

  During Design, working with Region Traffic Operations, collaborate with the TMC to determine to what extent these permanent systems can supplement the project's messaging methods (portable Highway Advisory Radio, PCMSs, etc.).

  During Construction, working with Region Traffic Operations, provide TMCs notification of upcoming of high-impact closures preferably two weeks in advance.

  On Active Traffic and Demand Management corridors (only present in the Northwest Region at this time), lane usage symbols and speed limits can be displayed in real-time to supplement the temporary traffic control closures.

- **WSDOT Incident Response Team (IRT)**

  Because capacity is already minimized in work zones, vehicle breakdowns or collisions can have significant adverse traffic impacts if not resolved quickly. IRT minimizes response times by collaborating with WSDOT TMC, police and emergency agencies, and towing companies to relocate or remove the blocking vehicles quickly.

  During significant high-impact closures, consider placing IRT and towing services (under IRT's direction) on standby in strategic work zone locations in the event disabled vehicles need to be quickly towed. See Section 5-16.E for details.

  During Design, engage IRT to determine anticipated costs and ensure reimbursement funding is provided for this operation via internal accounting methods. Verify necessary IRT staff is available and how they will be requested and utilized.

- **WSDOT Maintenance and Internal Staff Assistance**

  During major closures, advanced notification and closure notification signage may be necessary as far as 50 miles from the actual closure in isolated locations. An example of such a scenario would be a week-long closure of the Hood Canal Bridge where the shortest detour route is over 100 miles and 2½ hours.

Instead of arranging for Contractors to provide such services over such a vast area, an alternative approach is to arrange for the collaboration of several WSDOT Maintenance and/or IRT staff to perform duties in their own local areas. Ensure funding is available for reimbursement of services rendered via internal accounting methods.

- **WSDOT Signal Operations Assistance**

  During significant closures or detours, temporary adjustments to WSDOT- operated traffic signals may be necessary due to large increases in traffic along detour or alternative routes.

  Engage the Region's Signal Operations group during Design and then provide advanced notification in Construction preferably two weeks prior to the major closure. If needed, ensure funding is available for this operation for reimbursement for services rendered via internal accounting methods.

- **Local Agency Signal Operations Assistance**

  During significant closures or detours, temporary adjustments to Local Agency operated traffic signals may be necessary due to large increases in traffic along detour or alternative routes.

  Engage the local agency during Design and then provide advanced notification in Construction preferably two weeks prior to the major closure. Any agreements should be included in the Transportation Management Plan.

- **Motorist Use of GPS Technology**

  A majority of motorists use GPS for navigation purposes which may provide motorists an optional alternative route in real-time based on shortest travel time automatically (without needing extensive traffic control messaging) that effectively reduces work zone delays and queues by redistributing traffic across multiple corridors.

C. Coordinate Closures along Detours & Alternative Routes during High-Impact Closures

It is critical to restrict concurrent lane or ramp closures on parallel, alternative routes during high-impact closures. In Design, it should be determined if such closure restrictions are necessary by working with the Region Traffic Operations. If needed, be sure to include the closure restrictions in the Contract PS&E.

During Construction, Region Traffic Operations may still allow these restricted lane or ramp closures to occur on a case-by-case basis, but may reduce allowable hours to account for the additional traffic volumes that will be diverted onto the detour or alternative route.

Example: A full closure of southbound Interstate 5 (SB I-5) is occurring overnight in Vancouver, Washington. Thus, any concurrent lane closures along SB I-205 (parallel, alternative route) should be delayed until the work zone capacity can handle the additional traffic volumes from the SB I-5 closure. The SB I-5 to SB I-205 ramp should remain open during the SB I-5 as well as any ramps along the detour route or alternative route path.

D. Detour Route Considerations

Detour routes using local agency roadways require detour agreements, which should be completed in Design and included in the Transportation Management Plan. Coordinate early with local agencies, especially for significant road or ramp closures. In Construction, collaboration is needed to prevent conflicting concurrent closures along the detour route.

Consider rather the detour route can accommodate commercial vehicles, particularly oversized/overweight permitted vehicles, during closures. If travel restrictions are necessary, contact WSDOT Commercial Vehicle Services in advance (Section 5-15).

Consider the detour route's capacity. Of particular concern are signalized intersections at the beginning of the detour where only a single left-turn lane is provided operating as a protected movement (left only on green arrow).

Mitigations may include uniform police officers controlling traffic at any problematic intersections until traffic volumes are low enough to resume normal signal operation or to temporarily adjust signal timing.

Permissive-protect single left-turn lane, protected double left-turn lanes, and right turns serve greater traffic volumes and typically do not require additional mitigation.

Be cautious of all-way stop intersections along a detour route as they have capacities as low as 600 vehicles/hour (from all approaches).

Pedestrian and bicyclist detour routes should be short, in close proximity, and have accessibility features and grades comparable to the existing route to maximize their use. Provide advanced closure signage at decision points far enough in advance to allow the opportunity to utilize alternative routes without backtracking given that these users may have expended considerable physical effort reaching the closure and may not have access to check websites or other postings regarding upcoming work.

5-7 Extended Intermediate-Term Duration Closures

Intermediate-term duration closures are defined as those lasting 3 days or less and include weekend-duration closures (Friday night to Monday morning). Extended closures permit closure hours to extend beyond those normally used in PS&E and result in work zone congestion.

When it has been identified and utilizing extended closure hours is justified, detailed work zone traffic analysis needs to be performed by the Region Traffic Operations to determine anticipated delays and queues (Section 5-9) to determine permitted extended closure hours and any associated interim liquidated damages (Section 5-14). The WSDOT Transportation Data, GIS & Modeling Office (TDGMO) can provide Regions assistance with work zone traffic analysis and determine maximum allowable interim liquidated damages.

Diversion rates used in work zone traffic analysis are determined by Region Traffic Operations based on considerations such as the quality and number of alternative routes available, special event occurrence, and quality of public outreach.

In the Contract PS&E, clearly list permitted extended closures including days and times, maximum number allowable, and restrictions on what work operations are allowed to utilize the extended closures.

When work zone queues are anticipated to exceed more than 1 mile, consider work zone safety management strategies (Section 5-17), including a work zone queue warning system, in addition to implementing work zone congestion management strategies (Section 5-6.B).

There are several extended intermediate-term duration closure strategies available, including:

- Extended weeknights (Section 5-7.A)
- Extended Friday night into Saturday morning (Section 5-7.B)
- Extended Saturday night into Sunday morning (Section 5-7.C)
- Extended weekend morning closures (Section 5-7.D)
- Weekend-duration lane closures (Section 5-7.E)
- Weekend-duration road closures (Section 5-7.F)

A. Extended Weeknight Closures

After the weekday PM commute, decreasing traffic volumes allows any work zone queues to dissipate overnight. Thursday PM volumes tend to be higher later into the evening compared to other weeknights.

Traffic typically diverts around congested work zones using alternative routes, which reduces the traffic volume the work zone must serve. Diversion rates used in work zone traffic analysis are determined by Region Traffic Operations based on considerations such as the quality and number of alternative routes available, special event occurrence, and quality of public outreach.

On the other hand, traffic volumes typically increase quickly during weekday AM commute hours, which minimizes dissipation of any work zone congestion created; thus, work zone impacts to the weekday AM commute should be minimal and assume no traffic diversion.

Exhibit 5-1 Extended Weeknight Closure Guidance

Typical Diversion Rates (Optional)		PM Hours: ≤ 5% AM Hours: 0%
	Targeted Delays	**Comments**
Typical Closure	PM: ≤ 15 minutes AM: ≤ 5 minutes	Perform detailed work zone traffic analysis.
Extended Closure	PM: ≤ 30 minutes	Consider involving Region Management. Perform detailed work zone traffic analysis. Consider significant public outreach.

B. Extended Friday Night into Saturday Morning Closures

After the Friday PM commute, decreasing traffic volumes allows any work zone queues to dissipate overnight. Friday PM volumes tend to be higher later into the evening compared to all other weeknights.

When congestion occurs, traffic may divert using alternative routes around the work zone; therefore, decreasing the volume the work zone must serve. Diversion rates used in work zone traffic analysis are determined by Region Traffic Operations based on considerations such as the quality and number of alternative routes available, special event occurrence, and quality of public outreach.

Because there is no AM commute, closures may be extended into Saturday morning several hours later than weekdays. Because of increasing volumes, the ability to dissipate queues becomes reduced later into the morning.

Exhibit 5-2 Extended Friday Night into Saturday Morning Closure Guidance

Typical Diversion Rates (Optional)		Friday PM Hours: ≤ 10% Saturday AM Hours: ≤ 10%
	Targeted Delays	**Comments**
Typical Closure	Fri PM: ≤ 20 minutes Sat AM: ≤ 15 minutes	Perform detailed work zone traffic analysis.
Extended Closure	Fri PM: ≤ 45 minutes Sat AM: ≤ 30 minutes	Consider involving Region Management. Perform detailed work zone traffic analysis. Consider significant public outreach.

Friday night is typically used to accommodate Superload freight by keeping a minimum of two lanes open on T-1 and T-2 freight corridors when feasible. Superload freight over 20 feet wide is typically restricted to travel during early Saturday morning (1:00 a.m.-6:30 a.m.) or Sunday morning (1:00 a.m.-6:30 a.m.).

C. Extended Saturday Night into Sunday Morning Closures

Decreasing Saturday PM traffic volumes allows any work zone queues to dissipate overnight. Saturday PM volumes tend to be comparable to Friday PM volumes.

When congestion occurs, traffic may divert using alternative routes around the work zone; therefore, decreasing the volume the work zone must serve. Diversion rates used in work zone traffic analysis are determined by Region Traffic Operations based on considerations such as the quality and number of alternative routes available, special event occurrence, and quality of public outreach.

Because there is no AM commute, closures may be extended into Sunday morning several hours later than weekdays and typically an hour later than Saturday morning. Because of increasing volumes, the ability to dissipate queues becomes reduced later into the morning.

Exhibit 5-3 Extended Saturday Night into Sunday Morning Closure Guidance

Typical Diversion Rates (Optional)		Saturday PM Hours: ≤ 15% Sunday AM Hours: ≤ 10%
	Targeted Delays	**Comments**
Typical Closure	Sat PM: ≤ 20 minutes Sun AM: ≤ 15 minutes	Perform detailed work zone traffic analysis.
Extended Closure	Sat PM: ≤ 45 minutes Sun AM: ≤ 30 minutes	Consider involving Region Management. Perform detailed work zone traffic analysis. Consider significant public outreach.

D. Extended Weekend Morning Closures

Some work operations, such as bridge inspections or maintenance operations without noise permits, require daytime closure hours even in heavy congested urban areas but weekday daytime closures would result in unacceptable work zone congestion.

Instead, utilize extended weekend morning closures. Begin closures 1.5 hours before sunrise (times available for Seattle and Spokane) so traffic control and mobilization occur during darkness and crews begin work operations at first light. Balance the need to complete work and keep adverse traffic impacts tolerable using work zone traffic analysis (Section 5-9). Typically, Sunday morning closures reopen an hour later than Saturday.

E. Weekend-Duration Lane Closures

Weekend-duration lane closures, Friday evening to Monday morning commute, are practical solutions for longer work operations when extended overnight closure hours still do not yield sufficient work durations.

Weekend traffic demand tends to be less commute oriented and more discretionary than weekdays. With strong public outreach, motorists can plan ahead by avoiding an area using alternative routes, traveling early morning or later in evenings, or using public transit.

However, avoid weekend lane closures on major recreational routes due to greater communication and outreach challenges. Consider performing these closures during the off-season or weekdays (Sunday evening to noon Friday) instead.

Superload freight is not typically accommodated during weekend-duration lane closures but oversized freight should be along T-1 and T-2 freight corridors. If the roadway is narrowed or vertical clearances reduced, then WSDOT Commercial Vehicle Services should be contacted at least 7 days in advance. See Section 5-15 for details.

Perform work zone traffic analysis (Section 5-9) to assess traffic impacts and mitigation needs. It may be a good time to involve Region Management in the decision process. Region Traffic Operations will determine anticipated diversion rates, which range from 0 percent to 50 percent during hours of congestion for weekend-duration closures. Be aware hourly traffic volumes may be up to 15 percent higher early AM hours on weekends as motorists travel earlier to avoid the worse work zone congestion.

Interim liquidated damage values for weekend-duration closure should be included in the Contract PS&E (see Section 5-14 for details). Consider additional work zone safety management strategies (Section 5-17) when using these strategies.

Freeway Lane & Ramp Closure Weekend-Duration Strategies:

- **Closing up to half the existing freeway lanes**

  Reducing a 4-lane directional freeway to 2 open lanes needs viable alternative routes (2+ multilane principle arterials) and extensive public outreach.

  Reducing a 2-lane directional freeway to 1 open lane needs viable alternative routes (principle arterial, preferably multilane) and extensive public outreach.

- **Farther reduce roadway to a single open lane during overnight hours, but consider the additional work zone congestion created during the day.**

  Typical Friday and Saturday Night Strategy on Congested Urban Freeways: Reduce roadway to a single open lane at 10:30 p.m. and reopen the following morning to two lanes when traffic volumes reach 150 percent of a single open lane's capacity (typically Saturday 5:30 a.m. or Sunday 6:00 a.m.) to clear any early- morning congestion created before congestion starting building during the daytime weekend-duration lane closures.

- **Strategically closing freeway on-ramps can effectively manage congestion along mainline.**

  By strategically closing on-ramps, traffic volumes served by the work zone is reduced by forcing on-ramp traffic to use detour routes or alternative routes; however, avoid closing on-ramps with major trip generators (airport or other major freeways).

  Eliminating on-ramp merges maximizes the capacity through the work zone; therefore, minimizing queues and delays.

  Closing on-ramps prevent queues from spreading onto other corridors via queues extending up ramps and spilling into adjacent corridor thru lanes. With the ramp closed, the traffic queue remain contained on the original corridor, but additional congestion will occur along the detour route or alternative routes.

  Be cautious of closing freeway on-ramps in rural areas as detour routes may be several miles due to the large distances between interchanges.

  This strategy is ineffective if the detour route or alternative route does not bypass the work zone.

Conventional Highway (Non-Freeway) Weekend-Duration Lane Closure Strategies:

- **Temporary two-way, two-lane configuration an existing multilane highways**

  Each direction is reduced to a single open lane, then one direction of traffic is shifted into either the closed two-way, left-turn lane or the closed left lane of the oncoming direction, known as contraflow.

  On divided highways, each direction is reduced to a single open lane, then one direction of traffic is shifted via median crossover over into the closed left lane of the oncoming direction.

- **Temporary two-way, one-lane configuration on an existing highway**

  A single lane is maintained through the work zone with alternating traffic via flagger or temporary signal-control, which may include a pilot car operation.

F. Weekend-Duration Road Closures

For critical work operations it may not be practical to maintain mobility necessitating the use of weekend-duration road closures. Such work operations may include fish passage culverts and modifying existing intersections into roundabouts.

For the traveling public, closing the road for a short duration may be less inconvenience than traveling through a work zone for an extended period of time. Productivity during weekend closures are significantly greater than daily or nightly closures; thus, the project duration can be reduced considerably.

The main requirement for road closures is the availability of a detour route and its ability to accommodate increased traffic volumes, truck turning movements, and pavement integrity. Weekend traffic demand tends to be less commute oriented and more discretionary than weekdays. With strong public outreach motorists are able to plan ahead by avoiding an area by taking alternative routes, traveling earlier or later, or using public transit.

However, avoid weekend lane closures on major recreational routes due to greater communication and outreach challenges. Consider performing these closures using long-term duration closures during the off-season or weekdays (Sunday evening to noon Friday).

For roadway closures along truck freight critical corridors, WSDOT Commercial Vehicle Services should be contacted at least 7 days in advance (see Section 5-15 for details). For FHWA notification requirements for Interstate Highway closures, see Section 5-12.

Perform work zone traffic analysis (Section 5-9) to assess traffic impacts and mitigation needs. It may be a good time to involve Region Management in the decision process.

Interim liquidated damage values for weekend-duration closure should be included in the Contract PS&E (see Section 5-14 for details). Consider additional work zone safety management strategies (Section 5-17) when using these strategies.

Freeway Weekend-Duration Closure Strategies:

- **Directional freeway mainline closure utilizing a collector-distributor**

  Using lane closures, all traffic is forced to exit onto the collector-distributor around the work area before rejoining the mainline. This strategy provides the benefit of a “full roadway closure” in terms of productivity and safety, but maintains limited mobility through the work zone for the traveling public.

- **Directional freeway mainline closure utilizing a median crossover**

  Two-way, two-lane freeway traffic is maintained by placing all traffic on one side of the median with 11-foot lanes, 2-foot right shoulders, and 3-foot left shoulders adjacent to the temporary barrier separating opposing directions of traffic desirable; however, actual site conditions may justify narrower configurations and work zone speed limit reductions (Section 5-18).

  If existing paved shoulders are within the temporary travel lanes, verify the pavement depth is sufficient, drainage features/electrical J-box covers are traffic bearing, and roadway widths across bridges are sufficient.

Often, roadside safety features on freeways are designed for one-way traffic; when temporary two-way configurations are used verify these roadside safety components are sufficient (WSDOT *Design Manual* Chapter 1610 and Chapter 1620).

- **Directional freeway mainline closure utilizing a detour**

  Used in conjunction with lane closures, all traffic is forced to exit at an exit-ramp. A route-specific signed detour route should be provided along with significant mitigation and outreach strategies along with advanced notification.

- **Complete freeway mainline closure utilizing detours**

  For work operations such as overhead bridge demolition across all lanes, it may be necessary to close both directions of a freeway concurrently. A route-specific signed detour route should be provided for each direction along with substantial mitigation and outreach strategies.

Conventional Highway Closure Strategy:

- **Roadway closure with detour**

  The roadway is closed to all traffic with a signed detour route in place. Local traffic access may be permitted up to the actual roadway closure to maintain access for residents and local businesses.

5-8 Long-Term Duration Closures & Reconfigurations

Long-Term duration closures are defined as those lasting 4 days or more. Weekend- duration closures are considered intermediate-term duration (see Section 5-7.E and Section 5-7.F).

Some work operations may require extended closures, even longer than weekend- durations, in order to complete needed work. Such work operations include bridge rehabilitation, major roundabout installation, fish passage culverts, and roadway widening.

These extended closures occur on commuter, freight, and/or recreational routes and should be used only after other traffic control approaches were found to be ineffective or impractical.

When it has been identified and utilizing long-term duration closures is justified, detailed work zone traffic analysis needs to be performed by the Region Traffic Operations to determine anticipated delays and queues (Section 5-9) to determine permitted extended closure hours and any associated interim liquidated damages (Section 5-14). The WSDOT Transportation Data, GIS & Modeling Office (TDGMO) can provide Regions assistance with work zone traffic analysis and determine maximum allowable interim liquidated damages.

Diversion rates used in work zone traffic analysis are determined by Region Traffic Operations based on considerations such as the quality and number of alternative routes available, special event occurrence, and quality of public outreach.

In the Contract PS&E, clearly list permitted long-term duration closures including days and times, maximum number allowable, and any allowable work operation restrictions.

Section 5-12 provides FHWA notification requirements in advance of Interstate Highway closures or on the Federal-aid primary highway system.

When work zone queues are anticipated to exceed more than 1 mile, consider work zone safety management strategies (Section 5-17), including a work zone queue warning system, in addition to implementing work zone congestion management strategies (Section 5-6.B).

Multiple weekday-duration closures, typically Sunday night to noon on Friday, are similar to the weekend-duration strategies but serves as a practical solution for work operations requiring more than a weekend to complete or the work zone occurs along recreational routes experiencing high weekend traffic volumes, but are lower during weekdays.

Regions should expect work zone congestion to be very heavy the first day or two, but easing as the traveling public adjusts their driving habits. After a few days, locals will simply avoid the work zone while others utilize alternative routes or simply avoid travel. When possible, travelers will travel earlier in the morning or later in the evening to avoid the worst of the congestion.

For long-term duration closures, the exact traffic control strategy and closures will be determined on a case-by-case basis and is site-specific. The following are only some of the possible long-duration closure strategies:

- Temporary Bypasses (Section 5-8.A)
- Roadway Lane Closure & Reconfiguration (Section 5-8.B)

A. Temporary Bypasses

A strategy utilized for some bridge reconstruction and fish passage projects is to construct a temporary highway bypass around the fish culvert during its construction, particularly in areas where a sufficient detour or alternative route is unavailable. In addition, it may be utilized on routes serving commuting traffic during the week and recreation traffic on the weekend. Depending on traffic volumes, environmental restrictions, cost, and other practical considerations the bypass could be as follows:

- Two-lane, two-way temporary configuration
- One-lane, two-way temporary configuration utilizing temporary signals to alternate traffic during nonworking hours with flagger-controlled traffic during working hours.

B. Roadway Lane Closure & Reconfiguration

In locations with constrained geometrics, may require lane closures combined with reduced shoulder and lane widths that are laterally shifted onto the shoulders, work can occur on one-half of the roadway and/or bridge at a time. Typically, a two-stage configuration is utilized to complete work across the road/bridge. Such freeway reconfigurations should use a reduced continuous work zone speed limit based on the minimum shoulder and lane widths as shown in Exhibit 5-12 (Section 5-18.A).

Typically, site-specific staging plans and traffic control plans are included in the Contract PS&E for each stage including any needed temporary illumination plans. For more complex projects or locations with tight geometrics, multiple stages and reconfigurations may be necessary.

These long-term reconfigurations should be based on permanent design standards to the extent feasible (horizontal curvature, long-duration temporary pavement markings, temporary traffic barriers with impact attenuators, illumination) while being supplemented with standard temporary traffic control devices. See Chapter 1010 in the WSDOT *Design Manual* for additional work zone design information.

5-9 Work Zone Traffic Analysis

Work zone traffic analysis compares the anticipated work zone traffic volumes with its estimated capacity. When traffic volumes exceed capacity, queues grow and congestion build. When traffic volumes are less than capacity, queues dissipate.

The unit of measurement is vehicle per hour (vph) but may also be measured as vehicles per hour per lane (vphpl) for multilane roadways.

First, determine the anticipated traffic volume through the work zone. Obtain historical traffic volumes (Section 5-9.A) and correct older data for growth (Section 5-9.B). Next, account for any expected traffic diversion, determined by Region Traffic Operations, which decreases the volume served by the work zone. Next, determine the work zone's traffic capacity (Section 5-9.C for freeways and Section 5-9.D for conventional roadways).

With the anticipated traffic volume and work zone capacity, expected work zone queues and delays can then be calculated. For simple scenarios, see Section 5-9.E. For more complex scenarios, see Section 5-9.F.

Region Traffic Operations should perform work zone traffic analysis, but may delegate it to the Project Engineering Office. The WSDOT Transportation Data, GIS & Modeling Office (TDGMO)can assist by providing work zone traffic analysis to help determine expected queuing and delays.

Much of the same information used for work zone traffic analysis is also used by WSDOT TDGMO to determine maximum interim liquidated damage values (Section 5-14). Based on these maximum values, Region Traffic Operations can determine actual interim liquidated damage values for each closure which are listed in the Contract PS&E. Based on these maximum values, Region Traffic Operations can determine actual interim liquidated damage values for each closure which are listed in the Contract PS&E.

A. Obtaining Traffic Volumes

When possible, obtain current traffic volumes within the work zone limits. Be cautious of using traffic data older than a year, especially in high-growth areas.

Directional traffic volumes should be taken at several locations. On freeways, obtain mainline volumes between each interchange and volumes of each exit-ramp and on-ramp. On conventional roadways, obtain mainline volumes between significant intersections.

Traffic volumes should be obtained each day of the week closures are permitted as they may change significantly from day to day. For extended intermediate-term duration closures (Section 5-7) and long-term duration closures (Section 5-8) obtain several sets of data for each day for a good average, desirably 10 for each day. Screen the data set for any significant special events or holidays that may significantly skew the traffic volume average.

It is desirable to obtain traffic volumes in 15-minute intervals for greater accuracy in determining closure hours for closures on freeways and major arterials. It may become necessary to assign closures in 15-minute intervals on heavily congested corridors instead of typical hourly intervals. When 15-minute traffic volumes are used, multiply by four to obtain an *equivalent hourly volume* to use the hourly intermediate-term work zone capacities provided in Section 5-9.C and Section 5-9.D.

Recreational roadways will experience significant fluctuations in traffic volumes seasonally; however, most roadways experience higher traffic volumes in summer and lower in winter. Similarly, work zone capacities also are higher in summer and lower in winter by similar amounts **usually eliminating the need for seasonal adjustments for work zone traffic analysis in most areas**.

The following resources may be used to obtain existing traffic volumes on state routes and the Interstate Highway system:

- **WSDOT Traffic Data GeoPortal**

  This application allows users to obtain historic hourly and aggregate traffic volume data from WSDOT's network of Permanent Traffic Recorders (PTRs).

  For detailed information on GeoPortal application, including the map layer information and instructions for obtaining data within this system, see Traffic Data GeoPortal Help.

- **WSDOT Transportation Data, GIS & Modeling Office (TDGMO)**

  Hourly volume, classification, speed, and weight data can be obtained, when available, from the TDGMO. This includes data from both the PTR network and short-duration mechanical counts conducted throughout the state. To obtain this data, complete and submit a Traffic Data Request Form to TDGMO.

- **WSDOT ECM Portal**

  "Short Duration Count" searches an internal database for various hourly traffic counts, including NWR Traffic Studies Database.

- **CDR Software (Northwest Region Only)**

  This software allows engineers to access detailed traffic data for freeways and major arterial roadways from PTRs. Historic PTR data is available in 5-minute intervals but can be automatically aggregated and summarized as needed by the software, with 15-minute or one-hour intervals being the most useful for work zone traffic analysis.

- **Request New Traffic Studies**

  New traffic studies can be performed by the TDGMO and the Northwest Region upon request.

  To request new traffic studies statewide, contact TDGMO.

B. Correcting Traffic Volumes for Growth

When traffic volumes are more than a year old, then account for annual changes in traffic volumes. The growth rate of traffic is location specific. Traffic volumes often decrease during times of economic recession.

If needed, location specific growth rate estimates can be generated by contacting TDGMO or Region Traffic Operations. Without the availability of better data or information, a conservative growth rate of 3 percent per year can be assumed.

Caution should be used when applying a constant growth rate across all hourly traffic volumes because congested corridors may experience much higher growth rates during early AM commute hours as motorists adapt to worsening congestion by beginning their commutes earlier, as early as 3:30 a.m. in a few locations.

Without the availability of better data or information, using hourly traffic volumes from one location along a corridor and using the AADTs of both location to "adjust" the hourly volumes may be acceptable; however, if the "adjusted" hourly volumes are near the work zone traffic capacities then new traffic counts should be obtained.

C. Freeway Work Zone Traffic Capacities

The "rule of thumb" work zone capacity thresholds provided in this subsection include ranges based on the understanding that roadway conditions, roadway configurations, and work activity intensity all impact actual capacities; therefore, sound engineering judgement and Regional experience is still needed to perform proper work zone traffic analysis.

Stationary freeway lane closures are ones that occupy a location and are set up with standard traffic control devices.

Exhibit 5-4 Lane Capacities in Stationary Freeway Work Zones

Stationary Freeway Lane Description	Stationary Work Zone Lane Capacity (vehicles per hour per open lane)
General Purpose Lane (No Shift onto Shoulder)	Urban: 1400-1600 Rural: 1300-1500
Single Open Lane Shifted onto Shoulder	Urban: 1000-1100 Rural: 900-1000

Special Scenarios:

- Increase directional capacity by 100 vehicles/hour when traffic barriers separate travel lanes from work areas.
- When High Occupancy Vehicle (HOV) and Express Toll Lane (ETL) is present, assume its lane capacity as 1000 unless it is the only lane open, even when signed as "OPEN TO ALL".
- For steep upgrades (≥ 5 percent for more than ½ mile), reduce one lane's capacity by one-half to account for the slow trucks.

Mobile freeway lane closures are "moving lane closures" using transportable attenuators without channelization devices where work moves intermittently or continuously.

Exhibit 5-5 Lane Capacities in Mobile Freeway Work Zones

Mobile Freeway Lane Description	Mobile Work Zone Lane Capacity (vehicles per hour per open lane)
3 Open Lanes	Urban: 1250-1350 Rural: 1150-1250
2 Open Lanes	Urban: 1100-1200 Rural: 1050-1150
1 Open Lane	Urban: 1000-1100 Rural: 950-1050

Special Scenarios:

- When High Occupancy Vehicle (HOV) and Express Toll Lane (ETL) is present, assume its lane capacity at 750, even when signed as "OPEN TO ALL".
- For steep upgrades (≥ 5 percent for more than ½ mile), reduce one lane's capacity by one-half to account for the slow trucks.

- **Nightly Freeway Ramp Closures**

  When determining permitted closure hours for ramps, it is important to understand ramp closure hours are dependent on the excess capacity available along its entire detour route, including any intersections. If the detour route is already congested, then it has no excess capacity to absorb the detouring traffic. In short, the capacity of the detour route increases as overall volumes become lower. In other words, a detour route can serve higher detour traffic volumes at 11:00 p.m. than at 7:00 p.m.. Because overall traffic volumes higher later into evenings weekends than weeknights, the thresholds vary to account for this trend.

  The opposite is true during the morning because overall traffic volumes are increasing. Because excess capacity along the detour route decreases into the morning, the detour traffic volume that can be sufficiently served also decreases later into the morning. In other words, a detour route can sufficiently serve lower detour traffic volumes at 6:00 a.m. than at 4:00 a.m.. Because weekends have no AM commute traffic, the thresholds remain higher later into the morning.

  Suburban & urban corridors experience higher traffic volume levels than rural corridors; however, suburban & urban motorists are more accepting of higher congestion levels. The thresholds account for this trend as well.

  It is also important to distinguish between exit-ramp and on-ramps detour routes; particularly when temporary lane closures are in place on mainline in one or both directions of travel. Exit-ramp detours typically route on towards the next interchange and then back in the opposite direction resulting in higher traffic volumes than normal along the detour route, which should be accounted for when temporary lane closures are in place in either direction or additional work zone congestion may occur. On the other hand, on-ramps tend to use surface streets and local road detours to adjacent interchanges which lowers traffic volumes on the mainline in that section, and may help offset the additional traffic volumes generated by exit-ramp detours.

It is important to verify *the entire detour route* can sufficiently handle the added traffic volumes detoured, not just focusing on the ramp's volume in isolation. Additional work zone congestion strategies may be needed along the detour route (see Section 5-6.B for details).

Pay particular attention to detour routes turning left at signalized intersections with a short, single left turn lane with a protected left turn signal phase. Signal retiming or uniform police officer(s) controlling traffic at the intersection may be necessary. When traffic volumes sufficiently decrease, normal signal operation may be restored.

For guidance, ramp closure volume thresholds are available in Exhibit 5-6. Exhibit 5-7 provides ramp reopening thresholds. **Note this guidance is for nightly ramp closures.** Weekend-duration duration ramp closures are discussed in Section 5-7.E and long-term durations in Section 5-7.F.

Exhibit 5-6 Nightly Ramp Closure Volume Thresholds (vehicles/hour)

	Sunday night Monday night Tuesday night Wednesday night Thursday night		Friday night Saturday night	
Ramp Closure Beginning Time	Suburban & Urban Corridors	Rural Corridors	Suburban & Urban Corridors	Rural Corridors
7:00 p.m.	200	200	150	150
7:30 p.m.	250	225	175	175
8:00 p.m.	300	250	200	200
8:30 p.m.	375	300	250	225
9:00 p.m.	450	375	300	250
9:30 p.m.	525	450	375	300
10:00 p.m.	600	525	450	375
10:30 p.m.	700	600	525	450
11:00 p.m.	800	Any Volume	600	525
11:30 p.m.	900	Any Volume	700	600
11:59 p.m.	Any Volume	Any Volume	Any Volume	Any Volume

Notes:

- "Any Volume" means the ramp may be closed regardless of its volumes (excluding major special events).
- Additional work zone congestion strategies may still be necessary (Section 5-6.B) for ramp volumes exceeding 1000 vehicles per hour.
- Verify the *entire detour route* can sufficiently handle the added detour volumes, especially at intersections.

The following ramp closure examples are based on Exhibit 5-6 guidance to assist users:

Example #1: A suburban ramp can be closed starting 9:00 p.m. Monday night if its volume is less than 450 vehicles per hour at that time.

Example #2: A rural ramp can be closed starting 11:00 p.m. Friday night if its volume is less than 525 vehicles per hour at that time.

Example #3: Any ramp could be closed beginning 11:59pm any night of the week regardless of its volumes, except when its closure impacts major special events. Verify the entire detour route can sufficiently handle the detour volumes and consider additional work zone congestion strategies such as signal retiming or uniform police officer-controlled traffic at intersections when ramp volumes exceed 1000 vehicles per hour.

Exhibit 5-7 Nightly Ramp Reopening Volume Thresholds (vehicles/hour)

	Weekdays (AM Commutes)		Saturday morning		Sunday morning	
Ramp Reopening Time	Suburban & Urban Corridors	Rural Corridors	Suburban & Urban Corridors	Rural Corridors	Suburban & Urban Corridors	Rural Corridors
3:30 a.m.	800	600	Any Volume	Any Volume	Any Volume	Any Volume
4:00 a.m.	600	500	Any Volume	Any Volume	Any Volume	Any Volume
4:30 a.m.	450	350	Any Volume	Any Volume	Any Volume	Any Volume
5:00 a.m.	Reopen	250	800	600	Any Volume	Any Volume
5:30 a.m.		150	600	500	Any Volume	Any Volume
6:00 a.m.		Reopen	450	350	800	600
6:30 a.m.			300	250	600	500
7:00 a.m.			200	200	450	350
7:30 a.m.			150	150	300	250
8:00 a.m.			Reopen	Reopen	200	200
8:30 a.m.					150	150
9:00 a.m.					Reopen	Reopen

Notes:

- "Any Volume" means the ramp may be closed regardless of its volumes.
- Additional work zone congestion strategies may still be necessary (Section 5-6.B) for ramp volumes exceeding 1000 vehicles per hour.
- "Reopen" means the nightly ramp closure should be reopened regardless of its volumes (excludes weekend-duration or long-term closures) unless otherwise justified.
- Verify the *entire detour route* can sufficiently handle the added detour volumes, especially at intersections.

The following ramp reopening examples are based on Exhibit 5-7 guidance to assist users:

Example #1: A ramp can remain closed thru 3:30 a.m. during early weekday mornings regardless of its ramp volumes.

Example #2: A suburban/urban ramp should be reopened no later than 4:30 a.m. Tuesday morning if its volumes exceed 450 vehicles per hour at that time; unless otherwise justified (ramp is opposite of the AM commute direction), reopen the ramp by 5:00 a.m. on weekday mornings.

Example #3: A rural ramp should be reopened no later than 5:00 a.m. Wednesday morning if its volumes exceed 250 vehicles per hour at that time; unless otherwise justified, reopen the ramp by 6:00 a.m. on weekday mornings.

Example #4: Any ramp can remain closed thru 5:00 a.m. early Saturday morning regardless of its ramp volumes; unless otherwise justified, reopen the ramp by 8:00 a.m. on Saturday mornings (excludes extended weekend morning or weekend-duration closures).

Example #5: Any ramp can remain closed thru 6:00 a.m. early Sunday morning regardless of its ramp volumes; unless otherwise justified, reopen the ramp by 9:00 a.m. on Sunday mornings (excludes extended weekend morning or weekend-duration closures).

- **Daytime Freeway Ramp Closures**

  Some work operations, such as bridge inspections or maintenance operations without noise permits, require daytime closure hours even in heavy congested urban areas. Permitted closure hours for this situation should be examined on a case-by-case basis by Region Traffic Operations.

  Consider the following: What are the ramp volumes during the closure? Does the detour add considerable delays, especially for commuter and school traffic?

  If permitted, weekday daytime ramp closure hours are typically assigned between the AM commute and PM commute (9:00 a.m. to 3:00 p.m.).

  When daytime closures during weekdays result in unacceptable work zone congestion, an alternative approach is to utilize extended Saturday morning or Sunday morning closures. See Section 5-7.D for details.

D. Conventional Roadway Work Zone Traffic Capacities (Non-Freeway)

The “rule of thumb” work zone capacity thresholds provided in this subsection include ranges based on the understanding that roadway conditions, roadway configurations, and work activity intensity all impact actual capacities; therefore, sound engineering judgement and Regional experience is still needed to perform proper work zone traffic analysis.

- **Multilane Closures (Non-Freeway)**

  These lane closures maintain two-way traffic with at least one thru lane in each direction (no flaggers, pilot cars, temporary signals, etc.). Contraflow means two- way traffic is maintained by shifting one direction of travel into the opposing direction’s closed thru lanes or closed two-way, left-turn center lane.

Traffic capacity is further reduced when closures extend through signalized intersections, particularly for contraflow configurations. When traffic is shifted at or thru signalized intersections via contraflow, the signalized intersection shall be either controlled by uniform police officer(s) within the intersection per WAC 468-95-3015 or flaggers on all approaches with an optional flagger added within the intersection.

Exhibit 5-8 provides capacities for rural multilane roadways. Exhibit 5-9 provides capacities for urban multilane roadways.

Exhibit 5-8 Rural Multilane Work Zone Traffic Capacities

Lane Description	Work Zone Lane Capacity (vehicles per hour per open thru lane)
One Thru Lane(s) Each Direction (Typical lane closures)	No Signalized Intersections: 1200-1300 Thru Signalized Intersections: 1000-1100
One Thru Lane Each Direction (Contraflow)	No Signalized Intersections: 1100 -1200 Thru Signalized Intersections: 700-800

Note:
For steep upgrades (≥ 5 percent for more than ½ mile), reduce one lane's capacity by one-half to account for the slow trucks.

Exhibit 5-9 Urban Multilane Work Zone Traffic Capacities

Lane Closure Description	Work Zone Lane Capacity (vehicles per hour per open thru lane)
One Thru Lane(s) Each Direction (Typical lane closures)	No Signalized Intersections: 1050-1150 Thru Signalized Intersections: 850-950
One Thru Lane Each Direction (Contraflow)	No Signalized Intersections: 950-1050 Thru Signalized Intersections: 700-800

- **Single Open Lane with Alternating Traffic**

  Traffic capacities are significantly affected by the distance between flaggers or temporary signals due to the lost time waiting for alternating traffic directions to take turns. Additional intersections between flaggers farther exasperate this issue.

  Alternating traffic can be controlled via flaggers, AFADs, pilot cars, or temporary signals. Different methods will yield different work zone capacities. Pilot cars increase capacity by guiding motorists through the work zone more effectively, especially for work zones exceeding 800 feet between flaggers.

  When bicyclists are combined with alternating vehicular traffic, work zone capacity is significantly reduced due to their slow speeds and longer clearance intervals. Temporary signals are especially affected because the all-red clearance intervals for temporary signals typically assume bicycle speeds of 10 mph (unless a separate bicycle lane or shuttle is provided). All-red clearance time becomes excessively lengthy when distances between temporary signals exceed 1000 feet.

For congested work zones with alternating traffic, queues and delays can be minimized by reducing the distance between flaggers and the clearance time needed. For example, reducing the longitudinal buffer space and upgrading the protective vehicle up to a transportable attenuators (for speed 45 mph or higher) would minimize queues while still protecting the work area from errant vehicle intrusions because the flaggers are closer.

Exhibit 5-10 Alternating Two-Way Traffic Work Zone Traffic Capacities

Distance Between Flaggers or Temporary Signals	Total Work Zone Capacity (total vehicles per hour in both directions combined)			
	Flagger & AFAD	Flagger & Pilot Car	Temporary Signal (Separate Bicycle Lane or Shuttle)	Temporary Signal (Bicyclists Share Open Lane With Motorists)
200 feet	1200	N/A	1300	1100
500 feet	1000	1000	1050	850
800 feet	900	925	950	700
1000 feet	800[1]	850[1]	850	500
1500 feet	700[1]	775[1]	700	375
½ mile	550[1]	650[1]	550	250
1 mile	350[1]	475[1]	350	125

Notes:

[1] If bicycle volumes are significant and share open lane with motorists, use capacity listed in "Temporary Signal (Bicyclist Share Open Lane with Motorists)".

- Intersecting roadways lower capacities based on volume and frequency.
- When temporary signals are used to alternating traffic, consider Driveway Assistance Devices (DADs) control driveways avoid capacity reductions.

E. Simple Work Zone Queues & Delays

When work zone congestion is expected, then calculating the expected queue and delay becomes necessary to determine the level of work zone impact to determine the closure's feasibility and the level of mitigation needed.

Work zone queue and delays is calculated using the following equations:

$$\text{Traffic demand} = \text{average typical traffic volume} * \left(1 - \frac{\text{traffic diversion \%}}{100}\right)$$

$$\text{Number of unserved vehicles} = (\text{hourly traffic demand} - \text{WZ hourly capacity}) * \left(\frac{\text{time interval in minutes}}{60 \text{ minutes}}\right)$$

$$\text{Queue (miles)} = \text{\# unserved vehicles} * \left(\frac{25 \text{ feet}}{\text{vehicle}}\right) * \left(\frac{\text{mile}}{5280 \text{ feet}}\right) * \left(\frac{1}{\text{\# lanes}}\right)$$

$$\text{Delay (minutes)} = \text{\# unserved vehicles} * \left(\frac{1}{\text{WZ hourly capacity}}\right) * \left(\frac{60 \text{ minutes}}{\text{hour}}\right)$$

Explanation of Variables and Calculations:

- **Average typical traffic volume:** Expected traffic volume traveling through the work zone; see Section 5-9.A and Section 5-9.B for details.
- **Traffic diversion:** Percentage of vehicles that avoid traveling through the work zone during hours of congestion; see Section 5-7 and Section 5-8 for details. Diversion rates are determined by Region Traffic Operations.
- **Work zone capacity:** Anticipated traffic volume a work zone can serve; see Section 5-9.C for freeways and Section 5-9.D for conventional roadways.
- **Unserved vehicles:** Calculated value to determine how many vehicles are still waiting to proceed through the work zone for the given time interval in minutes. Number of unserved vehicles will carry over to any subsequent time intervals until dissipated.
- **Queue:** Calculated value to determine work zone queue length and is dependent on the number of unserved vehicles and how many open lanes are available prior to the capacity restriction (typically a lane closure merge point).
- **Delay:** Calculated value to determine the additional travel time through work zone and is dependent on the number of unserved vehicles and the work zone's current capacity. Delay is independent of queue length, but both queue and delay are dependent on the number of unserved vehicles.

Examples are provided on the following pages as reference.

Example #1a: A two-lane rural freeway is reduced to a single open lane shifted onto the shoulder. Average typical traffic volume is 1350 vehicles/hour. Assume 5 percent traffic diversion. Determine the queue and delay at the end of the first hour.

$$\text{Traffic demand} = 1350 * \left(1 - \frac{5}{100}\right) = 1283 \text{ vehicles/hour}$$

- Average typical traffic volume = 1350
- Diversion rate = 5 percent or 5/100.

$$\text{Work zone capacity} = 900 \text{ vehicles/hour/lane} \times (1 \text{ open lane}) = 900 \text{ vehicles/hour}$$

- Freeway work zone capacity information is found in Exhibit 5-4 in Section 5-9.C, which is capacity per open lane. Thus, multiply this value by number of open lanes.

$$\text{Number of unserved vehicles} = (1283 - 900) * \left(\frac{60}{60}\right) = 383 \text{ unserved vehicles in first hour}$$

- Since we are determining the queue/delay at the end of the first hour, the time interval is 1 hour or 60 minutes; thus, the 60/60 factor.

$$\text{Queue} = 383 \text{ unserved vehicles} * \left(\frac{25 \text{ feet}}{\text{vehicle}}\right) * \left(\frac{\text{mile}}{5280 \text{ feet}}\right) * \left(\frac{1}{2 \text{ lanes}}\right) = 0.91 = 0.9 \text{ mile}$$

- There are two open lanes prior to the lane closure where the freeway is reduced to a single open lane; thus, the queue length will occur in the 2-lane section.

$$\text{Delay} = 383 \text{ unserved vehicles} * \left(\frac{1}{900 \text{ vehicles per hour}}\right) * \left(\frac{60 \text{ minutes}}{\text{hour}}\right) = 25.5 = 26 \text{ minutes}$$

Answer: The work zone queue is estimated as 0.9 mile with 26 minute delays at the end of the first hour.

As demonstrated In Example #1a, the number of unserved vehicles is positive (+383); thus, traffic demand significantly exceeds the work zone capacity and queues and delays are increasing rather quickly. At the end of the first hour, the queue has increased to 0.9 mile with 26 minute delays and serves as the initial values for determining the queues and delays for the second hour.

Each hourly calculation are incremental; the unserved vehicles from the previous hour carries over to the next hour. Thus, the longer traffic demand exceeds a work zone's capacity, the worse the congestion becomes.

On the other hand, as traffic volumes decreases overnight, then the work zone's capacity will eventually exceed the traffic demand, and the queue and delays begin dissipating as demonstrated in Example #1b on the next page.

Example #1b: The same two-lane rural freeway lane closure in Example #1 remains in place for a second hour. The average typical traffic volume during the second hour is 915 vehicles; assume 10 percent traffic diversion as it is later in the evening with a good alternate route nearby. Determine the queue and delay at the end of the second hour.

$$\text{Traffic demand} = 915 * \left(1 - \frac{10}{100}\right) = 824 \text{ vehicles/hour}$$

- Average typical traffic volume = 915
- Diversion rate = 10 percent or 10/100.

$$\text{Work zone capacity} = 900 \text{ vehicles/hour/lane} \times (1 \text{ open lane}) = 900 \text{ vehicles/hour}$$

- Freeway work zone capacity information is found in Exhibit 5-4 in Section 5-9.C, which is capacity per open lane. Thus, multiply this value by number of open lanes.

$$\text{Number of unserved vehicles} = (824 - 900) * \left(\frac{60}{60}\right) = -76 \text{ unserved vehicles in second hour}$$

- Since we are determining the queue/delay at the end of the second hour, the time interval is 1 hour or 60 minutes; thus, the 60/60 factor.
- A negative number means the work zone capacity exceeds the traffic demand; thus, unserved vehicles from the first hour will be dissipated.

$$\text{Queue} = 0.91 \text{ miles} + \left[-76 \text{ unserved vehicles} * \left(\frac{25 \text{ feet}}{\text{vehicle}}\right) * \left(\frac{\text{mile}}{5280 \text{ feet}}\right) * \left(\frac{1}{2 \text{ lanes}}\right)\right] =$$
$$0.91 \text{ miles} - 0.18 \text{ miles} = 0.73 = 0.7 \text{ mile}$$

$$\text{Delay} = 25.5 \text{ minutes} + \left[-76 \text{ unserved vehicles} * \left(\frac{1}{900 \text{ vehicles per hour}}\right) * \left(\frac{60 \text{ minutes}}{\text{hour}}\right)\right] =$$
$$25.5 \text{ minutes} - 5.1 \text{ minutes} = 20.4 = 20 \text{ minutes}$$

Answer: The work zone queue is estimated as 0.7 mile with 20 minute delays at the end of the second hour.

In Example #1b, the number of unserved vehicles is negative (-76). This is good news because now the work zone capacity exceeds traffic demand causing queues to dissipate. This is why congestion is targeted in the PM overnight hours when traffic volumes are declining because any congestion created initially will dissipate overnight.

At the end of the second hour, the queue has reduced to 0.7 mile with 20 minute delays and serves as the initial values for determining the queues and delays after the third hour. If the third hour volumes are even lower, the queue and delays will reduce even quicker. Eventually, the queue and delays will fully dissipate and the work zone will be free flow.

Example #1c: The same two-lane rural freeway lane closure in Example #1 remains in place for a third hour. The average typical traffic volume during the second hour is 600 vehicles; assume 15 percent traffic diversion as it is even later in the evening with a good alternate route nearby. Determine the queue and delay at the end of the second hour.

$$\text{Traffic demand} = 600 * \left(1 - \frac{15}{100}\right) = 510 \text{ vehicles/hour}$$

- Average typical traffic volume = 600
- Diversion rate = 15 percent or 15/100.

$$\text{Work zone capacity} = 900 \text{ vehicles/hour/lane} \times (1 \text{ open lane}) = 900 \text{ vehicles/hour}$$

- Freeway work zone capacity information is found in Exhibit 5-4 in Section 5-9.C, which is capacity per open lane. Thus, multiply this value by number of open lanes.

$$\text{Number of unserved vehicles} = (510 - 900) * \left(\frac{60}{60}\right)$$
$$= -390 \text{ unserved vehicles in second hour}$$

- Since we are determining the queue/delay at the end of the second hour, the time interval is 1 hour or 60 minutes; thus, the 60/60 factor.
- A negative number means the work zone capacity exceeds the traffic demand; thus, unserved vehicles from the first hour will be dissipated.

$$\text{Queue} = 0.73 \text{ miles} + \left[-390 \text{ unserved vehicles} * \left(\frac{25 \text{ feet}}{\text{vehicle}}\right) * \left(\frac{\text{mile}}{5280 \text{ feet}}\right) * \left(\frac{1}{2 \text{ lanes}}\right)\right] =$$
$$0.91 \text{ miles} - 0.92 \text{ miles} = -0.01 = 0.0 \text{ mile}$$

$$\text{Delay} = 25.5 \text{ minutes} + \left[-390 \text{ unserved vehicles} * \left(\frac{1}{900 \text{ vehicles per hour}}\right) * \left(\frac{60 \text{ minutes}}{\text{hour}}\right)\right] =$$
$$25.5 \text{ minutes} - 26.0 \text{ minutes} = -0.05 = 0 \text{ minutes}$$

Answer: The work zone queue has fully dissipated with no delays at the end of the third hour.

In Example #1c, the number of unserved vehicles is negative (-390). This is great news because now the work zone capacity significantly exceeds unserved traffic demand from the second hour; causing queues to completely dissipate by the end of the third hour. This is why congestion is targeted in the PM overnight hours when traffic volumes are declining because any congestion created will dissipate overnight.

Now traffic through work zone is free flow.

Example #2A: U.S. Highway 12 is reduced to a single open lane with traffic alternating via flagger (no pilot car) in a mountain pass without any alternative routes available during daylight hours. The distance between flaggers is 1 mile. The average typical traffic volume during this hour is 263 vehicles/hour from eastbound and 524 vehicles/hour from westbound. Determine the queue and delay after 30 minutes of lane closure. Assume traffic queues are split evenly between the two directions.

$$\text{Traffic demand} = (263 + 524) * \left(1 - \frac{0}{100}\right) = 787 \frac{\text{vehicles}}{\text{hour}}$$

- Because traffic is alternated in a single open lane via flagger-control, the work zone must serve both directions of traffic. Therefore, the directional volumes are combined.
- Diversion rate = 0 percent or 0/100. No alternative routes are available.

$$\text{Work zone capacity} = 350 \text{ vehicles/hour}$$

- Conventional roadway work zone capacity information is found in Exhibit 5-10 based on 1 mile distance between flaggers.

$$\text{Number of unserved vehicles} = (787 - 350) * \left(\frac{30}{60}\right)$$
$$= 219 \text{ unserved vehicles after 30 minutes}$$

- We are determining the queue/delay after 30 minutes; thus, the 30/60 factor.

$$\text{Queue} = 219 \text{ unserved vehicles} * \left(\frac{25 \text{ feet}}{\text{vehicle}}\right) * \left(\frac{\text{mile}}{5280 \text{ feet}}\right) * \left(\frac{1}{2 \text{ directions}}\right) = 0.52 = 0.5 \text{ mile}$$

- Problem statement assumed queues are split evenly between both directions for simplicity; thus, divided queue by 2 directions.

$$\text{Delay} = 219 \text{ unserved vehicles} * \left(\frac{1}{350 \text{ vehicles per hour}}\right) * \left(\frac{60 \text{ minutes}}{\text{hour}}\right) = 37.5 = 38 \text{ minutes}$$

Answer: The work zone queue is estimated as 0.5 mile in each direction with 38 minute delays after 30 minutes of lane closure.

As demonstrated In Example #2A, the traffic demand far exceeds the work zone capacity and delays become substantial even after only 30 minutes of closure. A logical solution would be performing the lane closure during times when traffic volumes are lower, such as at night, but that may not be an option in some situations. Let's say the work must be performed at the time and volumes listed above. What now?

There are two remedies to improve the situation. **Minimize the distance between flaggers as much as possible and use a pilot car** as shown in Example #2B on the next page.

Example #2B: The traffic control in Example #2A has been modified. Flaggers with a pilot car escorting motorists through the work zone is used. The distance between flaggers has been reduced to 1500 feet. Determine the queue and delay after 30 minutes of lane closure. Assume traffic queues are split evenly between the two directions.

$$\text{Traffic demand} = (263 + 524) * \left(1 - \frac{0}{100}\right) = 787 \text{ vehicles/hour}$$

- Because traffic is alternated in a single open lane via flagger-control, the work zone must serve both directions of traffic. Therefore, the directional volumes are combined.
- Diversion rate = 0 percent or 0/100.

$$\text{Work zone capacity } = 650 \text{ vehicles/hour}$$

- Conventional roadway work zone capacity information is found in Exhibit 5-10 based on ½ mile distance between flaggers with pilot car.

$$\text{Number of unserved vehicles} = (787 - 650) * \left(\frac{30}{60}\right) = 69 \text{ unserved vehicles after 30 minutes}$$

- We are determining the queue/delay after 30 minutes; thus, the 30/60 factor.

$$\text{Queue} = 69 \text{ unserved vehicles} * \left(\frac{25 \text{ feet}}{\text{vehicle}}\right) * \left(\frac{\text{mile}}{5280 \text{ feet}}\right) * \left(\frac{1}{2 \text{ directions}}\right) = 0.16 = 0.2 \text{ mile}$$

- Problem statement assumed queues are split evenly between both directions for simplicity; thus, divided queue by 2 directions.

$$\text{Delay } = 69 \text{ unserved vehicles} * \left(\frac{1}{650 \text{ vehicles per hour}}\right) * \left(\frac{60 \text{ minutes}}{\text{hour}}\right) = 6.4 \ = 6 \text{ minutes}$$

Answer: The work zone queue is estimated as 0.2 mile in each direction with 6 minute delays after 30 minutes of lane closure.

As demonstrated In Example #2B, even though work zone congestion occurs, it has been greatly improved by simply reducing the distance between flaggers and using a pilot car. Depending on the work's duration (a few hours versus all day), additional mitigation strategies will be needed. Perhaps, flagger spacing can be reduced to 1500 feet so work zone capacity (775vph) matches expected traffic demand (787 vph).

A goal in work zone design is to allow crews to complete needed work while managing work zone mobility; collaboration and cooperation is necessary. This is exactly what work zone congestion management is all about.

F. Complex Work Zone Queues & Delays

Region Traffic Operations should perform complex work zone traffic analysis. The WSDOT Transportation Data, GIS & Modeling Office (TDGMO) can assist by providing work zone traffic analysis to help determine expected queuing and delays.

For more complex situations, consider using one of the numerous work zone queue analysis tools available:

- **WSDOT's Capacity-Queue-Delay Microsoft Excel Sheet**

  This WSDOT-developed tool estimates queues, delays, and user delay costs based on 15-minute intervals and includes traffic diversion rates. There is an hourly volume to 15-minute volume converter included if needed.

  The Excel files are available here. Copy the Excel files onto your desktop first before modifying. For detailed explanations, contact WSDOT HQ Work Zone Engineers.

- **CA4PRS (Construction Analysis for Pavement Rehabilitation Strategies)**

  This software is an agency decision-support tool to help select the most effective and economical construction and work zone strategies in terms of schedule, traffic impacts, and agency costs. CA4PRS is especially beneficial for large roadway rehabilitation and widening projects in congested urban areas having high-traffic impacts.

  CA4PRS software is free to WSDOT staff; for details, see the CalTrans CA4RPS website.

- **QuickZone**

  This software is a spreadsheet-based traffic analysis tool to estimate costs, traffic delays, and queues for urban and rural work zones, including alternating two-way traffic in a single lane.

  For details, see the FHWA QuickZone website.

- **SYNCHRO**

  This software is typically used for permanent traffic signal design; however, it is useful for temporary signal design for work zones as well for developing signal timing plans.

- ***Highway Capacity Manual*, 6th Edition**

  This manual is used for work zone traffic analysis of long-term staged configurations (remaining in place 24/7 for weeks), not intermediate-term (≤ 3 days) closures.

- **FHWA Traffic Analysis Tools Program – Deployment Track**

  Volumes VIII, IX, and XII specifically relate to work zones and provide comprehensive information. All three volumes are available at this FHWA webpage.

- **FHWA Sponsored Work Zone Traffic Management Analysis Training**

  Illinois College of Engineering provides a free 2-day class for work zone analysis via analytical method training throughout the nation. Check the registration/class schedule webpage and contact information for future courses.

5-10 Permitted Closure Restrictions

On Design-Bid-Build construction projects, permitted closures are listed in the Contract's Special Provisions (Specials) and in the Request for Proposal (RFP) on Design-Build projects. Maintenance closures are typically determined on a case-by-case basis.

When determining permitted closure hours for Contracts, consider the closures occur over months or years. At the Agency's option, permitted closure hours can be expanded during construction on a case-by-case, trial basis; however, if work zone congestion becomes intolerable and the Agency reduces the permitted hours after bidding, it may result in claims from the Contractor. On the other hand, if permitted closure hours are too conservative, it decreases the available working hours and may result in increased construction costs for negligible work zone congestion reductions.

Because Maintenance closures occur for a day or a few days, the Agency may assign less conservative closure hours with the understanding Maintenance crews remove the closure if work zone congestion become excessive.

Closure hours are provided for all permitted closures, including but not limited to:

- Shoulder closures
- Lane closures
- Ramp closures
- Roadway or directional roadway closures
- Staged construction allowable durations
- Pedestrian curb, traffic island, and/or sidewalk closures
- Extended lane closures for specific work operations
- Continuous roadway, directional roadway, lane, and/or ramp closures

A. Contractor Cooperation and Permitted Closure Restrictions Due to Other Projects

Contract PS&Es should provide an *Other Contracts or Other Work* section of anticipated projects, both State and local agency, occurring adjacent to or within the limits of the project requiring coordination and cooperation between Contractors.

Additional restrictions on permitted closures may be specified during scheduled roadway closures, directional roadway closures, and weekend lane closures occurring on other projects. This is often used on significant alternative routes around a major closures; for example, restricting any lane closures on southbound I-205 when southbound I-5 is closed for an adjacent project in Vancouver, Washington.

Consider language requiring a minimum of 1 mile between adjacent lane closures. For example, if a double right lane closure precedes a double left lane closure then the closures need to be separated by at least 1 mile to allow advanced warning signs for the second closure to be installed but also allow motorists sufficient time to transition across lanes. If PCMSs are used in addition to advanced warning signs, then increase the distance to 1.5 mile minimum.

B. Holiday Restrictions for Permitted Closures

Contract PS&Es may restrict permitted closures from occurring during holidays and holiday weekends (when the holiday occurs on Friday, Saturday, Sunday, or Monday). Typically, the restriction begins noon the day prior and may continue until noon the day after the holiday or holiday weekend. These holidays are listed in the WSDOT *Standard Specifications* Section 1-08.5.

Canadian holiday restrictions may be needed for projects near British Columbia; each Canadian holiday should be listed and typically include:

- Good Friday (Friday before Easter)
- Easter Monday (Monday following Easter)
- Queen's Birthday/Victoria Day (closest Monday to May 20)
- Canada Day/Dominion Day (always July 1)
- B.C. Day (first Monday in August)
- Thanksgiving Day (second Monday in October)
- Boxing Day (always December 26)

C. Special Event Restrictions for Permitted Closures

Contract PS&Es may restrict permitted closures from occurring two hours prior to, during, and/or two hours following major special events. Communication with stakeholders (including local interest groups) and obtaining their concurrence or understanding is important for public relations throughout Planning, Design, and Construction.

Each special event and its restriction interval should be clearly specified, including projected attendance thresholds when applicable. Clarification whether the restriction occurs for a time interval prior to, during, and/or after the event depends on anticipated traffic impacts caused by event traffic. Directional routes going towards the event experience increased volumes prior to the event while routes going away from the event experience increased volumes after the event. During the event, traffic volume may not be impacted by games and concerts but impacted by all-day events such as State Fairs.

Region Traffic Operations use experience to determine special event restrictions, including the event's project attendance threshold based on the project's location, but some special events that typically restrict permitted closures include:

- All Seattle Seahawk and Washington Huskie home football games
- T-Mobile Park, Century Link Field, or Tacoma Dome significant events
- Annual Seafair Hydroplane Race Weekend
- Washington State Fairs
- Watershed Music Festival at the Gorge Amphitheater
- Hoopfest Weekend 3-on-3 Basketball Tournament in Spokane
- Issaquah Salmon Days

In addition, the special event may impact traffic locally, regionally, or statewide. For example, Issaquah Salmon Days traffic impact tends to be more local than Seattle Seahawk games which are more regional. Events such as Hoopfest Weekend 3-on-3 Basketball Tournament have statewide impacts, especially on Interstate 90 between Seattle and Spokane.

With the restrictions in place, the Region Traffic Operations can still provide case- by-case exceptions to the restrictions but are not obligated to do so; thus, giving the Agency flexibility.

In the event the Agency allows permitted closures to occur during listed special event restrictions, it is especially important to consider the combined traffic impacts of multiple special events occurring concurrently. For example, when the Seattle Sounders and Mariners have concurrent games occurring in the afternoon, the traffic impacts are far greater than if one game occurred in the afternoon and the other in the evening.

Special Event Exception Example: There is a Construction work zone on Southbound I-5 (south of the stadium, influenced by the exiting event traffic). Mariners home game ends late Wednesday evening around 10:15pm (7:10 p.m. game) and exceeds the attendance threshold in the Specials, which restricts any lane closures until two hours after the event.

Simply prohibiting all lane closures until 12:15am often results in the Contractor not performing any lane closures that night (since they have less than 5 hours to install traffic control, perform minimal work, and typically reopen by 6am at the latest). Instead of completing the project in one season, it may become two because of the 40+ Mariner home games each season.

On a case-by-case basis, after performing work zone traffic analysis, the Region Traffic Operations may allow the Contractor to close 3 of 5 lanes on Southbound I-5 (in the path of exiting event traffic) during normal Contract hours but then delay the fourth lane closure until 11:30 p.m. to accommodate exiting game traffic (late night events tend to clear within about an hour after the event ends) even though the fourth lane is normally closed 11:00 p.m. per Contract PS&E. This allows Construction crews to install traffic control for the triple lane closures and work while still accommodating game traffic. This essentially maintains an open lane for game traffic and the other lane for typical non-event traffic to help minimize work zone congestion. At 11:30 p.m., once the game traffic is expected to clear, the roadway is reduced to one open lane and the work area maximized.

By doing so, the Contractor still completes work (albeit a reduced quantity) while mobility through the work zone is maintained versus simply performing no work at all.

In areas with special lane restrictions (High-Occupancy Vehicle or Express Toll Lanes), consideration rather left lane closures or right lane closures are implemented can be important. Closing right (general purpose) have higher impacts as motorists need to utilize the HOV or ETL and are reluctant to do so even when those lanes are signed as open to all traffic.

5-11 Closure Notification Requirements

On Design-Bid-Build construction projects, closure notification requirements are listed in the Contract's Special Provisions and in the Request for Proposal (RFP) on Design-Build projects.

Typically, the advance notification requirements are as follows:

- Notify the Engineer in writing 5 calendar days in advance of any shoulder, lane, ramp, and sidewalk closure
- Notify the Engineer in writing 14 calendar days in advance of any roadway closure
- Notify the Engineer in writing 30 calendar days in advance of any continuous lane, continuous partial roadway, or continuous roadway closure
- Notify the Engineer in writing 60 calendar days in advance of any continuous lane, continuous partial roadway, or continuous Interstate Highway System roadway closure lasting 7 consecutive days or more
- Provide a detailed traffic control closure schedule to Engineer for review and acceptance by noon Monday three weeks prior to implementing traffic control.
- Specifications should include language that notifications do not imply approval of closures

Typically, public notification requirements are as follows:

- Furnish and install information signs providing advance notification of road closures and/or ramp closures at least five working days prior to the closure
- Notify Washington Patrol; local fire, police, emergency services, and city engineering departments; Medic 1 and local transit agency (when applicable); other transit companies; and affected school districts in writing at least five working days in advance of each closure

5-12 FHWA Notification Requirements for Closures & Use Restrictions

To assure compliance with federal law (23 CFR 658.11), the Federal Highway Administration Washington Division (**WADIV**) needs to receive proper notification when closing certain routes.

WSDOT is required to provide WADIV advanced notification of full closures or use restrictions on the Interstate Highway System and Federal-aid primary routes. For National Highway System routes in Washington, click here.

Full closures: When all mainline travel lanes in one direction of travel or both directions of travel are closed to traffic due to construction activities, emergency closures, or for special events. Interstate to Interstate interchange ramp closures are included in this designation. Detours onsite or otherwise are also included in this designation.

Use Restriction: Restriction in place that limits the vehicle type, load, or function of the facility. The most common use restriction would be closing a route to all commercial vehicles. WADIV approves use restrictions on the Interstate Highway System and Federal-aid primary routes.

The Region Traffic Operations typically performs this FHWA notification via email to Washington.FHWA@dot.gov. Contact information for the FHWA Field Operation Engineers and the WSDOT Regions they cover is available at this FHWA website.

The required FHWA notification is summarized in Exhibit 5-11 on the next page:

Exhibit 5-11 FHWA Notification Requirements for Closures

Closure Description and Duration	Required WSDOT Action/FHWA Role
Interstate full closure or use restriction **(7+ consecutive days)**	Send WADIV notification **60 calendar days** in advance of potential closure. Send additional notifications as specific details are updated.
	WADIV sends recommendation of approval to FHWA HQ. FHWA HQ approval needed.
Interstate full closure or use restriction **(48+ continuous hours to 7 consecutive days)**	Send WADIV notification **14 calendar days** in advance of potential closure. Send additional notifications as specific details are updated.
	WADIV concurrence needed.
Interstate full closure or use restriction **(between 12 to 48 continuous hours)**	Send WADIV notification **7 calendar days** in advance of potential closure. Send additional notifications as specific details are updated.
Federal-aid primary system full closure or use restriction **(7+ consecutive days)**	Send WADIV notification **7 calendar days** in advance of potential closure. Send additional notifications as specific details are updated.

5-13 Work Zone Closure Coordination

Because performing several work zone closures concurrently can result in significant conflicts and adverse region-wide impacts to mobility, it is critical to coordinate closures. Through proper coordination, conflicting closures are avoided and adverse impacts to the traveling public reduced. It is important to coordinate between different Regions for high-impact closures.

Contact Region Traffic Operations to determine how work zone closures are coordinated in each region. In the Northwest Region, the Construction Traffic & Coordination Office (CTCO) will utilize advanced coordination methods due to the large number of competing projects within a specific area.

As part of WSDOT's Transportation System Management and Operations (TSMO), the WSDOT Next Generation Work Zone Database is a useful tool used by Regions to manage, avoid overlapping work zone conflicts, and combine work zone closures for several work operations when feasible to minimize traffic control costs. For additional information, view the User's Manual.

5-14 Interim Liquidated Damages

Interim liquidated damages (ILDs) are monies assessed or withheld from the Contractor for failure to reopen roadway closures, lane closures, and ramp closures by the time specified in the Contract PS&E.

On Design-Bid-Build construction projects, ILDs are listed in the Contract's Special Provisions and in the Request for Proposal (RFP) on Design-Build projects.

WSDOT TDGMO determines maximum ILD values based on the calculation of societal costs resulting from travel delays. To request interim liquidated damages, the Region Traffic or Project Engineering Office should complete the Interim Liquidated Damages Request Form (Form 312-001) and submit it to the TDGMO two weeks in advance of the date the values are needed. Per the *Plans Preparation Manual* Section 700.01(18), the TDGMO has standardized methodology for calculating interim liquidated damage values and is the only office with the authority to compute them.

To request interim liquidated values from TDGMO will need the following form and information sent via email:

- Form 312-001 *Interim Liquidated Damages Request Form*
- Permitted closure hours, including days of week
- Hourly traffic volumes used to establish permitted hours for each closure
- Work zone traffic control plans for each closure
- Detour plan(s) for each roadway closure or ramp closure, including hourly traffic volumes for the detour route if available
- Vicinity map
- Draft version of the interim liquidated damages section that will be included in the Contract PS&E, leaving the actual value amounts empty

Region Traffic Operations will then assign the actual liquidated damage value for each closure based on the maximum allowable amounts determined by TDGMO.

5-15 Commercial Vehicle Considerations

Freight transportation systems, including bridges and highways, are critical to supporting and growing more jobs, increasing regional domestic product, and developing a larger tax base. The multimodal freight transportation system allows business in Washington to effectively compete in regional and global markets.

Washington is the second-most trade-dependent state in the nation according to U.S. Department of Commerce International Trade Administration. Nationally, truck freight moves nearly 70 percent of all shipments according to USDOT Bureau of Transportation Statistics and FHWA. Each semi tractor-trailer carries about $25,000 in freight (2017).

A. Truck Freight Critical Corridors

The FGTS Truck Freight Corridor map shows freight corridors in Washington (Ranging from T-1 to T-5, with T-1 being the most critical).

Long-term duration stationary work zones should accommodate WB-67 design vehicles (a typical semi tractor-trailer) on T-1 and T-2 corridors, which include freeways and major arterial corridors. On corridors with heavy movements of Oversized & Superload commercial freight, consider either accommodating those larger vehicles or reducing the duration their movements are restricted. Coordination and collaboration with heavy freight haulers is advised.

Of particular concern are single lane ramps or single lane roadways delineated with temporary traffic barrier and/or guardrail on both sides. A minimum travel width of 16 feet plus any adjustments for traveled way widening values on open highway curves to accommodate the difference in tracking width of the WB-67 design vehicle's rear trailer axles that "cut" into the curve should be maintained.

See WSDOT *Design Manual* Chapter 720 for any temporary vertical clearance reductions, especially on the mainline of T-1 and T-2 freight routes. There have been numerous impacts from oversized loads to both permanent and temporary structures, even when advanced warning signs and over-height warning systems are in place.

If a construction or maintenance project is narrowing the roadway or restricting the vertical clearance, WSDOT Commercial Vehicle Services needs to be contacted at least 7 calendar days in advance.

B. Oversized and Superload Truck Freight

There are two categories of large truck freight, Oversized and Superloads:

Large Truck Freight Category	Width (feet)	Length (feet)	Height (feet)	Weight (pounds)
Oversize	8.5 to 16	Varies to 125	14 to 16	105,500 to 200,000
Superload	> 16	> 125	> 16	> 200,000

C. Oversized Freight Considerations

Oversized loads are usually self-permitting and do not require permission from the WSDOT Construction offices to travel through work zones; however, they are responsible for checking oversize/overweight restrictions and vertical clearance restrictions prior to transport.

Oversized freight still show up unexpectedly in work zones; therefore, it is desirable to provide a 16-foot wide travel way when possible; however, work operations often necessitate narrower widths. If a construction or maintenance project is narrowing the roadway or restricting the vertical clearance, WSDOT Commercial Vehicle Services needs to be contacted at least 7 calendar days in advance.

See *Washington Commercial Vehicle Guide* for details.

Oversized truck freight example; modular home straddling both lanes on Interstate 90 at a bridge rehabilitation work zone with a reduced traveled way.

Source: WSDOT

D. Superload Freight Considerations

Superload permitting is stringent and controlled through Commercial Vehicle Services. See Superload Requirements website and *Washington Commercial Vehicle Guide* for additional information.

Typically, Commercial Vehicle Services will forward Superload permits to Regions for review. Superloads may be required to obtain permission to transport through known work zones at least 72 hours in advance. Superloads can be sensitive to transport restrictions.

Typically, Superload transport is restricted to 11:00 p.m. to 3:00 a.m. on weeknights and 1:00 a.m. to 6:30 a.m. early Saturday and Sunday mornings, with Superloads exceeding 20 feet in width restricted to early Saturday and Sunday mornings only. Actual restrictions may vary by Region.

Superload truck freight example; Boeing B1 bomber 131 feet long, 29+ feet wide, and 15 feet high.

Source: WSDOT

5-16 Work Zone Traffic Incident Management Strategies

For major closures, determining permitted closure hours and the accepting the actual dates are critical as the closures must be coordinated with holidays, special events, and other work zone closures. Next, the traveling public and stakeholders need to be informed.

During the actual closure, it is critical to properly manage any work zone traffic incident since the roadway's capacity is already reduced. Sooner or later, an undesirable surprise happens including but not limited to:

- Traffic control devices get knocked over by an errant vehicle
- Disabled vehicle with mechanical failures blocks the only open lane through work zone
- A collision involving multiple vehicles with serious injuries or a fatality is blocking lanes
- An errant vehicle enters into the work area, attempting to take an "open" exit-ramp, is now stuck in newly placed concrete pavement

The plan to address such incidents typically consists of at least seven parts:

- Traffic Management Center (Section 5-16.A)
- Traffic Control Inspections (Section 5-16.B)
- Incident Discovery (Section 5-16.C)
- Public Outreach (Section 5-16.D)
- Advanced Preparation for Major Closures (Section 5-16.E)
- Drop Sites for Disabled Vehicles (Section 5-16.F)
- Emergency Vehicle Access (Section 5-16.G)

A. Traffic Management Center

Traffic Management Centers (TMC) serve an essential communication role in incident management. TMCs can contact WSDOT Incident Response Teams, Washington Patrol and other emergency services, and WSDOT staff. TMC can modify motorist information signage to inform the public of incidents, such as an accident.

For Regional TMC contact information, contact Region Traffic Operations.

For every work zone closure, provide the Region TMC details of the closure and its location in addition to point of contact information. Keep the TMC updated of the current closure status, including when closures are reopened. The Construction project office or the Design-Builder will want to verify what pertinent information is needed by the Region TMC when work zone closures are in place and determine whom handles this communication.

This allows TMC to call the point of contact if there are any traffic control issues, accidents in the work zone, or some other urgent matter.

B. Traffic Control Inspections

Required per WSDOT *Standard Specifications* Section 1-10, the traffic control supervisor (TCS) shall inspect traffic control hourly during working hours in addition to other periodic inspections during nonworking hours. The TCS shall correct, or arrange to have corrected, any deficiencies noted during these inspections.

C. Incident Discovery

Per WSDOT *Standard Specifications* Section 1-10, Contractors are required to have a traffic control manager who oversees temporary traffic control operations and approving actions of the Traffic Control Supervisor.

Upon discovery of any incidents, the Contractor's Traffic Control Manager, Traffic Control Supervisor, WSDOT Engineer, and Region TMC should be notified.

Contacting other parties, including local agencies, is determined on a case by case basis.

D. Public Outreach

For work zone incidents with high traffic impacts, the WSDOT Public Information Officer should be contacted so appropriate outreach with news media, social media, and blogs can distribute the information to the traveling public when needed.

In addition, the Region Traffic Management Center can modify motorist information signage to inform the public of incidents, such as an accident.

E. Advanced Preparation for Major Closures

Well in advance of major closures, the Construction project engineering office should collaborate with WSDOT Region Traffic Operations, WSDOT Communications, WSDOT Communications, WSDOT Regional TMCs, and WSDOT Incident Response Teams (IRTs).

WSDOT Communications serves an invaluable role in reaching out to the general public and stakeholders providing traffic-related and project information for construction or maintenance projects.

TMCs can use permanent variable message signs to provide motorists real-time information and advance notification regarding high-impact closures and major incidents. On Active Traffic and Demand Management corridors, lane usage symbols and speed limits can be displayed in real-time to supplement temporary traffic control.

During major weekend-duration lane closures, maintaining the already reduced capacity is critical. By strategically staging IRT and at least one tow truck on site, they can expeditiously respond to any traffic incidents, particularly blocking vehicles. If necessary, IRT and WSDOT TMC can collaborate to contact necessary police, emergency agencies, and WSDOT management.

F. Drop Sites for Disabled Vehicles

For work zones with narrow shoulders, disabled vehicles need to be moved off the roadway. Often, Contractor's nearby staging yard is used to temporarily store the disabled vehicle until it can be retrieved.

G. Emergency Vehicle Access

It is critical to maintain emergency vehicle access through work zones when possible; sometimes, minutes matter. Examples include:

- For long-term projects, when feasible provide adequate paved shoulders (8-foot widths desired) for emergency vehicles to pass queued vehicles, especially on single lane on-ramps that are metered, or use ramp metering preemption to clear the queue when an emergency vehicle is detected.
- During rolling slowdowns, develop a contingency plan to allow critical emergency vehicles access safely through the rolling blockade and work area when transporting critical patients. For additional rolling slowdown information, see Section 5-21.

If it is not feasible to maintain access during a roadway closure or rolling slowdown, advanced written notification should be provided to affected agencies.

5-17 Work Zone Safety Management

Per Secretary's Executive Order E 1001.02, all WSDOT employees are directed to make the safety of workers and the traveling public our highest priority during roadway design, construction, maintenance, and related activities. First, we need an understanding of work zone statistics because discussing mitigation strategies:

National work zone statistics

- 84 percent of fatalities occur to the traveling public, not workers (ARTBA, 2019)
- Nearly all fatal crashes occurred on freeway and arterial roadways with posted speed limits of 45 mph or higher (FHWA, 2018)
- 35 percent of fatalities involved large trucks and buses (ARTBA, 2019)
- 16 percent of fatalities involve pedestrians and bicyclists (ARTBA, 2019)

Washington work zone statistics

- 7 fatalities occurred to the traveling public (ARTBA, 2019)
- 3 fatalities involving a large truck (ARTBA, 2019)
- 0 fatalities involving workers (ARTBA, 2019)
- 0 fatalities involving pedestrians (ARTBA, 2010)

The primary focus for work zone safety mitigation should be to the traveling public on freeway and arterial roadways with posted speed limits of 45 mph or higher. Per FHWA, rear-end crashes are the most common type of work zone crash and are overrepresented by large trucks.

Consider the following strategies to help mitigate work zone impacts and enhance safety:

- Work zone queuing mitigation (Section 5-17.A)
- Positive protection devices (Section 5-17.B)
- Work zone speed limit reductions & advisory speeds (Section 5-17.C)
- Washington State Patrol enforcement (Section 5-17.E)
- Uniformed Police Officer work zone assistance (Section 5-17.F)

A. Work Zone Queuing Mitigation

At 65 mph, it may take fully loaded semi-tractor and trailers at least 7 seconds and 500 feet to stop per Work Zone Safety Consortium. It is critical for large truck drivers to anticipate queued traffic and get slowed down in advance. Queue warning systems have reduced associated collisions up to 45 percent per FHWA-supported Work Zone Safety Consortium report.

Queuing mitigation should be considered when queues extend beyond advance work zone signage on roadways with posted speed limits of 45 mph or higher and include:

- **Truck-Mounted PCMS**

  The simplest method is using a truck-mounted PCMS positioned ½ ± mile in advance of queues by moving up and down the paved shoulder in a safe manner as the queue changes. When the queue is no longer present, it is removed.

  This method is appropriate for non-recurring work zone queuing extending beyond the first warning sign, or PCMS if used. For example, queuing occurs for a few hours at the beginning of the lane closure before dissipating overnight and resumes a few hours in the morning before lanes are reopened.

  When used in Contracts, this truck-mounted PCMS can be included in the relevant traffic control plans as an additional PCMS in advance of lane closures that may be truck-mounted. Payment is via standard traffic control bid items already listed in the WSDOT *Standard Specifications*.

Truck-mounted PCMS displays two messages for 2 second each of a work zone queue ahead.

"NEXT # MILES" will be rounded up to the nearest whole mile.

Source: Modified from Trafcon

- **Queue Warning System**

  The Queue Warning System (QWS) provides mitigation that should be considered on 45+ mph roadways for daily, nightly, or weekend-duration closures with non-recurring work zone queuing up to 3 miles that dissipate based on detailed work zone traffic analysis (Section 5-9). Because of its simplicity, QWS works well when lane closure locations change on a daily or nightly basis (like for a paving project) with work zone queuing occurring for a few hours with free-flow traffic conditions otherwise.

  Queue warning systems (QWS) provide automated queue warning, closure information, and lane usage instructions to motorists via two PCMSs. Displayed messages automatically change as the queue lengthens or shortens as detected by 2 traffic sensors, typically located at the last lane closure taper and after the first advanced warning sign. For a 2mile QWS, place two PCMSs at 1± mile spacing prior to the first lane closure taper; for 3-mile QWS, use 1.5± mile spacing.

  QWS components may be provided by the Contractor or through an independent vendor. A QWS Technician programs and operates the system based on accepted traffic control plans and Special Provision/Request for Proposal. QWS Technician is not required to be on site when the system is in use but must be able to response to any system issues remotely. The QWS Technician may be an employee of the Vendor or someone trained and authorized by the Vendor, including Contractor or subcontractor Traffic Control Supervisor or other personnel. The Contractor or subcontractor will install, store, and remove the QWS components.

  QWS messaging needs to be included on the lane closure traffic control plan along with speed thresholds, typically 35 mph. Typical freeway lane closure plans are expected to be updated Summer 2021 in the WSDOT Work Zone Traffic Control Plans to include QWS messaging as part of the lane closure traffic control plan on Sheet 1A.

  General Specification Provisions and State-wide Request for Proposal for Queue Warning Systems is expected to be available starting in 2022. The Contract will specify when the QWS usage is required and specific system requirements.

  QWS is paid using a bid item paying hourly for when the QWS operation is in use, with mobilization and demobilization incidental. Standard traffic control bid items already listed in the WSDOT *Standard Specifications* will pay for installation and removal of the QWS components.

- **Smart Work Zone System**

  Smart Work Zone System (SWZS) provides mitigation that should be considered on 45+ mph roadways for longterm (4+ day), stationary closures with **recurring work zone queuing exceeding 3 miles** based on detailed work zone traffic analysis (Section 5-9) that should be considered. SWZS can be modified for any expected queue length. SWZS work best when the lane closure location does not move as it uses multiple components with complex programming.

  Smart work zone systems (SWZS) can provide automated travel time information, queue warning, and dynamic lane merge (“zipper merge”) instructions to motorists on a series of PCMSs leading into a work zone. Displayed messages change as the queue lengthens or shortens as detected by several traffic sensors. The number of PCMSs and sensors is determined by the anticipated queue based on detailed work zone traffic analysis

(Section 5-9). The system's complexity is adaptable based on the expected queue length and can be modified to meet site- specific situations and conditions.

SWZS components may be provided by the Contractor or through an independent vendor. A Technician programs and operates the system based on accepted traffic control plans and Special Provision/Request for Proposal. SWZS Technician is required to be on site when the system is in use. The QWS Technician may be an employee of the Vendor or someone trained and authorized by the Vendor, but shall be independent of the Contractor and Traffic Control Supervisor but shall collaborate and coordinate as appropriate. The Contractor or subcontractor will install, store, and remove the SWZS components.

When used in Contracts, a Smart Work Zone System traffic control plan should be included along with speed thresholds, typically 35 mph. Typical plans are available in the WSDOT Work Zone Traffic Control Plans for 3-mile and 6-mile SWZS.

General Specification Provisions are currently available and State-wide Request for Proposal for Smart Work Zone Systems is expected to be available starting in 2022. The Contract will specify when SWZS usage is required and specific system requirements.

SWZS is paid using two bid items. One bid item pays for mobilization and demobilization as lump sum; a second bid item pays hourly for when the SWZS operation is in use. Standard traffic control bid items already listed in the WSDOT *Standard Specifications* will pay for installation and removal of the SWZS components.

B. Positive Protection Devices

Positive protection devices are physical barriers not easily penetrated by errant vehicles that enhance work zone safety for both road users and workers. Such devices include temporary barrier, transportable attenuators, and protective vehicles.

Federal code 23 CFR Part 630 K, requires positive protection devices to be considered, to the extent practical, to manage work zone exposure to reduce the risk of fatalities or injuries to workers and road users. Alternative methods, such as reducing channelization device spacing at work crews, instead of using temporary barrier may be more practical.

See WSDOT *Design Manual* Chapter 1010 for further details.

C. Work Zone Speed Limit Reductions & Advisory Speeds

When used to supplement sound work zone design, reduced work zone speed limits and advisory speeds are tools to improve safety; however, they are not a "silver bullet".

According to Transportation Research Board's NCHRP Synthesis 482 "*Work Zone Speed Management*" report (download as a Guest using work email address), work zone speeds will be in greatest compliance with posted speed limits when:

- Workers are present and actively working
- Double fine signs are posted
- Radar speed display signs are used
- Police are actively enforcing the work zone speed limit

In addition, NCHRP Synthesis 482 reports that speed differential is minimized when work zone speed limit reductions are 10 mph less than the existing speed limit. Speed differential, known as speed variance, is a potentially useful surrogate measure for safety.

Numerous research studies confirm motorists do not just "add 5 or 7 mph to the posted speed limit", including this 1997 FHWA Report "*Effects of Rising and Lowering Speed Limits on Selected Roadway Sections*".

See Section 5-18 for detailed information, approval procedures, and required notifications for reduced work zone speed limits and advisory speeds. For Washington State Patrol Work Zone Enforcement and Assistance information, see Section 5-19.

D. Fines Double in Work Zone

Per Washington law, RCW 46.61.527, traffic fines double in all work zones without the need to post additional signage. To highlight the law, Washington State Patrol encourages the use of "NOTICE TRAFFIC FINES DOUBLE IN WORK ZONES" signs but they are not required for the double citation to be in effect.

E. Washington State Patrol Enforcement

Using roving and coordinated speed enforcement by Washington State Patrol (WSP) is a highly effective strategy to control speeds in work zones, much more so than police vehicles sitting with their red and blue warning lights flashing in a work zone.

During roving speed enforcement, WSP typically drive through the work zone while actively enforcing traffic laws but may also perform enforcement while stationary at strategically locations. WSP troopers pull over violators and issue citations at their discretion.

During coordinated speed enforcement, a WSP trooper performs active enforcement within the work zone while informing several troopers downstream of motorists violating traffic laws. Those troopers downstream then pull over violators and issue citations at their discretion.

For comprehensive information regarding this subject, see Section 5-19.

F. Uniform Police Officer Work Zone Assistance

Uniform Police Officer (UPO) is an all-inclusive term for any sworn police officer from local law enforcement agencies or Washington Patrol. Using UPOs is limited to traffic control assistance duties (flagging traffic at intersections or enforcing roadway closures) as shown on accepted traffic control plans.

For comprehensive information regarding this subject, see Section 5-20.

5-18 Speed Limit Reductions in Work Zones (Previously Appendix 5B)

It is WSDOT's objective to design work zones to operate in a manner consistent with the desired target speed dependent upon mobility, operation, and safety objectives while acknowledging drivers reduce their speeds only if they clearly perceive the need to do so.

Avoid speed limit reductions of more than 10 mph below the existing speed limit unless a restrictive feature is present. Use speed limit reductions only in portion of work zones where conditions or restrictive features are present, but avoid frequent changes in the speed limit.

Secretary's Executive Order E 1060.02 addresses the use, approval, required documentation, and required notices for work zone speed limits and advisory speeds:

- **Continuous regulatory** work zone speed limits are in effect for 24 hours a day for the duration of a project or stage of work lasting 3 continuous days or more.
- **Variable regulatory** work zone speed limit reduction is only in place during active work operations occurring during daily, nightly, and weekend-duration lane closures; otherwise, the existing speed limit is maintained.
- **Advisory speed** is a recommended speed associated with a warning sign for a work zone condition in place continuously or variably.

Regulatory work zone speed limit is enforceable; signage shall be black legend on white background.

Advisory speed is not enforceable; signage is black legend on orange background.

A. Continuous Work Zone Speed Limit and Advisory Speed

Continuous regulatory work zone speed limits (WZSL) are only considered when work zone design at the existing speed limit is not feasible or when operational or roadway conditions require a reduced speed for safe travel. Long-term temporary lane and shoulder width reductions should only occur to complete needed work operations, not for the sake of reducing vehicle speeds through the work zone. The distance and duration of reduced speed limits should be minimized the extent practical—slow down motorists only where necessary.

Exhibit 5-12 provides guidance to Region Traffic Operations for determining appropriate continuous WZSL on long-term temporary freeway reconfigurations.

Exhibit 5-12 Guidance for Continuous Work Zone Speed Limits on Freeways

Minimum Temporary Lane Width	Minimum Temporary Shoulder Widths	Continuous Regulatory Work Zone Speed Limit
10.5'	0.5'	50 mph
11.0'	1.0'	55 mph
11.0'	2.0'	60 mph
Maintain existing lane and shoulder widths or per WSDOT *Design Manual* Chapter 1232		Maintain existing speed limit

The State Traffic Engineer shall approve freeway temporary lane widths less than 10.5' and/or freeway temporary shoulder widths less than 0.5'.

Continuous WZSLs and advisory speeds approval is per Executive Order E 1060.02. State Traffic Engineer shall approve freeway continuous regulatory WZSLs of 45 mph or lower; the Region Administrator (Region Traffic Engineer when delegated) approves 50 mph or higher continuous freeway WZSLs.

Temporary lane and shoulder width reductions and lane closures do not trigger a use restriction in regards to FHWA notification (see Section 5-12 for details).

Traffic control plans will show the type, location, and limits of the approved speed limit reduction signing, including signing returning motorists to the existing speed limit. Covering conflicting existing speed limit signage is required per *Standard Specifications* Section 1-10.3(3)A.

Remove existing longitudinal rumble strips when within reconfigured temporary lane limits on long-term duration projects. Ensure all drainage, ITS, and other roadway structures within the existing shoulder are traffic bearing. Ensure pavement thickness is sufficient when traffic is shifted onto existing shoulders in the long-term duration reconfiguration.

Advisory speeds should only be used for unique situations and shall supplement warning signs or state the actual condition warranting the advisory.

When restrictive features in a work zone prevent the design speed from matching the work zone speed limit at a freeway median crossover, then MUTCD 6G.16 provides guidance for the restrictive feature to be designed at 10 mph less than the posted work zone speed limit. In this case, an advisory speed equivalent to the reduced design speed at the restrictive feature's location while the work zone speed limit is maintained.

> **Example:** A 60 mph continuous work zone speed limit is posted along a 10-mile freeway work zone, but its median crossovers at the beginning and end can only meet a 50 mph design speed due to restrictive features. Rather than post the entire 10-mile work zone 50 mph, maintain the 60 mph work zone speed limit and use a 50 mph advisory speed plaque (W13-1P) to supplement an appropriate warning sign (W1-4 or W24-1 series), at the crossovers.

B. Variable Work Zone Speed Limit and Advisory Speed

Variable work zone speed limit reductions are applicable to intermediate-term duration stationary work zones (lasting 3 continuous days or less, inclusive of weekend-duration closures) and may be considered as part of an overall safety strategy.

Freeway Shoulder Closures:

Reduced variable regulatory speed limits shall not be used for freeway shoulder closures.

Advisory speeds are allowable when unique conditions are present.

Typical Freeway Lane Closures; No Lateral Shift onto Shoulder:

Maintaining the existing posted speed limit is allowable for intermediate-duration (≤ 3 days) lane closures, when lanes are not shifted to conflict with the existing or temporary pavement markings.

Reduced variable regulatory work zone speed limits per Exhibit 5-13 are recommended when:

- Workers have no means of escape from motorized traffic (e.g., tunnels, bridge, etc.)
- Workers are actively present within one-half lane width of adjacent open lane(s) not protected by barrier
- High operation speeds combined with high traffic volumes are anticipated

If used, the variable regulatory work zone speed limit and advisory speeds are per Exhibit 5-13.

Exhibit 5-13 Freeway Variable Regulatory Work Zone Speed Limit/ Advisory Speed Policy

Typical Freeway Lane Closures; No Shifts onto Shoulder (One or more lanes open to traffic)		
Existing Speed Limit	**Variable Regulatory Work Zone Speed Limit**	**Advisory Speed**
70 mph	60 mph	Allowable when unique conditions are present
60 mph	50 mph	

Notes:

- Maintaining the existing posted speed limit is allowable
- Advisory speeds are used at specific locations only
- Radar Speed Display Sign with associated R2-1 speed limit sign is optional for Construction and optional for Maintenance

Variable work zone speed limit and advisory speeds approval is per Executive Order E 1060.02 in compliance with WSDOT Project Delivery Memo #19-01.

See Section 5-18.C for documentation requirements and Section 5-18.D for notification requirements.

It is understood there will be unique situations that may warrant adjustments to values listed in Exhibit 5-13 based on engineering judgement, but these adjustments are limited to 5 +/- mph to maximize consistency statewide.

When used, a Radar Speed Display Sign (RSDS) with an associated R2-1 speed limit sign should be located and relocated as needed to remain 500' +/- of work crews when feasible. Additional RSDSs may be added prior to each work crew based on engineering judgement.

RSDS General Specification Provisions are currently available and includes a requirement for RSDSs to have traffic data collection capabilities and for traffic data to be collected and transmitted to the Engineer upon request. This data may be requested by State Work Zone Engineers thru Region Traffic Operations.

Typical plans are included in the WSDOT Work Zone Traffic Control Plan Library for variable regulatory work zone speed limits on two-lane and three-lane freeway configurations.

Typical Freeway Lane Closures; Single Lane Shifted onto Shoulder:

Both work zone variable regulatory speed limit and advisory speeds listed in Exhibit 5-14 are **required** when a single open freeway lane is temporarily shifted onto the shoulder for intermediate-duration (≤ 3 days) closures.

It is understood there will be unique situations that may warrant adjustments to values listed in Exhibit 5-14 based on engineering judgement, but these adjustments are limited to 5 +/- mph to maximize consistency statewide.

This shifted configuration is necessitated by work operations including but not limited to:

- **Two-lane freeway** with the work area extending up to the lane line adjacent to traffic for work including HMA pavement, concrete pavement, and/or expansion joint rehabilitation.
- **Three-lane freeway** with the work area including both lanes and extending up to the lane line adjacent to traffic for work including HMA pavement, concrete pavement, and/or expansion joint rehabilitation.

Exhibit 5-14 Freeway Variable Regulatory Work Zone Speed Limit/Advisory Speed Policy

Single Open Freeway Lane Shifted onto Shoulder		
Existing Speed Limit	**Variable Regulatory Work Zone Speed Limit**	**Advisory Speed At Work Crew**
70 mph	55 mph	40 mph
60 mph	45 mph	40 mph

Notes:

- Maintaining the existing posted speed limit is prohibited
- Advisory speeds are required in advance of work crews
- Radar Speed Display Sign with W23-6 work crew advisory speed sign with W23-5 sign in advance, is required for Construction and recommended for Maintenance.

Variable work zone speed limit and advisory speeds approval is per Executive Order E 1060.02 in compliance with WSDOT Project Delivery Memo #19-01. See Section 5-18.C for documentation requirements and Section 5-18.D for notification requirements.

When used, a Radar Speed Display Sign (RSDS) with an associated work W23-6 crew advisory speed sign should be located and relocated as needed to remain 500' +/- of work crews when feasible. In addition, a W23-5 work crew ahead advisory speed sign should be located and relocated as needed to remain 1000' +/- of work crews. Additional RSDSs may be added prior to each work crew based on engineering judgement.

RSDS General Specification Provisions are currently available and includes a requirement for RSDSs to have traffic data collection capabilities and for traffic data to be collected and transmitted to the Engineer upon request. This data may be requested by State Work Zone Engineers thru Region Traffic Operations.

Typical plans are included in the WSDOT Work Zone Traffic Control Plan Library for these left shoulder shift and right shoulder shift configurations for two-lane and three-lane freeways.

C. Required Documentation Information

This section provides additional information and document templates regarding the *Required Document and Notices* section in Executive Order E 1060.02.

Memorandum:

- For work zone speed limit reductions requiring State Traffic Engineer approval, a formal memorandum shall be initialed by the Regional Administrator and/or Region Traffic Engineer to signify an official request by the Region. For a memorandum template, click here. Copy the template Word file onto your desktop first before modifying.

Traffic Control Plan:

- Traffic control plan accepted by the Region Traffic Engineer including the location of existing and proposed reduced speed limit signage along with requirements to cover or remove any conflicting speed limit signs.
- Typical traffic control plans available at WSDOT Work Zone Typical Traffic Control Plans; these typical plans may be modified as accepted by Region Traffic Engineer.

Project Vicinity Map

- Including a vicinity map in addition to the traffic control plan(s) is recommended

Work Zone Speed Reduction Worksheet:

A Microsoft Word template file of this work sheet is available. Copy the template Word file onto your desktop first before modifying.

Useful information needed to complete this work sheet includes:

- Posted Speed Limit, Number of lanes, Lane Width, and Shoulder Width can be found using the WSDOT State Highway Log.
- For all other locations and weekends, the AADT (Average Annual Daily Traffic) can be found using Traffic Data GeoPortal or completing a Traffic Data Request Form and submitting it to the Transportation Data GIS & Modeling office

D. Required Notification Information

This section provides additional information and template documents regarding the *Required Document and Notices* section in Executive Order E 1060.02.

Public Notice of Reduced Speed Limit:

Public notice, per RCW 47.48.020, is provided by publishing information in at least one issue of newspaper of general circulation regarding the reduced speed limit, including the location and effective dates. Advisory speeds do not require notifications.

- For a **continuous** speed limit reduction notice template and example, click here. Copy the template Word file onto your desktop first before modifying.
- For a **variable** speed limit reduction notice template and example, click here. Copy the template Word file onto your desktop first before modifying.

Consider placing a PCMS for advanced notification of continuous reduced work zone speed limits at least 72 hours in advance with a message similar to the following:

PCMS	
1	**2**
WORKZONE REDUCES TO 55MPH	STARTING 09/16 MONDAY
2.0 SEC	2.0 SEC

Notice to Headquarters Traffic Office of Reduced Speed Limit:

Email notice of the reduced regulatory work zone speed limit reduction (include a copy of the approved speed limit reduction work sheet) to the WSDOT HQ Work Zone Engineers:

No notice is required for advisory speeds.

Notice to Washington Patrol of Reduced Speed Limit:

Provide notice to WSP regarding the reduced work zone speed limit, including the location and effective dates. No notice is required for advisory speeds.

- For a **continuous** speed limit reduction notice template and example, click here. Copy the template Word file onto your desktop first before modifying.
- For a **variable** speed limit reduction notice template and example, click here. Copy the template Word file onto your desktop first before modifying.

Submit the notice to the appropriate Washington Patrol district. WSP currently has 8 districts (see Field Operations Bureau section).

See the WSP *Contact Us: District Office* webpage for district contact information.

See the WSP *Contact Us: PIO Contacts* webpage for district public information office contact information.

5-19 Washington Patrol Work Zone Enforcement and Assistance

It can be cost effective using Washington State Patrol (WSP) to supplement effective work zone strategies and traffic control devices by providing additional enforcement emphasis or performing specific traffic control assistance duties.

This General Special Provision (GSP) now allows Regions to define specific WSP activities and the number of hours provided by WSDOT at no cost to the Contractor on projects, but allows Contractors to request additional hours for those specific WSP activities at a 50/50 shared cost with WSDOT. This GSP should be included, even if zero hours are provided by WSDOT.

Roving Enforcement:

Using WSDOT-provided WSP roving speed enforcement a few times a week in active work zones when workers are present is an effective method to emphasize work zone speed limit reductions. During roving enforcement, WSP typically drive through the work zone while actively enforcing traffic laws but may also perform enforcement while stationary at strategically locations. The troopers pull over violators and issue citations at their discretion.

Coordinated Enforcement:

An alternative approach uses coordinated enforcement between multiple WSP troopers. A WSP trooper performs active enforcement within the work zone while informing several troopers downstream of motorists violating traffic laws. Those troopers downstream then pull over violators and issue citations at their discretion.

Photo Speed Enforcement:

Per RCW 46.63.170, automated work zone speed photo enforcement is currently prohibited as the state law restricts nearly all automated speed enforcement use outside of school zones. In 2008-2009, there was a pilot project for automated photo enforcement WSDOT work zones.

Double Fines in Work Zones:

Per RCW 46.61.527, traffic fines are doubled in work zones or reckless endangerment gross misdemeanors issued for the most serious violations that likely endangers people or property. The double fine citation does not require “FINES DOUBLE” and “NOTICE

FINES DOUBLE IN WORK ZONES” signs; however, their presence is encouraged by WSP. Routine enforcement by WSP in WSDOT work zones is always welcome and needs no special agreement.

When practical, a Public Information campaign to increase driver awareness of work zone safety issues will farther increase the effectiveness of WSP enforcement. Include notice via a PCMS in advance of an active enforcement area with a message similar to either of the following:

PCMS	
1	2
POLICE CHECKING SPEEDS	WORKZONE FINES DOUBLE
2.0 SEC	2.0 SEC

or

PCMS		
1	2	3
## MPH SPEED LIMIT	POLICE CHECKING SPEEDS	WORKZONE FINES DOUBLE
1.5 SEC	1.5 SEC	1.5 SEC

A. Procedure for Incorporating Use of WSP Enforcement and Assistance

Using WSP should be determined at the Design phase of the project and included in the Transportation Management Plan.

Regional Maintenance divisions may establish a standing Task Assignment agreement to allow quick response by WSP if needed.

WSDOT-WSP GC 5080 Agreement is a legal document allowing WSDOT to reimburse WSP for costs associated with assigning troopers for work zone enforcement or assistance. The Task Assignment, WSDOT Form 130-020, is completed for each project to assign specific work zone activities to WSP and connects WSDOT reimbursement to a specific work order.

Task Assignment Steps:

The Task Assignment should be completed, approved, and processed prior to the advertisement of a project to establish a WSP reimbursement work order.

- Region assigns a Task Management Manager for each project
- Task Assignment Manager develops a preliminary cost estimate using $125 per hour per WSP trooper including vehicle (increased from $75 in Agreement GC 5080 signed in 2007 to more accurately reflect current WSP costs). The minimum WSP shift is 2 hours.
- Task Assignment Manager requests the Agreement Number for each Task Assignment from Headquarters Traffic Office fiscal manager via email. Include the project name, route number, Contract or Work Order number (if known), and the preliminary cost estimate amount.
- Once the task number is assigned, the Task Assignment Manager completes WSDOT Form 130-020 and obtains approval typically from the Region Construction Project Engineer, WSP Agency Budget, and Fiscal manager. Two original copies are required, one for WSP and one for WSDOT.
- Task Assignment Manager submits WSDOT's original signed WSDOT Form 130- 020 to WSDOT Headquarters Budget Office. Copies are sent to Region Program Management, Construction Project Engineering Office administrating the project, Region Accounting office, and the Region Traffic Operations.
- The Region Accounting Office reimburses WSP per the Task Assignment Agreement.

B. Procedure for Requesting Use of WSP Enforcement and Assistance

Requests for WSP officers may occur after the Task Assignment Agreement is approved.

WSP currently has 8 districts (see Field Operations Bureau section) each with an Overtime Coordinator in which requests for WSP officers are made (troopers are not guaranteed and are subject to availability). See the WSP Contact Us: District Office webpage for district contact information.

WSP requests should be made at least two weeks in advance for major weekend- duration closures needing multiple troopers; make other requests at least one week in advance.

WSP responds to emergencies and incidents in work zones without the need of an Agreement, just like on roadways outside of work zones.

C. Procedure for Using WSP Enforcement and Assistance During Construction

An updated General Special Provision now allows Regions to define specific WSP activities and the number of hours provided by WSDOT at no cost to the Contractor on projects, but allows Contractors to request additional hours of those specific WSP activities at a 50/50 shared cost with WSDOT. A Task Assignment is still needed.

The WSP District Captain or their designee should be invited to pre-construction meetings, where specified WSP activities and hours of use should be discussed. Contact information for the WSDOT field engineer, Contractor Traffic Control Management, and the Traffic Control Supervisor should be provided to WSP.

During construction, it is optional for the on-site WSP trooper to attend the Contractor's Pre-Activity Safety meeting, or similar. The WSDOT field engineer or project inspector is to provide direction to WSP, but in collaboration with the

Contractor's traffic control management personnel. For each work shift when WSP is used, the WSDOT field engineer (or inspector) and WSP trooper shall complete WSDOT Form 421-045. Keep a copy of this form on file at the Construction Project Engineering Office. Contact Region Traffic Operations and see if they desire copies.

Usage of WSP is typically limited to enforcement duties and other supplemental uses not required as part of accepted Contract PS&E traffic control plans.

Typical WSP Usage Examples:

- Speed Enforcement Emphasis—Roving or coordinated enforcement
- Within or adjacent to rolling blockade when implementing freeway rolling slowdowns
- Full or directional closures of freeways; particularly in locations at high risk for errant motorist intrusion
- Controlling traffic at signalized intersections (only when shown on accepted traffic control plans)

WSP Usage Not Recommended:

The following tasks are not recommended as efficient use of WSP assistance and shall only be considered for short term use but not as an ongoing strategy

- General or routine use, especially with no significant traffic impacts expected
- Passive use (WSP vehicle parked near or inside work zone with blue or yellow lights flashing). WSP presence is not a substitute for proper traffic control
- During installation and removal of traffic control devices. WSP vehicles are not buffer vehicles
- Shoulder closures
- Lane closure(s) on roadways with posted speed limits of 40 mph or less
- Lane closure(s) with alternating traffic on a two-lane highway
- A ramp closure without other traffic control devices

5-20 Uniform Police Officer Usage in Work Zones

Uniform Police Officer (UPO) is an all-inclusive term for any sworn police officer from local law enforcement agencies or Washington Patrol.

A new General Special Provision requiring Contractors to provide UPOs as shown on accepted Contract PS&E traffic control plans and be reimbursed by the Agency via a hourly bid item.

During construction, it is desired for the UPO to attend the Contractor's Pre-Activity Safety meeting, or similar. The Contractor will provide direction to UPO, not the Agency. The UPO is **not** required to complete WSDOT Form 421-045.

For use of local agency law enforcement personal, the Contractor develops a project specific agreement with each police agency for use and payment.

Typical Uniform Police Officer Usage (Shown on Accepted Traffic Control Plans):

- Controlling either signalized intersections or unsignalized intersections
- Full or directional closures of roadways; particularly in locations at high risk for errant motorist intrusion
- Enforcing short-term road closures via traffic holds (Section 5-22)

Uniform Police Officer Usage Not Recommended:

The following tasks are not recommended as efficient use of local police officer assistance and shall only be considered for short term use but not as an ongoing strategy

- Speed Enforcement Emphasis (use WSP instead in WSDOT jurisdiction; see Section 5-19)
- General or routine use, especially with no significant traffic impacts expected
- Passive use (police vehicle parked near or inside work zone with blue or yellow lights flashing). Police presence is not a substitute for proper traffic control

- During installation and removal of traffic control devices. Police vehicles are not buffer vehicles
- Shoulder closures
- Lane closure(s) on roadways with posted speed limits of 40 mph or less
- Lane closure(s) with alternating traffic on a two-lane highway
- A ramp closure without other traffic control devices

5-21 Rolling Slowdowns

A rolling slowdown is a traffic control strategy that uses a rolling blockade of vehicles, each equipped with amber warning lights, traveling at slow speeds to create a gap in traffic to enable completion of work activities requiring exclusive access across or over the directional roadway that would otherwise present significant risks to motorists.

It is critical no traffic gets between the rolling blockade and work area. Within the limits of the rolling slowdown, traffic is held at most on-ramps, while freeway-to-freeway on-ramps should be closed with standard traffic control devices. Exit-ramps may remain open.

Rolling slowdowns may commence with additional temporary traffic control already set up (such as lane closures). Rolling slowdowns are most commonly used directionally on freeways due to their limited access. For other roadways, traffic holds may be more appropriate and are discussed in Section 5-22.

Accepted traffic control plans are required that detail the expected rolling slowdown duration, clear time at the work area, limits and target speed of the rolling slowdown, mainline rolling blockade details, chase vehicle details, temporary on-ramp closure details, portable changeable message signs used to warn traffic of the slowdown, and any additional requirements based on Guidance (Section 5-21.A) and Considerations (Section 5-21.B).

Work activities that typically necessitate a freeway rolling slowdown include but are not limited to the following:

- Utility line installation or removal over a freeway
- Removing an existing sign structure spanning over the freeway
- Reconfiguration of all freeway lanes that narrow and laterally shift all lanes in one work shift (Rolling slowdown is used to install a chicane to laterally shift a single open lane of traffic from the far left lane over to the far right lane, or vice versa) when reopening lanes to switch traffic control is not feasible
- During installation of traffic induction loops for permanent traffic recorders (see Standard Plan J-50.12-02 and J-50.15-01) using a lead-in across all freeway lanes to a stub-out in the shoulder which requires a chicane when reopening lanes is not feasible
- Emergency roadway or bridge repairs having short work durations (≤ 10 minutes)

- Based on WSDOT's determination, there is justification for using a rolling slowdown to mobilize large equipment, (cranes, drilling rigs, etc.) across the freeway versus demobilizing and mobilizing the equipment would lead to considerable delays and increased costs
- Based on WSDOT's determination, there is justification for using a rolling slowdown to provide construction vehicle ingress/egress movements between the work area onto mainline traffic in locations that would have minimal adverse traffic impacts and delays

Concurrent freeway rolling slowdowns in multiple directions is allowable when work operations occurring over all lanes in multiple directions.

A directional freeway closure is recommended in lieu of freeway rolling slowdowns during the following work operations occurring over **all lanes** in one direction:

- Setting new bridge girders
- Demolishing overhead bridge spans
- Removing overhead structural falsework
- Installing a new sign structure

WSDOT Region Traffic Operations may require directional freeway closures in lieu of freeway rolling slowdowns at its discretion.

A. Guidance

The following guidance applies when implementing rolling slowdowns:

- Avoid rolling slowdown durations exceeding 15 minutes
- Target rolling slowdown speeds 40 mph less than the posted speed limit when feasible
- Detours around the limits of the rolling slowdown are not necessary
- Traffic should not be stopped during rolling slowdowns, except as a last resort due to a unique circumstance or in an emergency situation.
- Use one blockade vehicle (transportable attenuator preferred) in each blocked lane
- Consider using at least one Washington Patrol (WSP) vehicle with each directional rolling blockade on freeways; WSP may serve as a rolling blockade vehicle
- Hold on-ramp traffic until the rolling blockade passes using construction or police vehicles placed prior to the paved gore in each on-ramp lane. Avoid holding traffic on freeway-to-freeway on-ramps, which should be closed with standard traffic control devices and may include signed detour routes.
- A chase vehicle should follow the slowest vehicle ahead of each directional rolling blockade up to the work area to ensure the roadway is clear.
- For concurrent rolling slowdowns in two or more directions, position a Traffic Control Coordinator with a WSP Coordinator near the work area to coordinate the rolling slowdown, respond to any incidents, and to coordinate needed emergency response.

- Inform Washington Patrol, local fire, police, emergency service agencies, and transit agencies (if applicable) at least 72-hours in advance of non-emergency rolling slowdowns.
- For significant freeway rolling slowdowns occurring within Transportation Management Areas (Seattle, Tacoma, Spokane, and Kennewick-Pasco urban areas):
  - Limit permitted rolling slowdowns to hours of lowest volumes; 11:00 p.m. to 4:00 a.m. during weeknights and 11:59pm to 6:00 a.m. on weekends
  - Require as part of the traffic control plan acceptance, a meeting with all necessary stakeholders to define responsibilities and ensure activities required for successfully executing a rolling slowdown will be followed
- Consider using a PCMS message similar to the example below for displaying advanced notification to the public:

PCMS		
1	2	3
15MINUTE DELAYS POSSIBLE	JUNE 13 SAT NITE 11PM-6AM	NB I-5 MP145 TO MP150
1.5 SEC	1.5 SEC	1.5 SEC

- Just prior to and during the rolling slowdown operation, consider using a truck-mounted PCMS to notify motorists of each rolling slowdown and its slow traffic remaining ½ ± mile in advance of the traffic queue moving along the paved shoulder:

PCMS	
1	2
ROLLING SLOWDOWN AHEAD	WATCH FOR SLOW TRAFFIC
2.0 SEC	2.0 SEC

B. Considerations

Consider the following when implementing rolling slowdowns:

- As part of the rolling slowdown traffic control plan, consider specifying the development of an emergency contingency plan to handle traffic should unforeseen circumstances occur, including but not limited to:
  - An Emergency Medical Services vehicle transporting a critical care or specialty care patient needs urgent accommodation past the rolling slowdown
  - Work activity exceeds the planned available clear time
  - An errant vehicle gets around the rolling blockade or on-ramp traffic hold and is heading towards the work area
- Have traffic queue formations and their dispersals monitored by traffic control personnel during and after each rolling slowdown with plan of action to respond to problems that develop because of the traffic queue
- Requiring all traffic queues clear prior to commencing any subsequent rolling slowdowns

C. Rolling Slowdown Equations & Calculations

Known Variables:

T_{CLEAR} = Clear time needed at work area [minutes]

V_{RS} = Rolling slowdown target speed [mph]

$V_{TRAFFIC}$ = Slowest Vehicle Speed Expected [mph]

Variables to be Determined:

D_{RS} = Minimum rolling slowdown distance needed [miles]

T_{RS} = Rolling slowdown duration [minutes]

Equations:

$$D_{RS} = \frac{T_{CLEAR} \times V_{RS} \times V_{TRAFFIC}}{60 \times (V_{TRAFFIC} - V_{RS})} \qquad T_{CLEAR} = \frac{60 \times (V_{TRAFFIC} - V_{RS}) \times D_{RS}}{V_{RS} \times V_{TRAFFIC}}$$

$$T_{RS} = \frac{60 \times D_{RS}}{V_{RS}} \qquad V_{RS} = \frac{60 \times D_{RS}}{T_{RS}}$$

Explanation of Variables and Calculations:

- **Clear time:** The duration at the work area available after the slowest vehicle followed by the chase vehicle passes and before the rolling slowdown blockade approaches.
- **Rolling slowdown target speed:** The target speed is based on the highest posted speed limit. Occurring after slowing down from typical operating freeway speeds, this is the speed the rolling slowdown blockade targets within the rolling slowdown limits for the duration of the slowdown.
- **Slowest vehicle speed expected:** Typically, the posted speed limit is used, but check for speed limit reductions within the rolling slowdown limits. If separate truck speed limits are present, use the truck speed limit for this value. There are unique situations such as steep upgrades (≥ 5 percent over ½ mile in length) where slow freight traffic may justify a lower speed.
- **Minimum rolling slowdown distance needed:** Calculated value that determines how far in advance of the work area the rolling slowdown begins.
- **Queue:** Calculated value to determine work zone queue length and is dependent on the number of unserved vehicle and how many open lanes are available prior to the capacity restriction (typically a lane closure merge point).
- **Rolling slowdown duration:** Calculated value to determine the duration the rolling slowdown remains in place to create the needed clear time at the work area.

Examples are provided on the next several pages as reference.

D. Rolling Slowdown Example #1

Situation: Freeway rolling slowdown needed for utility wire crossing southbound lanes of Interstate 5 located at Milepost 145.78. Crews need 10 minutes of clear time at the work area. The posted speed limit is 60 mph.

1st Determine: Duration of rolling slowdown needed in minutes and where it begins.

Known Variables:

T_{CLEAR} = 10 minutes

V_{RS} = 60 – 40 = 20 mph

Note: Rolling slowdown target speed is 40 mph less than 60 mph speed limit.

$V_{TRAFFIC}$ = 60 mph

Note: Traffic speed based on 60 mph speed limit since there are no major upgrades (≥ 5 percent) in this area.

Equations:

$$D_{RS} = \frac{T_{CLEAR} \times V_{RS} \times V_{TRAFFIC}}{60 \times (V_{TRAFFIC} - V_{RS})} \rightarrow D_{RS} = \frac{10 \times 20 \times 60}{60 \times (60-20)} = \frac{12000}{2400} = 5.00 = 5.0 \text{ miles}$$

$$T_{RS} = \frac{60 \times D_{RS}}{V_{RS}} \rightarrow T_{RS} = \frac{60 \times 5.00}{20} = \frac{300}{20} = 15 \text{ minutes}$$

The work area is located at MP 145.78. Mileposts decrease going southbound. Since the rolling slowdown begins prior to the work area, its milepost will be higher.

$$\text{Rolling slowdown location} = \text{Work Area} + \text{DRS} = 145.78 + 5.0 = 150.78$$

Answer: Rolling slowdown duration is 15 minutes and begins at Milepost 150.78.

2nd Determine: What on-ramps need to be temporarily held within the limits of the rolling slowdown until the mainline rolling blockade passes

As determined above, the rolling slowdown limits is between MP150.78 to MP145.78 on Southbound I-5. Using SRview 3 WSDOT, WSDOT GeoPortal, and/ or Google Maps (or similar), determine what on-ramps are located within the rolling slowdown limits.

Answer: On-ramps at the following locations need to be held:

- SR516 → Southbound I-5 (MP 149.07)
- S 272nd St → Southbound I-5 (MP146.71)

E. Rolling Slowdown Example #2

Situation: Freeway rolling slowdown needed for sign bridge removal over eastbound lanes of Interstate 90 located at Milepost 109.90. Crews need 7 minutes of clear time at the work area. The posted speed limit is 70 mph for cars and 60 mph for trucks.

1st Determine: Duration of rolling slowdown needed in minutes and where it begins.

Known Variables:

T_{CLEAR} = 7 minutes

V_{RS} = 70 – 40 = 30 mph

Note: Rolling slowdown target speed is 40 mph less than the highest speed limit, 70 mph, instead of the truck speed limit.

$V_{TRAFFIC}$ = 60 mph

Note: Traffic speed based on lower 60 mph truck speed limit since there are no major upgrades (≥ 5 percent) in this area.

Equations:

$$D_{RS} = \frac{T_{CLEAR} \times V_{RS} \times V_{TRAFFIC}}{60 \times (V_{TRAFFIC} - V_{RS})} \rightarrow D_{RS} = \frac{7 \times 30 \times 60}{60 \times (60 - 30)} = \frac{12600}{1800} = 7.00 = 7.0 \text{ miles}$$

$$T_{RS} = \frac{60 \times D_{RS}}{V_{RS}} \rightarrow T_{RS} = \frac{60 \times 7.00}{30} = \frac{420}{30} = 14 \text{ minutes}$$

The work area is located at MP 109.90. Mileposts increase going eastbound. Since the rolling slowdown begins prior to the work area, its milepost will be lower.

$$\text{Rolling slowdown location} = \text{Work Area} - \text{DRS} = 109.90 - 7.0 = 102.90$$

Answer: Rolling slowdown duration is 14 minutes and begins at Milepost 102.90.

2nd Determine: What on-ramps need to be temporarily held within the limits of the rolling slowdown until the mainline rolling blockade passes

As determined in above, the rolling slowdown limits is between MP102.90 to MP109.90 on Eastbound I-90. Using SRview 3 WSDOT, WSDOT GeoPortal, and/or Google Maps (or similar), determine what on-ramps are located within the rolling slowdown limits.

Answer: On-ramps at the following locations that need to be held:

- **US 97 → Eastbound I-90** (MP 105.82)
- **Canyon Rd → Eastbound I-90** (MP 109.74)

F. Rolling Slowdown Example #3

Situation: Freeway rolling slowdown needed for to transport a crane across all lanes of westbound I-82 over into the median at Milepost 38.16. Crews need 7 minutes of clear time at the work area. The work zone speed limit is 55 mph starting at MP 38.73 with the existing speed limit 70 mph (trucks 60 mph) maintained east of MP 38.73.

Determine: Duration of rolling slowdown needed in minutes and where it begins.

Known Variables:

T_{CLEAR} = 7 minutes

V_{RS} = 70 – 40 = 30 mph

Note: Rolling slowdown target speed is 40 mph less than the 70 mph posted speed limit.

$V_{TRAFFIC}$ = 55 mph

Note: Traffic speed is conservatively based on the lower 55 mph work zone speed limit for simplicity since there are no major upgrades (≥ 5 percent) in this area; typically the 60 mph truck speed limit would otherwise be used. This value could also be prorated.

Equations:

$$D_{RS} = \frac{T_{CLEAR} \times V_{RS} \times V_{TRAFFIC}}{60 \times (V_{TRAFFIC} - V_{RS})} \rightarrow D_{RS} = \frac{7 * 30 * 55}{60 * (55 - 30)} = \frac{11{,}550}{1500} = 7.70 = 7.7 \text{ miles}$$

$$T_{RS} = \frac{60 \times D_{RS}}{V_{RS}} \rightarrow T_{RS} = \frac{60 \times 7.70}{30} = \frac{462.0}{30} = 15.4 = 16 \text{ minutes}$$

The work area is located at MP 38.16. Mileposts decrease going westbound. Since the rolling slowdown begins prior to the work area, its milepost will be higher.

$$\text{Rolling slowdown location} = \text{Work Area} - D_{RS} = 38.16 + 7.7 = 45.86 = 45.9$$

Answer: Rolling slowdown duration is 16 minutes and begins at Milepost 45.9. Note 16 minutes slightly exceeds the guidance of 15 minute durations and should be justified.

2nd Determine: What on-ramps need to be temporarily held within the limits of the rolling slowdown until the mainline rolling blockade passes

As determined in above, the rolling slowdown limits is between MP45.9 to MP38.16 on Westbound I-82. Using SRview 3 WSDOT, WSDOT GeoPortal, and/ or Google Maps (or similar), determine what on-ramps are located within the rolling slowdown limits.

Answer: On-ramps at the following locations that need to be held:

- **Donald Wapato Rd → Westbound I-82** (MP 44.09)
- **Yakima Valley Highway → Westbound I-82** (MP 40.14)

G. Rolling Slowdown Example #4

Situation: Freeway rolling slowdown needed to install a temporary traffic control chicane to allow crews to restriping across all lanes in a single nightly shift on Eastbound Interstate 90 starting at Milepost 5.58. The I-5/I-90 interchange on- ramps are located at MP 2.67.

1st Determine: Determine the rolling slowdown speed, rolling slowdown duration, and clear time available in this unique scenario.

Known Variables:

$V_{TRAFFIC}$ = 60 mph

Note: Traffic speed based on 60 mph speed limit; no upgrades (≥ 5 percent) present.

Step #1: Determine the maximum rolling slowdown speed that fits within the 3.0 miles available (between the I-5/I-90 interchange to the work area) using the 15 minute maximum rolling slowdown guidance.

- Assume D_{RS} = 5.58 – 2.67 = 2.91
- Assume T_{RS} = 15 minutes

$$V_{RS} = \frac{60 \times D_{RS}}{T_{RS}} \rightarrow V_{RS} = \frac{60 \times 2.91}{15} = 11.64 \text{ (round down to 11 mph)}$$

Step #2: Using a 15 minute rolling slowdown duration and target speed of 11 mph, determine the maximum clear time available at the work area.

$$T_{CLEAR} = \frac{60 \times (V_{TRAFFIC} - V_{RS}) \times D_{RS}}{V_{RS} \times V_{TRAFFIC}} \rightarrow T_{CLEAR} = \frac{60 \times (60 - 11) \times 2.91}{11 \times 60} = \frac{8555.4}{660} = 13 \text{ minutes}$$

Answer: The rolling slowdown target speed is 11 mph, duration of 13 minutes, and begins at Milepost 2.67 (immediately following the I-5/I-90 interchange) on Eastbound I-90.

2nd Determine: What on-ramps need to be temporarily held or closed within the limits of the rolling slowdown until the mainline rolling blockade passes

As determined in above, the rolling slowdown limits is between MP2.58 to MP5.58 on Eastbound I-90. Using SRview 3 WSDOT, WSDOT GeoPortal, and/or Google Maps (or similar), determine what on-ramps are located within the rolling slowdown limits.

Answer: On-ramps at the following locations that need to be held/closed:

- **Hold Southbound Rainer Ave → Eastbound I-90** (MP 3.34)
- **Hold Northbound Rainer Ave → Eastbound I-90** (MP 3.79)

Note: Since the I-5 ramps to EB I-90 are at the rolling slowdown limits, the rolling slowdown blockade can concurrently begin along the freeway-to-freeway on-ramps from NB I-5 and SB I-5 and to join the EB I-90 blockade; however, freeway-to-freeway on-ramps traffic should not be stopped or held. If freeway- to-freeway ramps need to be stopped or held, they should be closed using standard traffic control devices.

5-22 Traffic Holds

A traffic hold is a traffic control strategy using flaggers and/or uniformed police officers (UPOs) to stop traffic in all directions to enable completion of work activities requiring exclusive access across or over the roadway that would otherwise present significant risks to motorists. UPOs include Washington Patrol and any local police agency.

Traffic holds shall not be used on freeway mainlines.

Traffic holds may be used on non-freeways roadways where rolling slowdowns (Section 5-21) are not feasible in lieu of a roadway closure. When used, it is preferred to reduce each approach down to a single open lane using standard traffic control devices and advanced warning signage. It is optional to place a UPO vehicle with emergency lights activated on either side of the work area after the flaggers to help block the roadway.

Traffic holds also may be used on roadways where traffic alternates in a single lane via flagger-control, particularly in areas where there are no alternative routes and work is being completed in a narrow area requiring traffic to be held in all directions.

When holding traffic at or near signalized intersections, the traffic signal must be turned off or set to all-way red flashing mode per WAC 468-95-3015. Per WAC 468-95-302, only UPOs should flag at the center of the intersection except in an emergency; however, flaggers may control each intersection leg.

A. Traffic Hold Guidance

Consider the following guidance when implementing traffic holds:

- Limit traffic hold durations to 10 minutes when feasible
- If traffic hold durations are 15+ minutes on major arterial roadways, provide advance notice to the public at least 72 hours prior to and during traffic holds:

PCMS		
1	2	3
15MINUTE DELAYS POSSIBLE	09/15/-19 NIGHTLY 11PM-5AM	AT SR527 & 180TH ST
1.5 SEC	1.5 SEC	1.5 SEC

DISPLAY AT LEAST 3 DAYS IN ADVANCE OF TRAFFIC HOLD

and

PCMS	
1	2
15MINUTE TRAFFIC HOLDS	BE PREPARED TO STOP
2.0 SEC	2.0 SEC

LOCATE TO REMAIN 1/2+/- MILE IN ADVANCE OF EXPECTED QUEUE.

PCMS MAY BE TRUCK MOUNTED

- For longer term traffic hold durations of 30+ minutes consider specifying traffic is to be released at regular time intervals such as 00 and 30 past the hour. This assists in setting expectations with the driver and thereby able to plan their travel through the area. Provide at least seven calendar day notice to the public except in emergencies. When considering this strategy, it may be a good time to involve Region Management in the decision process.

PCMS		
1	2	3
EXPECT 30MINUTE DELAYS	MAR13-17 MON-FRI 7AM-6PM	SR410 25 MILES AHEAD
1.5 SEC	1.5 SEC	1.5 SEC

and

PCMS		
1	2	3
30MINUTE TRAFFIC HOLDS	TRAFFIC RELEASED AT THE	TOP AND BOTTOM OF HOUR
1.5 SEC	1.5 SEC	1.5 SEC

DISPLAY AT LEAST 7 DAYS IN ADVANCE OF TRAFFIC HOLD

DESIRABLE TO PLACE JUST OUT OF TOWN OR NEAR AN ALTERNATIVE ROUTE SO MOTORISTS CAN AVOID WORK ZONE.

LOCATE TO REMAIN 1/2 +/- MILE IN ADVANCE OF EXPECTED QUEUE.

PCMS MAY BE TRUCK MOUNTED.

- At locations where bicyclists and motorists need to share a lane following the end of traffic holds, release motorists first allowing queues to clear and then allow bicyclists to proceed
- If feasible, release traffic in all directions until queues dissipate before commencing another traffic hold or alternating traffic
- To avoid severe traffic impacts, consider limiting permitted traffic hold hours
  - Consider limiting daytime traffic holds on weekdays to avoid impacting commuting and school traffic. Use nighttime hours if needed
  - As guidance, consider assigning permitted traffic hold hours based on the needed traffic hold duration and directional traffic volume thresholds list below which assumes that traffic in all directions is released at the end of the traffic hold:

Traffic Hold Duration (minutes)	Single Direction with Heaviest Traffic Volumes (vehicles/hour)
30	250
20	375
15	500
10	750
5	1200

- Recommend reducing each traffic approach to a single open lane with standard traffic control devices and advanced warning signage
- Inform Washington Patrol, local fire, police, emergency service agencies, and transit agencies (if applicable) at least 72-hours in advance of non-emergency traffic holds

5-23 WSDOT Approval, Acceptance, & Review Protocol for Local Agencies

When within WSDOT jurisdiction, the work zone traffic control plans shall be consistent with WSDOT standard work zone practices and policy in addition to applicable state and federal laws. These requirements may exceed those set forth in the *Manual on Uniform Traffic Control Devices* (MUTCD). Each WSDOT Region Traffic Operations will determine standard work zone practices within their Region.

WSDOT has authorization to accept work zone traffic control plans only within the boundaries of WSDOT Right of Way, including all Interstate Highways and WSDOT Limited Access (RCW 47.52).

There are conditions requiring WSDOT approval, acceptance, or review even when within local agency jurisdiction including:

- Review traffic control plans involving a full highway closure (RCW 47.48.010)
- Review traffic control plans that may impact state highway, freeway, or the Interstate Highway System
- Accept traffic control plans affecting a WSDOT owned or operated traffic signal along a State Route (RCW 47.24.020, Section 13).
- Approve temporary regulatory work zone speed limit reduction along a State Route (Secretary's Executive Order E 1060.02)
- Approve the installation of all traffic signals, both permanent and temporary, along a State Route (RCW 47.24.020, Section 13)

Local agencies may request WSDOT to *review* traffic control plans outside of WSDOT jurisdiction, but acceptance is still the local agency's responsibility.

The Memorandum of Understanding of "City Streets As Part of State Highways" provides an agreement between Cities and WSDOT for responsibilities in regards to the construction, operation, and maintenance for city streets that also function as state highways. By understanding responsibilities, it is then known who develops the associated traffic control plans.

Washington City and Town Profiles webpage provides current city population information.

The following information is needed to determine the appropriate traffic control plan (TCP) acceptances or reviews by WSDOT and local agencies:

- WSDOT TCP Acceptance & Review Stamp Protocol (Section 5-23.A)
- Right-of-Way & WSDOT Limited Access Information (Section 5-23.B)
- Local Agency Boundary Information (Section 5-23.C)
- State Highway Traffic Signals within Local Agencies (Section 5-23.D)

A. Traffic Control Plan Acceptance and Review Stamp Protocol

Document traffic control plan acceptance or review via stamps (including signature and date) on each sheet. Acceptance authority will be determined by each WSDOT Region Traffic Operations.

This subsection provides protocol for four types of traffic control plan stamps:

- Traffic control plan accepted and is entirely within WSDOT Right-of-Way and/or WSDOT Limited Access:

- Traffic control plan accepted within WSDOT jurisdiction but also needs to be accepted for portion within the local agency's jurisdiction ("dual acceptance"):

- Traffic control plan reviewed by WSDOT, at local agency's request, but must still be accepted by the local agency:

- Traffic control plan not accepted; consider providing comments and explanation of what needs to be addressed on the traffic control plan:

B. Right-of-Way and WSDOT Limited Access Information

WSDOT Right-of-Way plans, which also show WSDOT Limited Access boundaries, are the most useful way to determine which agency has jurisdiction for traffic control plan acceptance.

For general information regarding WSDOT Limited Access boundaries, see Exhibits in WSDOT *Design Manual* Chapter 530.

There are three typical ways to find specific boundaries of Right-of-Way and Limited Access:

- WSDOT Plans and Document Archive webpage provides a library for Right of Way Plans to determine these limits at each interchange or intersection
- WSDOT Active Right of Way Plans webpage provides a list of many right of way plans by corridor for the entire state
- Contact WSDOT Region Right-of-Way staff for further assistance

C. Local Agency Boundary Information

WSDOT GeoPortal has a "Political Boundaries" feature that displays the city, county, tribal land boundaries overlaid on a map of Washington.

D. State Highway Traffic Signals within Local Agencies

WSDOT has approval or acceptance authority of traffic control plans within the limits of signalized intersections on State Highways when the traffic signal is WSDOT owned or operated, even when within local agency limits exceeding the population thresholds specified in RCW 47.24.020, Section 17. The local agency has approval authority outside the limits of the signalized intersection within their jurisdiction.

Contact WSDOT Region Traffic Operations to determine which agency owns or operates State Highway traffic signals within the limits of local agencies.

Chapter 6 Traffic Regulations

6-1 General

Traffic regulations are intended to provide for driving behavior and actions that will lead to roadways that are the least likely to result in fatal and serious crashes. They create operating efficiencies on state highways, county roads, or city streets by placing enforceable operating restrictions on the use of the public roadway. A traffic regulation is either established in state law RCW 46.61, Rules of the Road, or is changed in law, based on data from an engineering and traffic investigation of road, land use and traffic (vehicle, freight, transit, pedestrian and bicyclist) conditions at the proposed location. Modifications to certain regulations require approvals at the State Traffic Engineer, Regional Traffic Engineer or Regional Administrator level. The guidelines in this chapter explain specific regulations and identify the information needed to establish or modify a traffic regulation.

The Rules of the Road (RCW 46.61) regulate basic traffic movements on public roads including:

- maximum speeds
- lane use
- vehicle restrictions stop control
- turning movement restrictions
- assignment of right of way
- parking

A traffic regulation other than the Rules of the Road may be implemented only after an official action by the appropriate jurisdictional authority. For state highways, a proposed traffic regulation (or modification) is approved by either the Regional Traffic Engineer, Regional Administrator, or the State Traffic Engineer, depending on the delegation of authority, and is administered as a "Calendar Agenda".

Where city streets are part of managed access state highways, a city or town may regulate parking, stop control, and turn prohibitions by establishing an ordinance or resolution. Under RCW 47.24.020(11), if a city or town wants tow regulate the above regulations on a state highway, the department must approve any regulation that is not identical to state law before it becomes effective (RCW 46.61.415).

A. Regional Traffic Regulations Approved by Regional Administrator

- Traffic signal installation permits on state highway system.
- Reduced speed limits in construction or maintenance zones.
- Regulatory speeds in rest areas, weigh stations, and ferry terminals.
- Stop control on state highways.
- Turn prohibitions and restrictions.
- Pedestrian prohibitions on partial or modified access control highways.
- Roadside parking restrictions (except for angle parking).
- Tow-away zones along freeways.
- Prohibitions on fishing or jumping from bridges.
- Emergency or construction closures and weight restrictions.
- Midblock pedestrian crossings

B. Headquarters Traffic Regulations Approved by State Traffic Engineer

- Regulatory speeds (outside construction and maintenance work zones).
- 20 mph school speed zones established under WAC 468-95-330.
- Bicycle prohibitions on limited access highways.
- Truck restrictions (including trucks hauling hazardous material).
- HOV lane designations.
- Hard shoulder running.
- Angle parking on state and federal-aid highways.
- Parking restrictions for park and ride lots and other parking facilities.
- Regulation of sales within state parking facilities.
- Permanent weight restrictions.

Permanent traffic regulation records are maintained in the office of the designated approving authority.

Traffic regulations or modifications are coordinated and administered by the Regional Traffic Engineer and submitted to either the Regional Administrator or the State Traffic Engineer as a Calendar Agenda (Figure 6-1 or Figure 6-2), for approval. The regulation's approval or denial is recorded, which provides the necessary official documentation of the regulatory action. Regulations related to speed limit changes that are approved by the State Traffic Engineer are placed in a statewide Speed Zone Inventory database.

6-2 Documentation

Additionally, as outlined in this chapter, retain a summary of the engineering and traffic investigation and other data to support and document the regulation. Follow Chapter 11 records management for retention in the *Traffic Manual*. Inventories of traffic regulations are maintained in the office of the designated approving authority. Informational copies of completed Calendar Agenda action items are exchanged between the State Traffic Engineer and region Traffic offices. Copies are also provided to the Washington State Patrol (WSP), appropriate local agency and the Transportation Data, GIS and Modeling office (TDGMO).

6-3 Regional Traffic Regulations

Some types of traffic regulations address specific local traffic and geometric characteristics, without statewide implications. The Regional Administrators or Regional Traffic Engineers are delegated the authority to approve those regulations, which include the following:

1. **Traffic Signal Installation Permits –** Traffic control signals are addressed in the *Manual of Uniform Traffic Control Devices* (MUTCD), Chapter 4. Discussion includes advantages and disadvantages of signals, possible alternatives to signals, and the warrants under which signals are justified. In addition, signal installation types, which require a Traffic Signal permit are included in Section 1330.02(1) of the *Design Manual*, Traffic Signal.

Permits are **not** required for:

- Object identification beacons that are not installed overhead at an intersection
- Speed limit sign beacons
- Stop sign beacons
- Rectangular Rapid Flashing Beacons – pedestrian signs
- Lane assignment signals at toll facilities
- Portable Temporary Traffic Control Signals, as identified in *Standard Specification* 1-10.3(3)K.

When considering a signal, complete a warrant analysis for the proposed location in accordance with Section 1330.02(1) of the *Design Manual*. If a signal is warranted, submit a Calendar Agenda request (Figure 6-1) with the documentation below to the Regional Administrator for approval.

Your submittal should include:

- A vicinity map showing SR/MP location of the proposed signal
- Detailed sketch showing traffic volumes, lane distribution, and other data relative to the request. Photos of the location and surrounding area, if possible.
- A complete signal warrant analysis package, as described in Section 1330.02(1)(a) of the *Design Manual*.
- If the proposed signal location is at a Collision Analysis Location (CAL), Collision Analysis Corridor (CAC), or is listed in the latest priority array, collision data for the last three years should be included with the signal warrant analysis (part of Warrant 7)
- A statement detailing local agency funding and maintenance responsibilities, if applicable.
- All city, county, fire district, and citizen requests, along with copies of other pertinent documents and correspondence.
- The history of previously tried corrective countermeasures.
- Other supporting data such as proximity to schools, shopping centers, pedestrian traffic, etc.
- Signal Application Checklist (Figure 6-3).

Once approved, a Statewide Signal Permit Inventory number is obtained from Headquarters and noted in part “F” on the permit form (Forms Management - Form 242-014). Send a copy of the completed permit to Headquarters for final documentation. At a minimum, the complete signal warrant analysis should be included with the submittal to Headquarters for documentation purposes.

Where signal removal is being considered, refer to Section 6-6, Rescinding Existing Traffic Regulations and Section 1330.02(1) of the *Design Manual*.

B. **Reduced Regulatory Speed – Construction/Maintenance Zones –** The Regional Administrator may reduce speed limits in construction or maintenance work zones, following the guidelines given in Secretary's Executive Order E 1060 and *Traffic Manual* Appendix 5B. In some instances, speed limit reductions must be approved by the State Traffic Engineer.

C. **Regulatory Speeds in Rest Areas, Weigh Stations, and Ferry Terminals –** The department is authorized (RCW 46.61.405) to set speed limits on any part of the highway system and at ferry terminals. Rest areas and weigh stations are included in the definition of a state highway (RCW 46.04.197). In 1987, these Calendar Agenda items were delegated to the Regional Administrator. RCW 47.38.020 provides more details on the limitations on use of rest areas. Rest Areas are limited to a maximum stay of eight hours in a 24-hour period for vehicles and commercial vehicles may park up to an hour beyond their federally mandated rest periods. RCW 47.38.010 specifies the rules governing use and control of rest areas, historic sites, viewpoints, etc.—Penalties Identify appropriate speed limits at these locations through an engineering and traffic investigation that considers:

- Existing speed characteristics
- Pedestrian traffic patterns
- Geometric elements
- Congestion
- Operational conflicts

Field observation during periods of heavy use may be necessary to determine these characteristics.

The Rules of the Road (RCW 46.61.415) state that speed limits on local roadways cannot be posted at lower than 20 mph. Lower or higher speeds may be determined based on the engineering and traffic investigation.

Submit regulatory speed limit requests for these locations as a Calendar Agenda item to the Regional Administrator. Include data collected from the engineering and traffic investigation to support the request.

Regional Administrator Calendar Agenda items shall include:

- A vicinity map and detailed strip map showing SR/MP location of the rest area, ferry terminal or weigh station.
- A description of the operational conditions, such as heavy pedestrian usage, which identify the need for a speed reduction. Include speed studies if they are available.
- A study of the last three years' crash history.
- Include proposed mitigation to reduce speeds.
- Copies of WSP concurrences.

D. Stop Control on State Highways – All state highways are considered arterials and entering traffic must stop when signs are posted (RCW 46.61.195). Most intersections of a state highway and a county road or city street are controlled by a stop sign posted on the local roadway. However, stop control can be installed on the state highway approaches if it will improve the intersection operation and if the traffic volume on the local roadway is equal to or higher than the state highway volume. The specific provisions regarding stop control are:

- The department is responsible for STOP or YIELD signs on county road approaches to state highways and on city street approaches in cities and towns under 27,500 population (RCW 47.24.020 (13)(17). Population threshold increases in 2023.
- The department can designate a county road or city street as an arterial having preference over the state highway if it will improve traffic conditions. (RCW 46.61.195)
- An incorporated city or town may pass an ordinance designating a city street as an arterial having preference over a state highway, if approved, in writing by the department. The city or town is then responsible for the STOP or YIELD signs. RCW 46.61.195 does not specify a population threshold; therefore, any city or town may exercise this authority.)
- Vehicles entering arterials from all other public or private roadways must stop before entering, when STOP signs are posted on the approach.

Respond to requests for state highway stop control by conducting an engineering and traffic investigation to determine if it is warranted at the subject location. Consider an all-way STOP if approach volumes are approximately equal or if a collision analysis shows collisions which are correctable by all-way stops (i.e., angle collisions). See MUTCD, Section 2B.05 Stop Sign and All Way Stop plaque.

Document the investigation and submit the proposed regulation to the Regional Administrator as a Calendar Agenda item. Include:

- A vicinity map and detailed strip map showing SR/MP location of the intersection, together with the total traffic volumes and approach distributions.
- A description of the operational conditions (such as sight distances) which identify the need for stop control, including any history of previously tried corrective measures.
- A study of the last three years' crash history, including whether the location is a Collision Analysis Location (CAL), Collision Analysis Corridor (CAC), or is listed in the latest priority array.
- A city or town ordinance is required for city streets which are part of state highways.
- Copies of city, county, and/or citizen requests along with other pertinent documents and correspondence.
- Copies of WSP and/or local police agency concurrences.

E. Turn Prohibitions and Restrictions – Specific turning movements may be prohibited or restricted by traffic regulations to reduce potential conflicts or improve the operational characteristics of an intersection or business access.

Turn prohibitions that are established in the Rules of the Road or are clearly defined by design elements in the MUTCD, Section 2B.19 do not need a traffic regulation. All other turn prohibitions require a traffic regulation.

Conduct an engineering and traffic investigation of the subject location; document the investigation and submit the proposed regulation to the Regional Administrator as a Calendar Agenda item. Include:

- A vicinity map and intersection sketch showing the SR/MP location together with the total traffic volumes, approach lane distributions and turning volumes.
- Descriptions of operational conditions which identify the need for the regulation, such as pedestrian movements, large truck turning radii, or lack of adequate gaps.
- The alternate routing intended to accommodate the turn-restricted traffic. Convenient and strategic alternate routing is necessary to minimize the likelihood that a driver will ignore the prohibition.
- A study of the last three years' collision history, including whether the location is a Collision Analysis Location (CAL), Collision Analysis Corridor (CAC), or is listed in the latest priority array.
- Copies of city, county, and/or citizen requests along with other pertinent documents and correspondence.
- A city or town ordinance is required for city streets which are part of state highways.
- Copies of WSP and/or local police agency concurrences, if applicable.
- Photos or video, if available.

F. Pedestrian Prohibitions on Full, Partial or Modified Access Control Highways – Pedestrians are prohibited on highways that have been established and constructed as fully controlled limited access facilities WAC 468-58-050; WAC 468-58-010. This prohibition does not apply to pedestrian overcrossings, under-crossings and other facilities provided specifically for the use of such traffic.

On partial and modified access control highways the department is authorized to prohibit non-motorized traffic (e.g., pedestrians, bicycles) (RCW 46.61.160). Therefore, on highways with partial or modified access control, a specific traffic regulation is required to prohibit pedestrian traffic. A prohibition is only considered when an engineering and traffic investigation determines that pedestrians have an alternate route. It is not WSDOT policy to close pedestrian access when no feasible alternate route exists.

Prohibitions are appropriate along partial and modified access controlled highways in areas having the appearance of full access control, in areas where parallel pedestrian routes are available, and other areas where pedestrians on the shoulder proximity to the travel lanes does not provide sufficient width for walking or where speeds, volume and roadway complexity in combination preclude pedestrian use.

Document the investigation and submit the proposed regulation to the Regional Administrator as a Calendar Agenda item. Include:

- A vicinity map of the area showing proposed prohibition limits and alternate pedestrian routes. Includes SR and MP.
- Traffic volumes, shoulder width and posted speed limit.
- Crash history for the past three years including any pedestrian involvements.
- Summary statement detailing need for prohibition. Local agency coordination may be necessary, if so, include a summary of the coordination documentation.
- Copies of WSP concurrences.
- Photos or video, if available.

G. Roadside Parking Restrictions – Parking or standing shall be permitted, except where parking has been limited by date and time and such limitations and restrictions have been approved by city ordinance or county resolution and the Regional Administrator (RCW 46.61.570(2). The Rules of the Road, (RCW 46.61.560 through 46.61.590) provide specific parking restrictions that are effective at all times along public roadways. When the region considers additional parking restrictions, conduct an engineering and traffic investigation to determine the need.

Document the investigation and submit the proposed regulation to the Regional Administrator as a Calendar Agenda item. Include:

- A detailed strip map of the area showing SR/MP, intersecting streets, and driveways, and other on-street or off-street parking alternatives.
- Photos or video if available.
- The type of restriction requested (i.e., time of day, mid-block to corner).
- An analysis of operational conditions, such as narrow shoulders or limited sight distances that identify the need for the regulation.
- Copies of a city or town ordinance, as required for city streets which are part of state highways.
- Correspondence or comments regarding adjacent property and business owners' parking.
- Copies of WSP and/or local police agency concurrences.

H. No Parking and No Parking Tow-Away Zones along Freeways – WSDOT has the authority to restrict parking and place official traffic control devices prohibiting, limiting and restricting the stopping, standing or parking RCW 46.61.575. "No Parking" restrictions are appropriate at locations where operationally parked vehicles may block sight distance or pose a hazard.

On a limited access facility, it shall be unlawful for any person stop or park a vehicle within the right of way, including the shoulders, except at locations where signing specifically allows such stopping and parking RCW 47.52.120.

A "No Parking/Tow Away Zone" along a freeway may be established where there is an operational problem or collision history associated with vehicles parked on the shoulder. The WSP typically identifies these suggested locations.

When "Tow Away Zones" are required in addition to the "No Parking", officers have the ability to promptly remove an unattended vehicle from a roadway shoulder if it constitutes an obstruction or jeopardizes public safety (RCW 46.55.113(2)(b)). The "no parking/tow-away zone" traffic regulation and related signing provide additional information for the motorist and an effective enforcement tool for the WSP.

Submit the proposed regulation to the Regional Administrator as a Calendar Agenda item. Include:

- A detailed strip map of the area showing SR/MP, direction of traffic, roadway approaches and interchanges.
- An analysis of operational conditions, roadway speed limit, including crashes associated with vehicles parked on the shoulder, narrow shoulders, or limited sight distances.
- Parking restrictions in Rest Areas are approved by the State Traffic Engineer.
- Copies of WSP and/or local police agency request and concurrence.

I. **Prohibitions of Fishing or Jumping from Bridges –** Prohibitions of fishing or jumping from bridges are intended to alleviate injuries from distraction, jumping and person actions that might create unexpected conditions. An engineering and traffic investigation is conducted to determine the need for the prohibition.

Document the investigation and submit the proposed regulation to the Regional Administrator as a Calendar Agenda item. Include:

- A vicinity map showing the SR/MP of the bridge and the bridge number from the *Bridge List* M 23-09.
- A brief description of the conditions requiring the prohibition.
- Copies of public or local agency correspondence.
- Copies of WSP and/or local police agency concurrences.

There are a number of 'fishing from bridges' prohibitions that were adopted by the former Highway Commission, prior to traffic regulation authority being transferred to the department. The prohibitions remain effective unless rescinded by the Regional Administrator.

J. **Highway Restrictions or Closures – Emergency, Temporary, Construction, or Weight Related –** The Regional Administrator approves emergency, temporary, construction, or weight related restrictions or closures. These place specific limitations on the use of a state highway. Examples are:

Emergency Closures or Restrictions: Emergency closures or restrictions may be implemented immediately, without prior notice or posting, in accordance with the procedures in Chapter 1 of the *Maintenance Manual* M 51-01. The *Maintenance Manual* provides signing guidelines for emergency and non-emergency closures and restrictions.

Temporary or Construction Restrictions or Closures: RCW 47.48.010 gives the department the authority to close highways or segments of highways to all vehicles or any class of vehicles where such continued use will damage the roadway or be dangerous to traffic.

Investigate and document:

- Document the conditions that require the restriction or regulation.
- Detour accessibility options and emergency response contingency plan.
- Internal WSDOT division correspondence, if any.
- Copies of public or local agency correspondence.
- Copies of WSP and local police agency concurrences.

Submit the proposed regulation to the Regional Administrator as a Calendar Agenda item. Include:

- A vicinity map of area including SR/MP.
- A discussion of roadway condition or situation that requires the restriction or closure.
- Detour map, if available.
- Copies of WSP, emergency response and local police agency concurrence.
- Prior to restricting or closing a roadway segment, notice of the action must be given (per RCW 47.48.020) by:

  Publishing a notice describing the restriction or closure in at least one newspaper issue of general circulation in the county, city, or town where the highway is located.

  Posting a notice describing the restriction or closure in a conspicuous place at the ends of the highway or highway section.

It is important to remember state highway closures, unless it is under emergency conditions, require a *three*-day publication and posting a notice of closure, before the highway may be closed.

If the closure will be in effect for less than 12 hours (such as for many Special Events) it is not necessary to post a notice in a newspaper. Advance closure notices must still be posted on the highway. The Special Event Letter of Agreement is sufficient documentation of an event related restriction or closure.

Weight Restrictions: In accordance with WAC 468-38-080, temporary weight restrictions may be immediately imposed on highways in response to emergency road conditions, such as potential damage from freeze/thaw action.

The State Traffic Engineer approves *permanent* weight restrictions on bridge structures where posting is necessary due to deterioration of the structure. The Bridge and Structures office typically initiates the restriction.

Oversize Load Restrictions: Notices of any roadway restriction or closure must be distributed to the Commercial Vehicle Services Office and signs must be installed by region maintenance that identify the milepost limits and the duration of the restriction. The Commercial Vehicle Services Office issues the oversize load permits and should be made aware of any restrictions or closures along state highways. Some restriction may require pilot cars to accompany these loads (WAC 468-38).

K. Midblock Pedestrian Crossings on State Highways – The Regional Administrator may delegate the authority to the Region Traffic Engineer to approve midblock pedestrian crossing installations.

Chapter 4 Multi-Modal Design includes design guidance. Conditions that might increase the value of a midblock crossing includes the following:

- High pedestrian crossing present.
- Long block spacing.
- Opportunity to channel multiple pedestrian crossings to a single location.
- Visible crossing for pedestrians and motorists.
- Local agency support.
- Pedestrian traffic generator within vicinity of crossing. (e.g. transit stop, shopping, and high-density housing).

A traffic engineering study shall be submitted to the Region Traffic Engineer for approval by the project manager. If approved by the Regional Traffic Engineer, they shall forward the proposed crossing request to the Regional Administrator as a Calendar Action agenda item. Request should include:

- A vicinity map of the area showing proposed crossing along with pedestrian generators.
- Traffic volumes.
- Crash history for the past three years including any pedestrian involvements.
- Summary statement detailing need for crossing.

6-4 Headquarters Traffic Regulations

Some types of traffic regulations address conditions that have statewide implications. To assure uniformity, these are approved by the State Traffic Engineer, and include the following:

A. Regulating Speed Limits

Speed limits are set to be the speed that is least likely to result in traffic fatalities and serious injuries and achieve compliance by the majority of drivers. In some cases, this will involve setting iterative speed limits over time until physical and psychological conditions can be changed to influence driver speed.

Speed limits frame expectations for drivers and other roadway users. Properly set speed limits should result in predictable, consistent, and reasonable vehicle speeds that consider the mobility, safety, accessibility and convenience for all users, including drivers, transit operations, pedestrians, and bicyclists.

Roadway context (current and planned future), changing development, transit, and bicycle and pedestrian facilities and activity, are all significant factors that need to be considered in addition to the traditional engineering study. There may be instances where the study may include a more in-depth review of speed limits in population centers for roads through and adjacent to residential and business districts.

The objective of speed zoning is to achieve operating speeds that minimize fatal and serious injuries for all road users and provide statewide consistency.

Review and Approval of New Speed Zones:

The Secretary of Transportation has delegated approving authority to the State Traffic Engineer to authorize the establishment of speed limits. Region Traffic Operations divisions are responsible for performing the engineering/traffic analysis, context and multimodal user investigation needed to determine the most desirable operating speeds and implementing changes necessary.

Region Traffic offices may receive requests to reduce or increase speed limits from local agencies, tribal governments, citizen groups, developers, and law enforcement agencies. However, before the investigation begins, it is important to discuss the possible outcome of the review to ensure the requestor understands how WSDOT evaluates and sets speed limits. This is a good time to determine milepost limits of the speed zone request. It is also important to consider other roadway, user, and context changes in addition to speed zoning to address the underlying reason for the request. Speed zoning is often not as effective as other speed management solutions but is often looked to as the easiest and cheapest solution by requestors.

1. **Engineering and Traffic Investigation:** RCW 46.61.410 and RCW 46.61.405 authorize the secretary to Transportation to increase or decrease the speed limit based on an engineering and traffic investigation. The Region Traffic offices shall conduct an engineering and traffic investigation when determining the appropriate speed limit. WAC 468-95-045 modifies the MUTCD 2B.13 and provides guidance related to what is included in an engineering study. Weather, road surface conditions, or congestion may impact a proper investigation.

   The following are factors that are considered:

   a) **Roadway Characteristics and Roadway Users –** Consider roadway characteristics of the proposed segment, adjacent transitional speed zones, existing traffic control devices, roadway facilities and condition, and traffic generating activity (for all user types) within and adjacent to the proposed speed zone. Key roadway factors to consider:

      - Roadway alignment may dictate operational speed due to curvature of the roadway. A time travel speed review may be useful in making the determination.
      - Roadway facilities for all user types, including vehicle travel lanes/ widths, on-street parking, transit facilities, pedestrian and bicycle facilities, sidewalks.
      - Operational devices for all user types including signalized intersections, controlled/uncontrolled pedestrian/bicycle crossings, speed feedback signs, special signing, etc.
      - Route continuity should be reviewed. Verify the proposed segment has similar characteristics as adjacent or near-by speed zones. Where applicable, review and potentially revise adjacent speed zones.

- Future changes in, or plans for, roadside development, private and public access points within the segment may influence driver behavior.
- Pedestrian and bicycle activity and accessibility, existing and projected; school zone, transit, rail, parks, and urban development may influence driver behavior. Research nearby pedestrian and bicycle traffic generators. Multimodal paths, sidewalks, or trails may influence driver behavior. Please consider path location, path width, and demand of active transportation users. A multimodal LOS performance measurement may be useful in urban/suburban developed environments when required information is available.

b) Speed Studies – Speed studies are used to evaluate how the drivers are currently operating along the roadway. Speed studies should be conducted during non-peak hours, away from intersections, signalized locations, non-inclement weather, and outside of curves. When possible, a minimum of 100 free-flowing vehicles should be sampled. Roadways less than 1000 ADT, 30 free-flowing vehicles should be sampled. Depending on length of proposed speed zone segment, several locations may be used to conduct speed studies.

Most drivers will select a speed at which they believe is safe and reasonable based upon their perception of the roadway. In consideration of the actual speeds on a particular roadway, WSDOT considers two speed measures and they are:

- 85^{th} percentile speed: the 85^{th} percentile is the speed at or below 85 percent of vehicles travel under free-flowing conditions
- 10 mph pace: the 10-mph pace is the *range* of speed at which the majority of cars are traveling on a particular stretch of road

WSDOT places an emphasis on the pace speed over the 85^{th} percentile speed when considering speed limit changes.

Where operating speeds are high, other speed management techniques may be necessary.

c) Crash History – Crashes resulting in fatalities and serious injuries are the most important crash types to consider. Analyze crashes to determine potential causes or patterns. Evaluate if a reduced speed limit would change the number or the severity of crashes. The following information should be considered:

- Review the most recent three years of crash history.
- If there are areas of concentrated crashes and the operating speed is consistent with the posted speed, verify a speed change is the preferred solution. The preferred solution may be independent of a speed limit change, or addition to.

Consider if other solutions besides speed limit changes are feasible to address crash history. Crashes involving tailgating, illegal passing, or other aggressive behaviors may be associated with speed differentials and may also be considered.

Communication and a field review with local law enforcement and the Washington State Patrol is beneficial.

Crash history may be used to determine system-wide changes to prevent crashes proactively in similar locations.

d) **Traffic Conditions:** The type and number of users along the roadway (includes passenger vehicles, trucks, busses, pedestrians, bicycles) all have an influence on driver speed selection. Drivers also adjust their speed for temporary conditions unrelated to volumes of all user types. These conditions may be point or segment occurrences (such as access points), and influence driver speeds for varying durations and distances. The recurrence of these conditions should be considered in determining the regulatory speed for the segment, particularly for segments that present difficulties in measuring free-flow speeds. The use of temporary advisory speeds may also be a suitable treatment. These influences may include:

- Roadside development. Increased levels of roadside development and access may lead to the potential for more traffic conflicts because of ingress and egress, turning movements, transit use, bicycle, and pedestrian activity.
- Locations where seasonal and other peak events occur that may impact traffic.
- Highways with limited locations for law enforcement to set up enforcement or pull a motorist over.
- Locations with increased pedestrian or bicycle presence.
- Increase or decrease in AM/PM Peak Travel Times.
- Increase or decrease in ADT's.
- Venues that generate increased traffic, both pedestrian and vehicular traffic. Also, ferry, rail and transit terminals may influence traffic.
- Truck volumes.

Preliminary Review and Consideration: Where speed zone changes are justified, submit a preliminary speed zone request to the Headquarters Traffic Office for *preliminary approval*. Include the following:

- Proposed SR and Milepost, existing speed limit and proposed speed limit.
- Include a summary as it relates to your engineering investigation and include:
  - Speed studies, crash history, recent or future construction projects.
  - Communication outreach.
  - Multimodal considerations.
  - Other contributing information supporting the change in speed limit.

- Proposed traffic calming mitigation, for example:
  - Driver feedback signing, no pass striping, geometric changes.
  - Other traffic calming or speed management measures.

There are several benefits in conducting preliminary discussions with the Headquarters Traffic office. The Headquarters Regulations Specialist can assist regions with package preparation and provide guidance and recommendations on speed mitigation.

2. **Full Package Submittal Calendar Agenda Action:** Regional Traffic offices will submit a full package speed zone request to the State Traffic Engineer as a Calendar Agenda Action item (Figure 6-2). The submittal shall include:

a) Cover Memo from Regional Traffic Engineer or Regional Administrator, to the State Traffic Engineer:

- Summarize the traffic investigation to include reasons for the change and who initiated the request. Include decisions from preliminary Headquarters review.
- Include pedestrian, bicycle, transit and community interest and benefits, if applicable.
- Include state route, *existing* begin and end speed zone mileposts, and posted speed limit and *proposed* begin and end mileposts and proposed speed limit.
- If the zone is located within the city/town limits or vicinity, include city/town name.
- Include previously tried corrective speed reducing measures and results. When applicable, include the roadway characteristics, geometrics, condition, grade, and sight distance, etc.

b) Vicinity Map Showing

- State route, mileposts, city limit boundary (if applicable), speed study milepost locations and results; including 10 MPH Pace and 85th percentile speeds.
- Show existing speed zone boundary, adjacent speed zones, and proposed speed zone.
- Identify roadway, context and user characteristics that are used for justification. For example, include trail crossings.
- The map should be readable and may include satellite imagery.

c) Crash History

- Include three (3) years of the most current crash history. Include only the crash summary.

d) Local Agency Concurrence

- A copy of the local agency ordinance or resolution is required for changes to speed limits within incorporated cities or towns.
- Highways that are fully controlled limited access do not require a city ordinance, however, it is important to include documentation of local agency communication and understanding.
- The Washington State Patrol concurrence at the Lieutenant level or higher.
- Speed Limit Request Checklist (Figure 6-4).

e) Other Documentation

- An environmental review of the State Environmental Policy Act (SEPA) if the proposed speed limit is being raised to above 55 MPH.
- If applicable, a narrative on how tribal considerations is addressed, see environmental review process.

When the engineering and traffic investigation does not support a speed limit revision; implement other potential corrective measures, such as traffic calming/ speed management revisions, warning signs, and public information campaigns. Observe and document the results of these measures before submitting a speed zone proposal.

- The State Traffic Regulations Specialist maintains a statewide speed limit inventory.

3. **Speed Limits for Schools and Playgrounds –** State law includes two parts to address reduced 20 mph speed zones for schools or playgrounds. A Calendar Agenda Action is not required to approve school speed zones when following the criteria in RCW 46.61.440 as noted below. If the proposed school speed zone segment extends beyond the 300 feet, a Calendar Agenda Action approval by the State Traffic Engineer is required.

   PART 1: RCW 46.61.440(1) establishes a 20 mph speed zone **at a marked school or playground crosswalk** when the marked crosswalk is posted with standard school speed limit or playground speed limit signing.

   PART 2: RCW 46.61.440(2) allows a county or incorporated city or town to establish a 20 mph speed zone on a roadway **bordering a marked school or playground**. The speed zone may only include area consistent with active school or playground use.

   Part 1 establishes a 20 mph speed zone at a marked school or playground crosswalk, when the crosswalk is posted with standard school or playground signs. School or playground crosswalk speed zones are addressed in WAC 468-95-330 and WAC 468-95-340 and discussed in Chapter 2 – Signing. School speed zone signing is shown in Chapter 2. School Speed Limit assembly shall consist of a top plaque SCHOOL legend, a Speed Limit sign, and a bottom plaque may indicate; specific time periods of the day and/or days of the week, or the term *When Flashing*, is used to notify motorist when the school speed limit is in effect.

To increase visibility, these signs may be supplemented with a flashing beacon or flags to increase compliance with the speed zone may be considered.

The 20 mph speed zone shall extend a full 300 feet in either direction from the marked school or playground crosswalk unless there is less than 300 feet to the terminus of the roadway. School or playground speed zones established under this law do not require a traffic regulation.

There may be locations where the 20 mph speed zone may extend more than 300 feet from the crosswalk, however, the distance beyond 300 feet requires a traffic regulation based on an engineering and traffic investigation. This regulation is approved by the State Traffic Engineer.

For city streets that are also state highways, the department must approve the city ordinance that extends the school or playground speed limit (RCW 47.24.020(11) and RCW 46.61.415(5)).

Where school crosswalks serve an elementary school, the engineering and traffic investigation should consider the school's Walk Route Plan. The Superintendent of Public Instruction limits the number of school crossings and allows only one entrance-exit from each block to and from the school.

Part 2 allows a county or incorporated city or town to establish a 20 mph speed zone adjacent to and extending up to 300 feet beyond the border of a school or playground property. The zone may only include the area consistent with active school or playground use (WAC 468-95-330). A marked crosswalk is not necessary to establish a 20 mph speed zone under RCW 46.61.440(2).

There may be locations where the 20 mph speed zone may extend more than 300 feet from the border of a school or playground property, however, the distance beyond 300 feet requires a traffic regulation based on an engineering and traffic investigation. This regulation is approved by the State Traffic Engineer.

For city streets that are also state highways, the department must approve the city ordinance that extends the school or playground speed limit (RCW 47.24.020(11) and RCW 46.61.415(5)).

4. **Speed Limits on State Highways Within Tribal Reservation Boundaries –** Beginning in 2009, state law (RCW 46.61.480) affirms that tribal authorities may determine the speed limit on the portions of non-limited access state highways that pass within tribal reservation boundaries. The speed limit must be based on an engineering and traffic investigation and is not effective until approved by WSDOT, and appropriate signing is posted.

   Submit a Calendar Agenda Action request to the State Traffic Engineer for approval.

5. **Speed Limits on Ocean Beaches –** Ocean beaches are under the jurisdiction of the Washington State Parks and Recreation Commission (RCW 79A.05.610). The Commission has set the maximum speed limit on beaches at 25 mph (WAC 352-37-130).

6. **Minimum Speed Limit –** Although RCW 46.61.425(2) authorizes the department to post a minimum speed limit on a highway segment, the Rules of the Road do not mandate a statutory minimum speed limit for state highways. RCW 46.61.415 states in part that minimum speed limits on local roadways may not be set lower than 20 mph. Further, RCW 46.61.440 sets 20 mph as the speed limit at marked school or playground crosswalks. For consistency with these statutes, it is suggested that 20 mph be the lowest speed limit that the department will consider.

7. **20 MPH Speed Limits within a City or Town –** When approached by a town or city, and the land use context indicates significant interaction of people walking, biking, and using motorized vehicles, a regulatory 20 MPH speed limit should be considered using the following guidance:

   - The State Highway functional classification shall be a *nonarterial* highway. These highways typically provide both land access and traffic circulation within residential neighborhoods, commercial and industrial areas and differ from the arterial system.
   - The proposed speed zone is within incorporated city/town limits and is supported by the city/town. An ordinance is required for all non-limited access highways.
   - The existing posted speed limit is 25 MPH.
   - The roadway should have common characteristics to effectively constrain speed.
   - The Washington State Patrol and local agency law enforcement are in support of the reduction.
   - Reference the *Guidance for Setting Speed Limit 20 MPHs* (2019), outside of school zones.

   Once a determination has been made, submit your Calendar Agenda Action item to the State Traffic Engineer for approval. In your cover memorandum, include information regarding the above criteria used in your determination.

   In addition to towns and cities, a lower speed limit may be considered in unique situations such as weigh stations, ferry terminals or rest areas.

8. **Vehicle Specific Speed Limits, Trucks –** The maximum speed limit for trucks is 60 mph (RCW 46.61.410). The department may set lower maximum limits by vehicle class if determined necessary for safety reasons (RCW 46.61.405(2)).

   Trucks are defined as vehicles over 10,000 pounds gross weight and all vehicles in combination (except auto stages). RCW 46.04.130 defines a combination of vehicles as every combination of motor vehicle and motor vehicle, motor vehicle and trailer, or motor vehicle and semi-trailer.

9. **Environmental Review Process –** SEPA requires an environmental review of any proposal to raise the speed limit on a highway to above 55 mph. Contact the Regional Environmental Manager's Office for information on the environmental review process and to determine if the proposed speed limit change area falls within an air quality maintenance area (non-attainment area) for carbon monoxide or ozone. A completed review must accompany the traffic regulation request package. For further information, consult the *Environmental Manual* M 31-11.

   Either of two review procedures will be required:

   a) If none of the proposed change area is located within an air quality maintenance area, the reviewer completes the Non- project Environmental Checklist and the *Determination of Non-Significance*. Include a copy in the traffic regulation package and provide copies to the Headquarters Environmental Services Office. It is not necessary to provide a copy to any other jurisdiction, nor does SEPA require a comment period.

   b) If any part of the proposed change area is located within an air quality maintenance area, the local Metropolitan Planning Organization (MPO) must model impacts from the proposed speed limit increase. If the modeling shows that the carbon monoxide and ozone allowances are not exceeded, follow the same procedures outlined for areas outside air quality maintenance areas. If the modeling shows that the carbon monoxide and ozone allowances will be exceeded, the impacts must be mitigated before the speed limit may be increased.

Washington State Laws in Setting Speed Limits:

Maximum speed limits for state highways, county roads, and city streets are mandated in the Rules of the Road (RCW 46.61.400). Statutory speed limits are:

a) Twenty-five miles per hour on city and town streets;

b) Fifty miles per hour on county roads;

c) Sixty miles per hour on state highways

The department may raise or lower state highway speed limits based on an engineering and traffic investigation (RCW 46.61.405 and 46.61.410).

WAC 468-95-045 modifies the MUTCD section 2B.13 to give guidance that the 85th percentile speed is a consideration along with other factors in setting speed limits. These factors include:

- Road characteristics, shoulder condition, grade, alignment, and sight distance.
- The pace speeds.
- Roadside development and environment.
- Parking practices and pedestrian activity.
- Reported crash experience for at least a 12-month period (WSDOT looks at three years); and
- Other factors, such as route development or comprehensive plans

RCW 47.24.020 establishes jurisdictional control with respect to state highways that are also considered city streets. Cities have the authority to regulate speed limits, however, speed limits not identical to state law must be approved the Secretary of Transportation.

RCW 46.61.415 Local authorities may establish or alter speed limits in their respective jurisdictions based on an engineering and traffic investigation. Speed limit increases are limited to sixty miles per hour and decreases are limited to twenty miles per hour.

Cities and towns within their jurisdiction may establish a maximum speed limit of twenty miles per hour on a nonarterial highway, or part of a nonarterial highway, that is within a residence district or business district.

A city or town may establish a twenty mile per hour speed limit without an engineering and traffic investigation if the city or town has developed procedures regarding establishing a maximum speed limit under RCW 46.61.415(3). Any speed limit established under this subsection may be canceled within one year of its establishment, and the previous speed limit reestablished, and may be done without an engineering and traffic investigation. Twenty mile per hour posted speed limits on state highways will likely be posted on collector routes in small rural towns.

Changes to the speed limit on state highways within an incorporated city or town must be approved the Washington State Department of Transportation.

B. Other Regulations

1. **Bicycle Restrictions –** Bicycle restrictions may be implemented at specific locations due to speed differentials between bicyclists and other traffic, extremely high traffic volumes, roadway geometrics, or other safety considerations. Where bicycle restrictions are necessary, alternate routing suitable for bicycles must be available.

2. **Restrictions on Limited Access Highways to Bicycles, RCW 46.61.160 –** The department of transportation may by order, and local authorities may by ordinance or resolution, with respect to any limited access highway under their respective jurisdictions prohibit the use of bicycles.

   When considering an area for bicycle restriction or prohibition, conduct an engineering and traffic investigation and involve the regional active transportation bicycle coordinator, the bicycling community, and local agencies. Their input assures that bicycling interests are considered and that bicycle commute corridors remain intact.

   Prior to submitting your calendar action, conduct a preliminary review of your submittal with the Active Transportation Divisions State Bicycle and Pedestrian Coordinator. Document the investigation and submit the proposed regulation to the State Traffic Engineer as a calendar agenda item. Include:

   - A vicinity map and strip map showing SR/MP of the area.
   - Location and descriptions of available alternate routes.
   - Copies of documents, correspondence, citizen requests, and Active Transportation Division review comments.

- Narrative on how bicycle interests are addressed.
- Crash data involving bicycles.
- Copies of WSP and/or local police agency concurrences.
- Description of operational complexities (e.g., restricted shoulder width, interchange configurations) which identify the need for the regulation, as they relate to the following guidelines:

  1. Routes over 100,000 motor vehicles per day (ADT), or
  2. One or more of these criteria:

20,000 to 100,000 ADT	
Criteria	**Condition and/or Consideration**
Shoulder Width	Less than 4 feet when ADT between 20,000 and 60,000 or 8 feet when ADT exceeds 60,000 ADT.
Double On/Off Ramps	Consider forced exit and return.
Interchange Spacing	Less than 2 miles with ramp volume greater than 10,000 ADT, use forced exit and return.
Tunnels/Bridges	Consider restriction when alternate routes are available.

The State Traffic Engineer will coordinate with the department's State Bicycle and Pedestrian Coordinator to arrange for a review of the proposed restriction. Once approved, Headquarters Traffic will notify the Active Transportation Division and they will update the statewide map on highways closed to bicycles (State Highways Closed to Bicycles).

3. **Truck Restrictions –** Truck restrictions may be imposed by statutory mandate (RCW or WAC), or by approval by the State Traffic Engineer through a Calendar Agenda item. Truck restrictions are either as lane restrictions or route restrictions and designations.

   Left-Lane Restrictions – As mandated by RCW 46.61.100(3) and WAC 468-510-020, no vehicle towing a trailer or no vehicle or vehicle combination over 10,000 lbs. may use the left lane of limited access highways having three or more general purpose lanes in one direction.

   Lane restrictions for trucks may also be imposed on other highway sections through a State Traffic Engineer Calendar Action. Although rare, these restrictions may be necessary to improve traffic flow on facilities having two general purpose lanes in one direction.

   Truck route restrictions and designations – These restrictions are normally implemented together to establish a preferred truck route through a corridor. Route restrictions and designations may be initiated by a local agency for city streets that are also state highways.

An engineering and traffic investigation is conducted to determine the need for the restriction and route designation.

Document the investigation and submit the proposed regulation to the State Traffic Engineer as a calendar agenda item. Include:

- A vicinity map and strip map showing SR/MP of the area defining restricted route and truck route.
- Description of operational characteristics which identify the need for the restriction.
- Copies of speed studies, volume studies including vehicle classification, and a three-year crash history.
- Copies of documents or correspondence from citizen groups.
- A copy of the local agency ordinance if the restriction is for a city street that is also a state highway.
- Copies of WSP and/or Washington Trucking Association concurrences.

Refer questions concerning WAC 468-510-020 to the State Traffic Regulations Specialist.

4. **Hazardous Material Route Restriction –** Some highways, due to operational characteristics, may be restricted for certain classes of vehicles, such as those carrying hazardous materials.

   Conduct an engineering and traffic investigation and document the condition warranting a restriction. Submit as a calendar agenda item to the State Traffic Engineer with the following supporting information:

   - A vicinity map showing the SR/MP of the restriction.
   - Summary document detailing operational characteristics (tunnels, high traffic volumes) of the highway warranting the restriction.
   - Copies of WSP and/or local agency concurrences.

5. **HOV Lane Designation –** High Occupancy Vehicle (HOV) RCW 46.61.165 lanes are exclusive traffic lanes limited to carrying public transportation vehicles, private motor vehicles with the number of occupants specified on posted signs, motorcycles, and emergency vehicles RCW 47.52.025 (WAC 468-510-010). The Revised Codes of Washington give WSDOT the right to designate any lane or ramp for HOV if it will increase the efficient utilization of the highway or will aid in the conservation of energy resources. The goal of the system is to maximize the people-carrying capacity of the freeway system, by providing incentives to use buses, vanpools, and carpools. In addition to provide capacity for future travel growth and reduce transportation-related pollution and dependency on fossil fuels.

Designated HOV lanes are established through a regulation approved by the State Traffic Engineer. Conduct an engineering and traffic investigation, document the condition, and submit the following information as a Calendar Agenda item:

- A vicinity map and strip identifying the SR and milepost limits and showing the locations of ramps within the proposed section.
- The proposed minimum number of occupants per vehicle, and engineering documentation to support that minimum.
- Projected lane occupancy rates for both the HOV lane and the adjacent general-purpose lanes.
- Proposed hours of HOV operation.
- Copies of design data.
- For proposed shoulder HOV lanes, include the pavement depth information that the shoulder has adequate structural strength to support the HOV lane traffic.
- On highways where bicycles are allowed on the shoulder, a narrative on how bicycle traffic will be accommodated if the shoulder HOV lane is approved.

6. **Angle Parking on State Highways**

Statutory Requirements – Angle parking may be requested by a city or a town, for a city street that is also a state highway (RCW 46.61.575(3)). Local authorities, by ordinance or resolution, may permit angle parking on such a street, if the department has determined that the roadway is of sufficient width to permit angle parking without interfering with the free movement of traffic.

Conduct an engineering and traffic investigation of the location. If angle parking is determined appropriate, submit a Calendar Agenda item to the State Traffic Engineer with the following supporting documentation:

- Vicinity and strip map showing the SR/MP of the proposed parking regulation.
- Narrative describing the need for angle parking, including speed limit and traffic volumes.
- Crash data for the past three years.
- Copy of the city or town ordinance establishing angle parking.
- Parking plan layouts.
- A demonstration (using a passenger vehicle for design purposes) that the parking maneuver can be accomplished without interfering with the free movement of traffic. Use turning movements to demonstrate ability.
- Review and document bicycle lanes in the vicinity.

Where it is necessary to initiate removing angle parking, it is important to partner with local agencies (for city streets that are also state highways) and/or the business community to establish a mutually acceptable time frame. In many locations, angle parking may be the only parking available to business patrons. In these cases, a comprehensive approach to providing other parking must be part of any effort to remove angle parking. Refer to the procedures for Rescinding Traffic Regulations below.

7. **Park and Ride Lots and Rest Area Parking Restrictions**

   Park and Ride Lots: Within the department's park and ride facilities, parking is limited to a maximum of 48 hours, when posted with signs (R8-1201). The State Traffic Engineer established this restriction through an official Calendar Agenda action on January 8, 1982. (RCW 46.61.577) Local agency police can enforce parking regulations in WSDOT Park and Ride lots if the city or town has adopted an ordinance similar to the department's 48 hour parking maximum.

   Work closely with regional transit agencies, Public Transportation and Regional Planning offices when considering changes to Park and Ride facilities. Included is a link to WSDOT's Park and Ride locations statewide; Park and Ride.

   If modifications are necessary to the 48-hour ruling, submit a Calendar Agenda item to the State Traffic Engineer with the following supporting documentation:

   - Vicinity map showing SR/MP of Park and Ride Location.
   - Narrative describing the need for the parking restriction.
   - Local Agency ordinance if located outside the boundary of a limited access highway.
   - Documentation related to communication with Regional Planning Division, Public Transportation, local transit agency, law enforcement, regional maintenance, and local agency.

8. **Rest Area Parking:** Rest Area parking is permitted by law RCW 47.38.020. Rest Area parking is limited to eight hours within a twenty-four-hour period. No person shall camp maintain a camp, tent, or other sleeping accommodation in a Rest Area within the limits of the right-of-way of interstate highways or other state highways or in other areas of state or interstate highways as designated in RCW 47.12.250.

   The department may designate zones within a Rest Area with shorter parking time limits for the purposes of maximum efficiency and safety.

   Commercial Vehicles can park up to an hour beyond the federally mandated rest period. In most cases this is eleven hours.

   The department shall post the appropriate signage consistent with RCW 46.55.070(1) at all Rest Areas regarding the parking time limits in this section.

   If modifications are necessary outside of what is authorized, submit as a Calendar Agenda item to the State Traffic Engineer with the following supporting information:

   - Vicinity and strip map showing the SR/MP of the proposed parking regulation.
   - Narrative describing the need for parking restriction.
   - WSP concurrence.
   - Parking plan layouts.

9. **Other Parking restrictions; Ferry Terminals, and Chain-Up Areas**, conduct an engineering and traffic investigation of the location and document the condition. Submit the proposed restriction as a Calendar Agenda item to the Regional Administrator together with copies of all correspondence associated with the request.

10. **Regulation of Sales within State Parking Facilities –** The use of state parking facilities for sales of vehicles or other merchandise is not allowed and the supporting enforcement statutes are as follows:
    - RCW 46.55.070 specifies the posting requirements for public parking facilities.
    - RCW 46.55.010(14) defines an unauthorized vehicle and the required period of time prior to impoundment for posted public parking facilities.
    - RCW 46.55.080 authorizes that police officers may direct the impoundment of unauthorized vehicles.
    - RCW 47.32.120 makes it unlawful to "merchandise" in a manner that requires the use of any portion of state highway right of way.
    - RCW 46.55.240(1)(a) provides a city, town, or county the authority to adopt the provisions of RCW 46.55 by ordinance or resolution.
    - WAC 308-330-436 of the Model Traffic Ordinance (MTO) may be used by local agencies who have adopted the MTO, for park and ride lots located within their jurisdiction.

11. **Permanent Weight Restrictions –** Permanent weight restrictions may be imposed if the structure is deemed insufficient to support the maximum legal load. An example, a bridge restriction could be due to the deterioration of the structure over time or they were built to an old standard or code. Bridge and Structures division will normally initiate bridge weight restrictions.

    Investigate and document the need for the restriction and submit a Calendar Agenda Action request to the State Traffic Engineer. Include:
    - A strip map to include SR and MP.
    - A narrative describing the road or bridge condition leading to the restriction.
    - The appropriate maximum weight limit for a restricted section of roadway, as determined by the department's Materials Laboratory.
    - A determination of the appropriate bridge weight limit as set by the Bridge and Structures office.
    - Citizen or local agency correspondence.
    - Alternate routing, if available.
    - Detour plan, if necessary.
    - A copy of WSP concurrence.

    Weight restrictions are signed with the appropriate R12 series signs illustrated in the *Sign Fabrication Manual* M 55-05.

6-5 Other Traffic Restrictions

Compression Brake Prohibition – The department does not regulate compression brake use; compression brake regulations are enacted by local agencies and may be signed on state highways as described in the Chapter 2.

6-6 Rescinding Existing Traffic Regulations

Occasionally changes to the highway or roadside environment create the need to rescind a traffic regulation. The Regional Administrator or State Traffic Engineer accomplishes this through a Calendar Action Agenda item. **Removing the signs or posted notices of the regulation does not rescind the regulation.**

A. Regional Traffic Regulations – Use the following guidance when rescinding regional traffic regulations:

1. When **removing a traffic signal,** complete Section E, Report of Change, on the regional copy of the Traffic Signal Permit. Part of Section E provides documentation for the date of removal, together with the engineer's name, title, and reporting date. A copy of that permit is then sent to the Headquarters Traffic Regulations Specialist for retention in the signal permit file.

2. Reduced regulatory speeds in construction or maintenance areas may be implemented under certain conditions specified within Secretary's Executive Order E 1060 and *Traffic Manual* Appendix 5.B. The guidance states that when the warranting conditions no longer exist, the reduced regulatory speed limit is no longer justified. Generally, this is at the end of the project and is noted in the Work Zone Speed Reduction Request. The permanent speed limit signs are then reinstalled, uncovered, or turned toward traffic.

   The Regional Administrator, using the regional Calendar Agenda process, has the authority to rescind the following regulations if they are no longer necessary:

   - Stop Control on state highways.
   - Turn prohibitions.
   - Pedestrian prohibitions on partial or modified access controlled highways.
   - Roadside parking restrictions (except for angle parking, and restrictions for park and ride lots and other parking facilities).
   - Tow-away zones.
   - Prohibitions of fishing or jumping from bridges.
   - Weight or closure restrictions.

   Conduct an engineering and traffic investigation and document the condition requiring the rescinding of the regulation. Removing the regulatory signs does not rescind the traffic regulation, but renders it unenforceable under RCW 46.61.050(2).

B. Headquarters Traffic Regulations – The State Traffic Engineer, using the Calendar Agenda Action process, rescinds the following regulations if they are no longer needed:

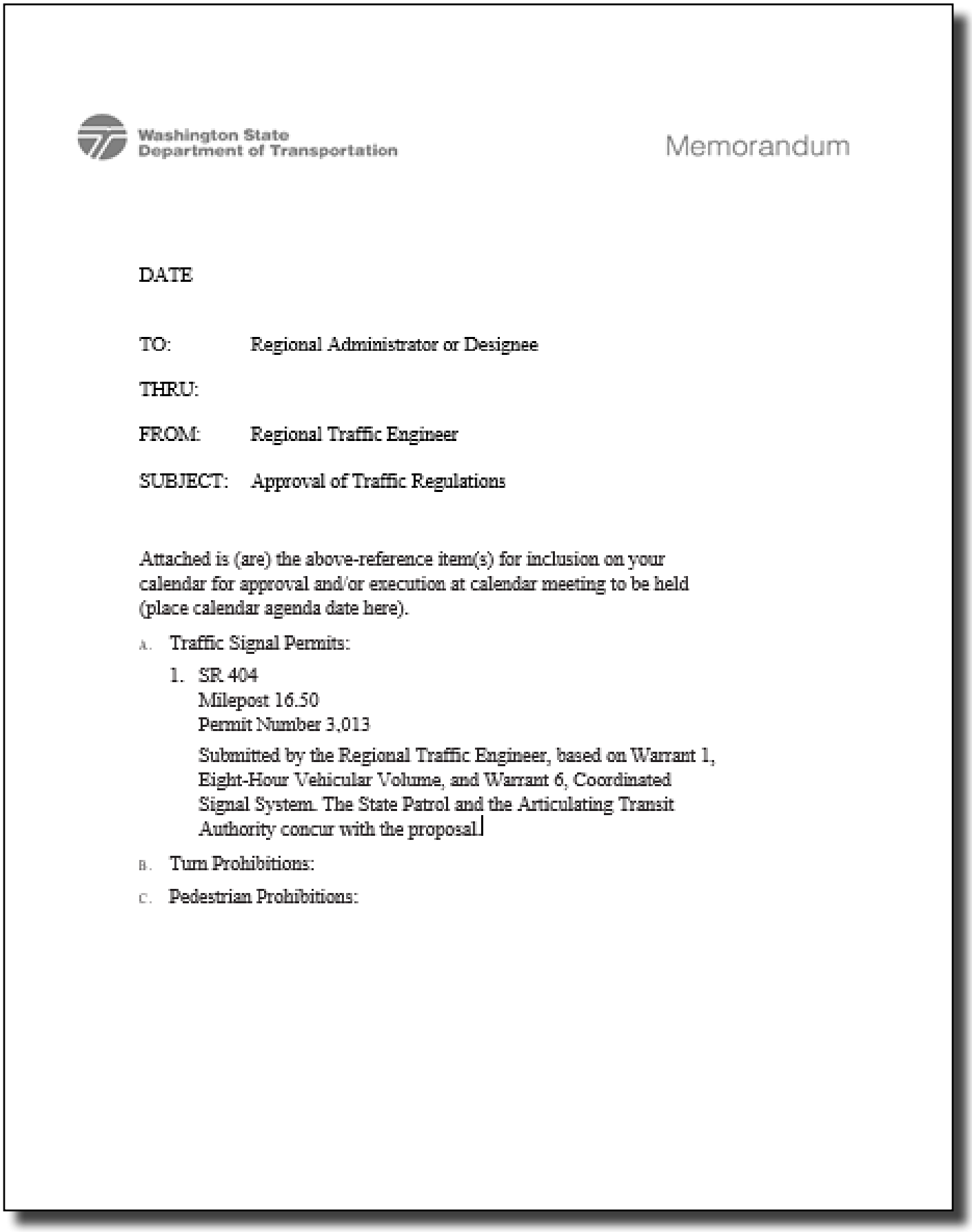
- Bicycle prohibitions.
- Truck restrictions.
- HOV lane designations.
- Angle parking on state highways.
- Parking or sales restrictions for park and ride lots and other parking facilities.

Permanent regulatory speed limits may only be amended with a proposed speed zone revision submitted through a Calendar Agenda Action item.

Provide documentation to support rescinding the traffic regulation to the State Traffic Engineer's office. As with the regional traffic regulations noted above, removing signs does not rescind the traffic regulation, but renders it unenforceable under RCW 46.61.050(2).

6-7 Figures

Figure 6-1 Regional Agenda Calendar Action



Washington State Department of Transportation

Memorandum

DATE

TO: Regional Administrator or Designee

THRU:

FROM: Regional Traffic Engineer

SUBJECT: Approval of Traffic Regulations

Attached is (are) the above-reference item(s) for inclusion on your calendar for approval and/or execution at calendar meeting to be held (place calendar agenda date here).

A. Traffic Signal Permits:

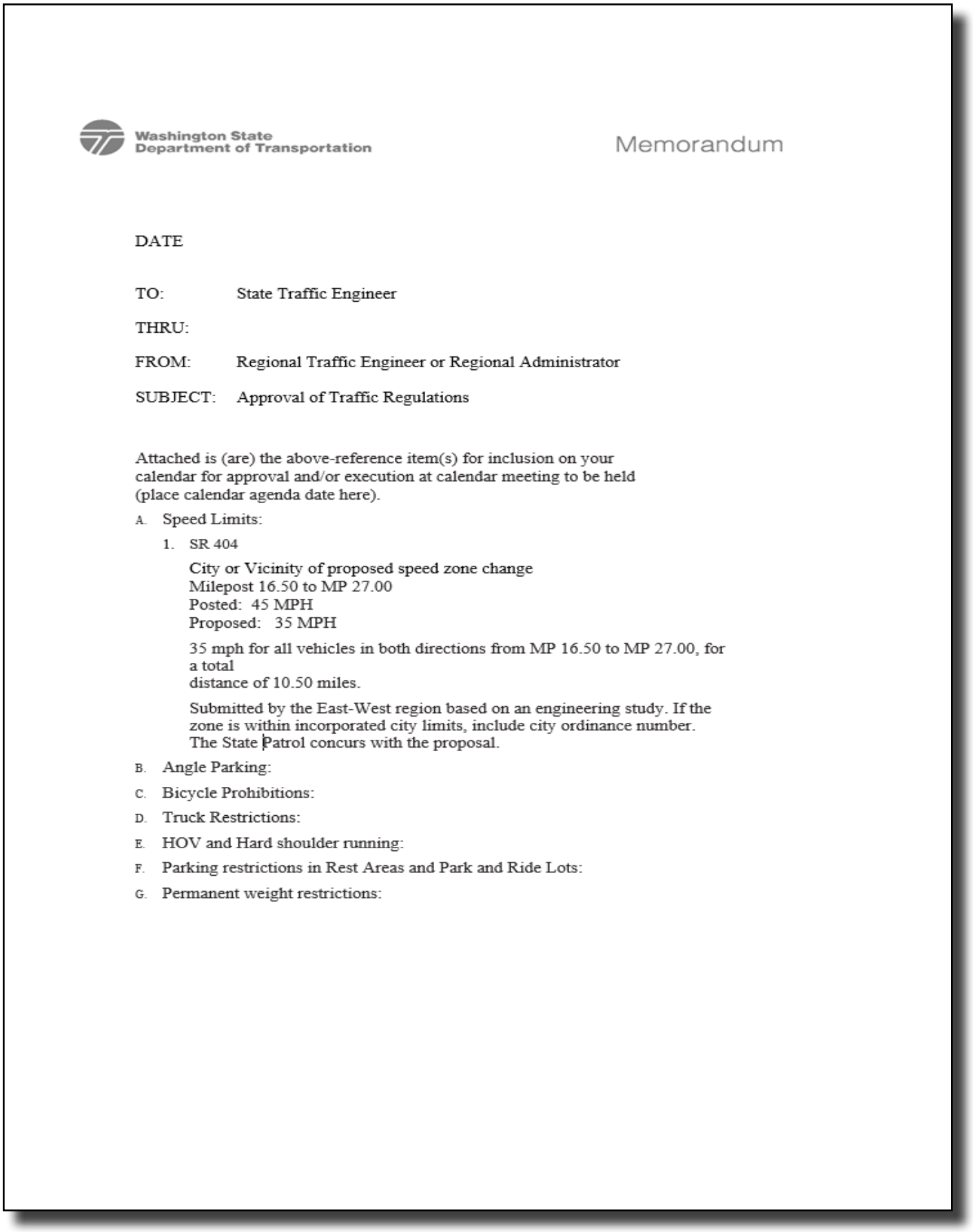
1. SR 404
   Milepost 16.50
   Permit Number 3,013

   Submitted by the Regional Traffic Engineer, based on Warrant 1, Eight-Hour Vehicular Volume, and Warrant 6, Coordinated Signal System. The State Patrol and the Articulating Transit Authority concur with the proposal.

B. Turn Prohibitions:

C. Pedestrian Prohibitions:

Figure 6-2 State Traffic Engineer Calendar Agenda



Washington State Department of Transportation

Memorandum

DATE

TO: State Traffic Engineer

THRU:

FROM: Regional Traffic Engineer or Regional Administrator

SUBJECT: Approval of Traffic Regulations

Attached is (are) the above-reference item(s) for inclusion on your calendar for approval and/or execution at calendar meeting to be held (place calendar agenda date here).

A. Speed Limits:

1. SR 404

City or Vicinity of proposed speed zone change
Milepost 16.50 to MP 27.00
Posted: 45 MPH
Proposed: 35 MPH

35 mph for all vehicles in both directions from MP 16.50 to MP 27.00, for a total
distance of 10.50 miles.

Submitted by the East-West region based on an engineering study. If the zone is within incorporated city limits, include city ordinance number. The State Patrol concurs with the proposal.

B. Angle Parking:

C. Bicycle Prohibitions:

D. Truck Restrictions:

E. HOV and Hard shoulder running:

F. Parking restrictions in Rest Areas and Park and Ride Lots:

G. Permanent weight restrictions:

Figure 6-3 Signal Application Checklist (page 1 or 2)

Date: _____

Submitted By: _____

Pennit No.: _____

Location: SR No. _____ MP _____ Minor Rd. _____

Vicinity Map: lndude a general vicinity map of area showing intersecting roads, and any other features such as nearby signals and interconnected systems that may be of importance for analysis of application.

ADTS: Include an AOTS for all approaches entering the intersection.

ADT: Mainline _____ N ___ S ___ E ___ W ___ Mainline _____ N ___ S ___ E ___ W ___

ADT: Minor St. _____ N ___ S ___ E ___ W ___ Minor St. _____ N ___ S ___ E ___ W ___

No. of lanes: Mainline Thru _____ Minor St. Thru _____

Number of Tum lanes: Mainline _____ Priority Array _____

Signed Speed limits: SSL on Mainline _____ 85th % _____

SSL on Side Street _____ Priority Array _____

Estimated Start Date: _____ Estimated Cost: _____

Estimated Completion Date: _____

Figure 6-3 Signal Application Checklist (page 2 or 2)

Maintenance Responsibility: Co. _____ City _____ State _____

Funding Responsibility: Co. _____ City _____ State _____

Volume Counts: Be sure to remove all free right turn movements in your volume counts to ensure that an accurate analysis of the intersection can be done.

Warrants Met: Warrant No. 1 _____ Hrs. Warrant No. 2 _____ Hrs.

Warrant No. 7 _____ Crash Exper. Other _____

Brief Summary: Include previously tried corrective measures, proximity to schools, shopping centers, etc. Also include citizen input and whether or not this is part of a program project.

Figure 6-4 Speed Limit Check List

Location: SR: _____ BEGIN MP: _____ END MP: _____

Vicinity Map: Include a general vicinity map of area showing city limit boundaries and adjacent speed zones, and any other features of importance for analysis of the speed zone request.

Strip Map: Include a strip map showing 10 MPH Pace and 85th percentile speeds within the proposed area to be considered, noting the appropriate mileposts. If there are other contributing factors, such as, curve warning signs with advisory speeds, and pedestrian crossings, include them.

Speed Limits (Include a current copy of the Speed Zone inventory.):

Existing	Proposed
_____ MPH, MP _____ to MP _____	_____ MPH, MP _____ to MP _____
_____ MPH, MP _____ to MP _____	_____ MPH, MP _____ to MP _____
_____ MPH, MP _____ to MP _____	_____ MPH, MP _____ to MP _____

Lane Width: _____ Shoulder Width: _____

Collision Data: Include the latest three (3) years collision data together with yearly collision rate, yearly critical rate, and yearly statewide average for the area to be considered.

Correspondence: Include all appropriate correspondence, including citizen petitions and local ordinance.

Concurrences:

Washington State Patrol: _____ City: _____ County: _____

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Chapter 7 Specialized Highway Uses

7-1 Introduction

State highways function as multi-modal travel routes for multiple transportation purposes and serve commuters, commercial vehicles, bicyclists, pedestrians, transit, recreational and other traffic. In addition, there may be both short-term and long-term specialized uses of the roadways. Short-term special uses of the highways include parades, running or bicycle events, filming, and festivals. Long-term special uses such as designated shoulder- driving segments for slower vehicles, or school bus stops or pedestrian crossings on limited access highways, can also be authorized on specific roadway sections. Requests are also received for permanent specialized highway uses such as transit vehicle stops and placement of interpretive signing. This chapter provides guidelines to assist in responding to special highway use requests.

A Memorandum of Understanding (MOU #C010355GSC) between the Washington State Department of Transportation (WSDOT) and Washington State Patrol (WSP) governs the operation of special events (parades, running or bicycle events, filming, and festivals) on state highways. The MOU establishes guidelines and defines responsibilities for event operations. It also includes examples of event administration documents (Figure 7-4).

Special events on the state highway system are administered through the regional Traffic Office for events taking place in a single region, or through the State Traffic Engineer's office for multi-region events. A Letter of Agreement or a Letter of Acknowledgement between WSDOT and the special event permittee defines the operation. There is no fee to event permittees for special event administration and coordination.

Continuing or long-term specialized uses are also addressed in the Traffic office, and may include coordination with other WSDOT offices or agencies. The State Traffic Engineer's office is available as a resource for questions about events or other specialized highway uses not specifically addressed in this chapter.

7-2 Bicycling, Running, Walking, Parade, Festival, and Bicycle Racing Special Events

WSDOT receives numerous requests for short-term use of state highways or right of way for recreational or other public events. The Regional or State Traffic Engineer's office will respond to event permittees within ten working days of receiving a request to begin the review and coordination process. Special events are generally not held on fully controlled limited access highways. Occasional exceptions may be considered where no alternate route is available and roadway conditions allow for participant and other roadway users' safety.

In reviewing an event request, WSDOT will:

- Establish on-going communication with event permittees to address route determination, traffic control, logistical issues, and other concerns.
- Conduct a traffic engineering analysis to determine the impact of the proposed event, as needed.

- Consult with regional Construction and Maintenance offices to identify any operational conflicts along the proposed route.
- Contact WSP to coordinate the event per the WSDOT/WSP Memorandum of Understanding, "Special Events on State Highways".
- Review special event traffic control plans.
- Discuss alternative routes, if needed.
- Submit separate billings to Event Permittee for services related but not limited to labor costs, equipment related costs, and indirect costs for services such as; traffic control, maintenance operations, work zone safety or other highway operations activities.

Additionally, WSDOT may:

- Provide use of Changeable Message Signing and Highway Advisory Radio (HAR) systems where available and appropriate.
- Suggest event specific signing to provide information for all highway users.

A. **Administration Guidelines –** Use of state highways or highway right of way for bicycle, running, walking, parades, festivals, or other special events is administered through either a Letter of Agreement or Letter of Acknowledgement between WSDOT and the event permittee. Events that will not impact highway operations, where all participants will follow all Rules of the Road (Chapter 46.61 RCW) at all times, and where no traffic control is needed are not required to contact WSDOT. However, because those events may also benefit from WSDOT services, contact with the event permittee is encouraged to ensure coordination with WSDOT projects, WSP, and other special events occurring in the immediate vicinity.

   Planning a Special Event on state highways, event permittee may use WSDOT website for an online or pdf application. Our application process is located online at www.wsdot.wa.gov/contact/events/special-events. Based on the specific event situation as described below; issue a Letter of Agreement or a Letter of Acknowledgement, or if circumstances warrant, a Letter of Denial. These documents are signed by the regional or headquarters signing authority. The Letter of Agreement is signed by the event permittee and regional or headquarters signing authority. If an event is denied, WSDOT will work with the event permittee to seek solutions to the issues causing the denial. Event permittee may appeal a denial through the process outline in this chapter.

   1. **Letter of Acknowledgement –** A letter of Acknowledgement is issued when event participants will follow the Rules of the Road at all times and when no specific traffic control is needed and the event will not negatively impact traffic. The Letter of Acknowledgement may (Figure 7-5) address specific event conditions such as:
      - Operational restrictions on specific highway sections due to conflicts with construction or maintenance operations.
      - The use of small crashworthy signs for guiding event participants.
      - Other highway conditions or restrictions.

Examples of when a Letter of Acknowledgement is appropriate:

a. A group of 100 people will participate in a running event using portions of a state highway. The runners will conform to the Rules of the Road at all times. No impacts to traffic.

b. A bicycle ride of 500 people uses a filtered start over several hours so bicycle riders are spread out along the roadways. Riders will cross the highway intersections in a legal manner and follow all other Rules of the Road.

c. A vehicle convoy of 10 to 15 vehicles accompanying "Santa Claus" to a local charity event uses portions of the state highway, following the Rules of the Road at all times.

2. **Letter of Agreement –** A Letter of Agreement (Figure 7-6) is issued when WSDOT's review and analysis determines that the event participants are not able to follow the Rules of the Road, that there will be an impact on traffic operations, or that special traffic control is required. Additional information and terms may be attached as Exhibits to the Agreement.

   A Letter of Agreement is developed when the event will:

   - Require special traffic control (flaggers, escort vehicles, and/or law enforcement) to support the safe passage of event participants and the traveling public.
   - Occur outside the roadway but within the right of way, and involve the use of highway facilities for non-transportation purpose.
   - Close a portion of the highway to the public.
   - Use services or personnel provided by WSDOT, WSP, or other law enforcement.
   - Placement directional signing for the traveling public on WSDOT right of way.

   Examples of when a Letter of Agreement is appropriate:

   a. A running or bicycle event uses local police control at a state highway intersection to allow participants to cross the highway while on-coming traffic stops.

   b. A large running event requests the use of portions of an approved limited access highway.

   c. A parade closes the highway to traffic and a detour is required.

   d. Temporary directional signs to a community festival are placed on the state highway right of way.

The following guidelines are considered and addressed when developing a Letter of Agreement:

a. Event permittees should be encouraged to use county roads or city streets where possible.

b. Where a state highway will be closed for an event, a suitable detour route must be available and the Region Traffic Engineer or their designee must review a detour traffic control plan. Road closures require a minimum three-day advance notice to the public (RCW 47.48.020). Longer notice is desirable for large impact events.

c. Events requiring a Letter of Agreement must have a commercial general liability insurance policy that names WSDOT as an "additional insured".

   Referenced in Exhibit A – Figure 7-7. Minimum policy requirements for an event are for $1 million per occurrence and with a $2 million in the aggregate. If vehicles are used as part of the event operation, a minimum $1 million per occurrence commercial automobile liability insurance coverage must be added to the policy. Proof of insurance and indemnification of WSDOT is required prior to issuing the Letter of Agreement.

d. The event permittee or sponsors will pay for all extraordinary costs for labor and materials provided by WSDOT, WSP, or local agency law enforcement.

e. WSDOT may determine that pre-event notices of the event are needed in specific locations or situations. This is a courtesy to local communities and can reduce traffic congestion on event day. If used, the event permittee will post the notices seven to ten days before the event.

f. Requests for state highway use within an incorporated city or town should have the city or town's concurrence.

g. At least 72 hours (preferably seven days) in advance of the event, the event permittee shall notify all local fire, ambulance, transit, law enforcement departments, and other service-oriented activities that may be impacted by the event.

   - There may be occasions when a pre-event meeting with all of the above is necessary. This will ensure open communication is available and the event organizer is in direct communication with law enforcement and emergency personnel.

h. Department regulations and state law limit bicycling events and prohibit running or walking events on fully controlled limited access highways.

3. **Post Event Review –** WSDOT staff may conduct a follow-up evaluation to assess event operation. Discussion with the event permittee, law enforcement, WSDOT Area Maintenance and other affected groups can help identify any operational or public safety concerns and identify needed improvements. Document these issues so they can be addressed the next time the event occurs.

B. **Appeal Process –** WSDOT has an appeal process for cases when a request for a special event on a state highway is denied. The letter of appeal should be submitted to the State Traffic Engineer within 30 days of the event denial, and a minimum of 14 days before the scheduled event.

WSDOT and Event Permittee Coordination – When WSDOT receives a request from an event organizer for an event taking place in a single region, either from the online application or an email with an attached pdf, the regional Traffic office administers the special event. The State Traffic Engineer's office will administer special events taking place across multiple regions.

WSDOT's review identifies the proposed event's impact on traffic operations and focuses on traffic control or operational solutions to mitigate those impacts.

Communication between WSDOT, event permittee, and WSP is essential to develop effective event operations and to schedule agreed upon services.

WSDOT staff determines if construction, maintenance or other operations will conflict with the event; or if there are atypical roadway conditions such as a construction detour or another scheduled special event. Conflicts can often be avoided through schedule or route adjustments. Include information about significant activities and conditions that may affect the event in the Letter of Acknowledgement or Letter of Agreement. Contact the ferry system when an event includes use of state ferries.

WSDOT may provide advance public notice about events that may impact traffic operations as a courtesy to the affected communities. Advance notice can influence regular highway users to choose other routes on event day, thus reducing event impacts. Including any requirements for giving such notice in the Letter of Agreement. Notice can include:

- Placement of pre-event signs along the affected route.
- Press release by the organizer and WSDOT.
- Other public information efforts commensurate with the event scale.

Work with the region or headquarters public information office (PIO) to publicize large events and their associated congestion or delays.

Copies of completed Acknowledgement and Agreement letters are shared with the following:

- Regions and state Traffic Engineer's offices
- WSP
- Affected construction or maintenance offices are also notified.

Sharing this information helps assure statewide uniformity in WSDOT special event administration.

C. **Bicycle Racing –** Timed event bicycle races are sometimes held on state highways under purview of WAC 468-400 (Bicycle Racing) and Washington Bicycle Racing Guidelines (www.wsdot.wa.gov/publications/manuals/fulltext/M3050/BRG.pdf).

Refer to these guidelines for Bicycle Race event operation and administration. The WAC and racing guidelines were developed through a cooperative effort between WSDOT, the bicycle racing community, WSP, and the Washington Traffic Safety Commission. A letter of Agreement is developed between WSDOT and the event permittee and liability insurance indemnifying the department is required.

There are several common types of bicycle races: Time Trial, Criterium, Road Race, Stage Races, Cyclocross, Mountain Bike (MTB), Duathlon, Triathlon, or Multi-sport Event, and Relay/Cross Country. Each type of bicycle race has the potential to utilize a state highway, and each type has specific traffic control needs. Details are covered in the Bicycle Racing Guidelines.

7-3 Filming on State Highways

Filming of commercials or movies on state highways is administered using the Letter of Agreement in conjunction with Exhibit A for Insurance, Figure 7-7 and Exhibit C for Filming Event Agreement, Figure 7-9. The Letter of Agreement authorizes the filming and defines the terms and conditions applicable to the particular operation. It should be completed ten days prior to filming, if possible.

When WSDOT receives a request for filming, conduct a traffic engineering investigation that considers traffic impacts and safety. The regional Traffic office administers filming events taking place in a single region or through the State Traffic Engineer's office for multi-region filming events.

Filming may not be scheduled on highways with high traffic volumes or during peak traffic flow periods. Generally, Interstate and other freeway mainline closures are not permitted. Road or lane closures on other state highways may be considered.

Traffic control and enforcement shall be provided by the WSP in cooperation with local police agencies where appropriate. The filming company must pay all costs for labor, equipment, and supplies incurred by the department and the WSP within 30 days from event permittee's receipt of billing.

The filming company must obtain a commercial general liability insurance policy that names WSDOT as an 'additional insured'. Minimum policy requirements are $1 million per occurrence with $2 million in the aggregate coverage per filming event. Commercial automobile insurance coverage must be $1 million per occurrence if vehicles are supporting and/or to be used in the filming event. Proof of insurance and indemnification of WSDOT must be provided prior to the filming event.

WSDOT and the WSP may develop additional guidelines and operational procedures for individual filming operations on state highways. These are included in the Letter of Agreement and Exhibit C – Filming Event Agreement.

7-4 Other Special Events

WSDOT receives requests for many types of special events on state highways or right of way. Car or tractor caravans, wagon trains, transcontinental running events, and stagecoach tours have all been conducted on state highways. Each of these is administered through a Letter of Agreement or Letter of Acknowledgement, as determined by a traffic engineering analysis and depending on the specific event conditions. Contact the State Traffic Engineer's office for discussion of any questions or concerns about special events.

7-5 Traffic Control for Special Events

When a special event includes a highway closure, detour, flagging operation, or other traffic control, a traffic control plan is developed and submitted by the event permittee to WSDOT. Consideration is given to the type of highway, traffic speed, traffic volumes, geometrics at the traffic control site, and duration and type of event operation.

When event permittees need help in plan development, WSDOT may either offer that assistance or advise the organizers of reference materials contained in both the *Manual of Uniform Traffic Control Devices* (MUTCD) and WSDOT's *Work Zone Traffic Control Guideline For Maintenance Operations* M 54-44. WSDOT must review all event traffic control plans.

Consider traffic control or other special operations with these event circumstances or roadway conditions:

- Where events with mass starts begin on state routes, or where, because of course design, large numbers of participants enter the state route together.
- When the number of participants may cause delay of five or more vehicles, impacting traffic operations.
- When narrow shoulders cause vehicles to move into the opposing traffic lane to pass event participants.
- Where there are significant sight distance restrictions such as numerous no passing zones.
- Other safety or operational considerations.

Traffic control must meet MUTCD and WSDOT standards. Traffic control operations shall be conducted by law enforcement officers or certified flaggers. They shall comply with the submitted traffic control plans reviewed by WSDOT. Typical traffic control plans are located in the MUTCD or WSDOT *Work Zone Traffic Control Guidelines for Maintenance Operations* M 54-44. For example, TCP 20 may be used to address the intermittent stopping of highway traffic to allow event participants to safely enter or cross a highway or intersection.

The following guidelines are for developing a traffic control plan for intersection flagging operations:

A. All flagging operations shall be conducted by a uniformed law enforcement officer or a flagger controlling each intersection leg.

B. If flagging at a signalized intersection, the signal shall be shut down or placed in flash mode. Flagger directions at signalized intersections shall not be in conflict with signal displays. During hours of darkness, flagging stations shall be illuminated.

C. For flagging operations on highways with a posted speed of 40 mph or less, three

advance signs on each approach are generally used. The "ROAD WORK AHEAD" sign should be replaced by an event specific message such as "RUNNING EVENT AHEAD", "BIKES ON ROAD", OR "BICYCLE CROSSING". The second and third signs should be "PREPARE TO STOP" and the "FLAGGER" symbol respectively.

D. On high-speed highways, where the posted speed is 45 mph or more, a four sign sequence is generally used. The additional sign may be either a repeated "EVENT AHEAD" or a specific sign noting the traffic condition.

E. Sign spacing shall conform to WSDOT requirements, based on highway type and speeds.

7-6 Special Event Signing Guidelines

Special event related signs may be allowed on the state right of way through the Letter of Agreement or Letter of Acknowledgement. The purpose of special event signs is to help manage event related traffic or to alert roadway users of potential traffic impacts. Sign types include:

- Directional signing to the event.
- Route designation signing for participants.
- Pre-event signing to give advance notice to roadway users.
- Detour signing

Announcement of the event on a banner may be allowed in some circumstances (WAC 468-95-148) (see Section 7-8).

A. **Directional Signing for Large-Scale Events –** Temporary directional signing may be installed for large-scale spectator activities such as county fairs, conventions, and major sporting events that do not qualify as destinations on permanent supplemental guide signs. This requires a written agreement between the WSDOT region and the event sponsor.

The department may design, fabricate, install, maintain, and remove temporary directional guide signs using the following criteria:

1. The region determines that the event will generate sufficient traffic to create operational challenges along a state highway.
2. The sign is requested by the sponsoring agency with enough lead-time for design, fabrication, and installation (a minimum of three months).
3. Signing is from the nearest state highway only.
4. Signs are sized for the specific highway type.
5. Signs shall be white letters on a green background and the design shall provide a clear, simple message.

6. Installation and removal shall be by WSDOT or an approved contractor and meet MUTCD and WSDOT requirements.
7. Any needed follow-through signing on local roadways must be installed prior to sign installation on the state highway.

B. **Day of Event Directional Signs –** Directional signs may be installed on the day(s) of the event to direct traffic from the nearest state highway to the event or event parking. Signing will be located only at points where traffic must turn from the state highway or make another route decision. Follow-through signing on city and county roads must also be installed. No commercial advertising is allowed.

1. Signs are allowed through a Letter of Agreement.
2. Signs must be of lightweight crashworthy materials such as corrugated plastic. Lightweight 'sandwich board' signs no larger than 4-feet by 4-feet may be allowed.
3. Sign type, size, and location will be determined and noted in the Letter of Agreement.
4. Signs may be in place only for the duration of the special event.
5. Signing shall not interfere with or obstruct the view of any traffic control devices or the sight distance to or from an intersection or road access.
6. Portable Changeable Message Sign (PCMS) and other portable signs shall be placed off the shoulder if practicable, or on the far right of the shoulder, to maintain bicycle and pedestrian traffic. Examples of sign messages:
   - Fair Next Two Exits
   - Heavy Traffic Ahead
   - Expect Delays
7. The regions may determine additional guidelines for day of event directional signing to address traffic safety and operational concerns.
8. Signs installed on the right of way, which are not described in the Letter of Agreement, may be immediately removed by WSDOT.

C. **Route Designation Signing for Event Participants –** Small signs may be used to direct event participants along the event route or to event points such as rest or food stops.

1. Signs are allowed through the Letter of Acknowledgement or Agreement, which addresses sign size and type.
2. Signs must be of lightweight crashworthy materials such as corrugated plastic. Lightweight 'sandwich board' signs no larger than 4-feet by 4-feet may be allowed.
3. Signs may be in place only for the duration of the special event.
4. Messages should consist of "Name of Event" or other simple message and a directional arrow. No commercial advertising is allowed. Sign and Pavement Markings example link.

D. **Pre-event Signing –** Advance notice signing is sometimes installed to advise regular highway users of an upcoming event that will affect normal traffic operations. It is a courtesy to any communities or highway users affected by a special event to alert them about potential traffic impacts and delays.

- Pre-event signs, if required, are addressed in the Letter of Agreement.
- Sign size, material, message, and locations are noted in the Letter of Agreement. Sign color shall be black letters on an orange background.
- Sign message is limited to name and date of event and a traffic control message such as "Use Alternate Route" or "Expect Delays" or more specific directional information as applicable. No commercial advertising is allowed.
- Signs and supports must be of crashworthy materials. Types include roll-up signs on approved portable bases and signs mounted on approved posts. Allowance is made for crashworthy sign materials such as corrugated plastic.
- Portable Changeable Message Signs (PCMS) sign messages such as "Special Event Ahead", "Expect Delays", "Bicycles on Road" and "Flaggers Ahead".
- Post mounted signs shall be installed per MUTCD installation standards. Signs shall not be installed on existing regulatory or warning sign posts. Signs may be installed on existing guide or informational sign posts.
- Pre-event signing shall be installed between seven and ten days before the event and removed within three days after the event.

Additionally, when a roadway is to be closed for an event, pre-event "Road to be Closed" signs must be posted a minimum of three days in advance (RCW 47.48.020). The sign will give the date(s) and time(s) of closure.

7-7 Special Event Pavement Markings

WSDOT allows placement of temporary directional pavement markings (commonly called "Dan henrys" in the bicycle community) to indicate the special event route. These markings give direction to event participants and are located at points where a route decision must be made.

A. All pavement markings must use non-permanent, chalk based or "fade-away" paint. Permanent marking paint is prohibited.

B. Markings should be placed only just before, at, and just after directional decision-making points.

C. Route confirmation markings are permitted at major intersections.

D. For bicycle events, markings are placed to the right of the edge line where riders have a good rideable shoulder. Otherwise, they are located in the ordinary line of riding.

E. For running events, pavement markings are placed on the shoulder facing traffic.

F. The markings should be visible to event participants but placed so they are unobtrusive to others. A guideline is to make these marks no larger than 12 × 18 inches.

G. Markings must be placed away from traffic control pavement markings and existing construction or survey pavement markings.

7-8 Banners

WSDOT receives requests from public agencies, civic organizations, the event sponsors, to install banners for a variety of informational purposes on state highway right of way.

Most installation requests are for horizontal suspension over the roadway, using span wire, and are the focus of this section. The occasional requests for vertically mounted banners, such as on luminaire poles, are processed case-by-case.

Some installations may require wind load analysis prior to approval (see Section 7-8.D).

A. **Statutory and Regulatory Overview –** The term "banners" means the signs, banners, and decorations described in state law (RCW 47.36.030) and the Washington Administrative Code (WAC 468-95-148). WAC 468-95-148 establishes approval criteria (see Section 7-8.C) that allow the department to permit banners visible to state highways. RCW 47.42.020(10) exempts banners from the Highway Advertising Control regulations, if the banners do not display commercial advertising.

On city streets that are also part of the state highway system under RCW 47.24, the cities are responsible for approving banner installations that are more than 20 feet above the roadway surface. WSDOT allows banners 20 feet above the roadway surface (WAC 468-95-148).

- Thus, requests for banners on city streets that are also part of the state highway system are referred to the city for approval.
- On state highways in unincorporated areas, the department has the authority to regulate banners.
- WSDOT maintains authority on limited access roadways, in both incorporated and unincorporated areas. Banners may not be visible from limited access highways.

B. **Permit Administration in Unincorporated Areas –** Banners permits are administered through the region Traffic Office, using a Banner Placement Permit (Figure 7-1) issued by the regional signing authority. This permit may be modified to accommodate request for vertically installed banners.

The region Maintenance Office having jurisdiction over the proposed banner location receives a copy of the completed permit, for their information when processing over-height vehicle permits.

The region Traffic Office also coordinates any required wind load review or analysis with the headquarters Bridge and Structures Office.

For a banner attached to utility company-owned poles, the sponsor must provide the region with a copy of the utility company's permitting correspondence. This practice assures WSDOT that the utility company's wind load and banner attachment considerations have been addressed.

Temporary poles may be installed in department right of way outside the clear zone, after the sponsor secures a department-issued General Permit. This practice assures WSDOT that the installation won't interfere with department operations or underground utilities, and that traffic control considerations are addressed. A Banner Placement Permit is also required.

As a matter of practice, WSDOT does not allow horizontally suspended banners to be attached to WSDOT-owned traffic signal poles or luminaire poles. Adding banners to signal poles may interfere with or obstruct the view of traffic control devices, in conflict with RCW 47.36.030 and WAC 468-95-148. Regarding luminaire poles, it's likely that significant debris on the roadway would result from a knock-down. Banners should not be attached to crossing structures because a disconnection could cause a banner to fall onto the roadway.

Some cities have installed permanent banner poles on city-owned property outside the clear zone.

C. **Approval Criteria –** WSDOT may approve banner installations in unincorporated areas that promote a community sponsored event in accordance with the following criteria:

1. Banner messages are limited to name, date, and event sponsor. Commercial advertising is not allowed (RCW 47.42.020 and WAC 468-95-148).
2. At least 20 feet of vertical clearance must be maintained from the roadway surface to the bottom of the banner (RCW 47.36.030 and WAC 468-95-148).
3. Banners are not permitted to be visible from Interstate highways, or any other state highways having a posted speed limit of 50 mph or greater (WAC 468-95-148).
4. Banners shall not interfere with or obstruct the view of any traffic control device, or impair the operation of transportation management systems or illumination (RCW 46.36.030 and WAC 468-95-148).
5. For temporary events, banners may be installed not more than 30 days before the event and shall be removed not more than three days after the event (WAC 468-95-148). The duration of informational banners is determined case by case.
6. WSDOT will not permit a sign, banner, or decoration to be mounted over any multi-lane (four or more lanes) highway. Vertical mounting on luminaire posts is permitted, provided such installations meet wind load requirements specified by WSDOT (WAC 468-95-148).
7. WSDOT does not allow banners to be illuminated in any manner. (RCW 47.36.180).

D. **Wind Load Analysis for Banners Placed on Vertical Poles –** Standard size banner installations do not require a wind load analysis. Standard banner sizes range from two to four feet vertically by 20 to 24 feet horizontally, with three feet by 20 feet about average. Banner manufacturing incorporates wind slits or wind ports to minimize wind stress.

For larger banners consult with the Headquarters Traffic office to determine if the proposed installation warrants a wind load analysis. The Bridge and Structures Office will need 120-150 days for the wind load review if an analysis is necessary and may charge the event sponsor.

As an alternative, the event sponsor may submit wind load calculations, performed and stamped by an engineer licensed in Washington State, to verify the compatibility of the installation.

7-9 Transit Vehicle Stop Zones

Region Traffic offices receive and review requests from transit agencies for approval of transit stops on state highways. The "Transit Vehicle Stop Zone Guidelines" Guidelines are currently under review and will be available shortly. The guidelines provide a standardized process for managing requests for transit stops outside incorporated areas. WSDOT has a commitment to making transit stop locations more viable and user friendly as well as safe. The guidelines consider the operational needs of the department and transit authorities as well as public safety. See the *Design Manual* Chapter 1430 for information about incorporating transit vehicle stops into the project design process.

When Transit Agencies request a transit vehicle stop zone outside of any incorporated city or town, the public transit agency shall be responsible for conducting a field review to evaluate accessibility to the proposed location. When the requested location is within the roadway, the transit agency shall have a policy for in-lane stops that addresses safety and operational issues. (WAC 468-46-010).

Transit agencies will complete the Transit Stop Application, and submit it to the Region Development Services office or Region Planning, once submitted, the application will be forwarded to the regional Traffic Office, where they will conduct a field review and verify sight distance. It is required by law, once WSDOT receives the application from the public transit authority, WSDOT shall assess the sight distance for the proposed stopped (WAC 468-46-040). The investigation may include shoulder width, accessibility, roadway crossing opportunities, lighting, and possible room for shelters, see Figure 7-11. The Americans with Disabilities Act guarantees access to public facilities (i.e., transit) for all persons; therefore, the review process must consider the needs of all transit users at each stage of transit use, including both before and after using the transit service.

Once the review has been completed, the stop location is either approved or denied. The region Development Services or Planning Division will administer the permit, Transit Stop Permit. If a location is denied, a letter stating the reasons is issued by the region.

The Rules of the Road provide general restrictions and privileges concerning transit vehicle stops:

A. RCW 46.61.560 provides that, outside of incorporated cities or towns, no one can stop, park, or leave a vehicle upon the roadway. An exception is granted for public transit vehicles stopped to receive or discharge passengers at a marked transit stop approved by the department or the county on their respective facilities.

   It further allows public transit vehicle drivers to momentarily stop to receive or discharge passengers at unmarked stop zones under the following circumstances:

   - Stop in a safe and practicable position.
   - Activate four-way flashing lights.
   - Stop only where there is an unobstructed view, for an adequate distance to not create a hazard for other drivers.

   The statute anticipates transit stops on the roadway within incorporated cities or towns where stops are frequent and operating speeds are typically lower. (Note that RCW 46.04.500 excludes the shoulder from the definition of the roadway).

B. RCW 46.61.570 specifies several locations where it is illegal to stand or park a vehicle, except temporarily to load or unload property or passengers, and authorizes other limitations or restrictions by city ordinance, county resolution, or department order (traffic regulation).

C. RCW 46.61.575 authorizes WSDOT to place traffic control devices that prohibit, limit, or restrict, stopping, standing, or parking. This authority is granted for locations where WSDOT has determined by regulation that stopping, standing, or parking will endanger highway users or interfere with the free movement of traffic.

D. WAC 468-46-010 upon receipt of a transit stop request from a public transit authority, requesting approval of a transit vehicle stop zone outside of any incorporated city or town, the WSDOT shall assess the sight distance at the proposed location.

E. WAC 468.46.040 WSDOT shall install, at its own expense, transit vehicle stop ahead symbol signing (W14-1011), for each approved transit vehicle stop zone where the transit vehicle is not visible for a distance of 500 feet. Signing shall be consistent with the MUTCD.

7-10 School Bus Stops on Highways

School bus stops must be located where there is a minimum of 500 feet sight distance to the bus stop, to provide adequate visibility. If feasible, locate stops off the state highway. The state regulations noted below further govern locations. School District bus stop requirements are found in WAC 392-145-011.

A. **Limited Access Highways –** WAC 468-58-030 and RCW 47.52 regulate school bus stops along limited access highways and prescribe the department's related duties:

1. School bus stops are not allowed along fully controlled limited access highways. Exceptions may be authorized at interchanges where WSDOT has provided a location and along the mainline where there is a separated facility.
2. WSDOT must approve school bus stops located along partial and modified control limited access highways in rural areas.
3. WSDOT approval is not required along modified control limited access highways in urban areas.
4. All approved school bus stops shall be signed in accordance with the MUTCD.
5. The State Traffic Engineer will maintain an inventory of approved stops.

See Section 7-13 for information about pedestrians crossing limited access highways.

B. **WAC 392-145, Additional Rules for School Bus Drivers –** The Superintendent of Public Instruction Office (OSPI) adopted WAC rules that regulate school bus stopping. Consider these rules when reviewing school bus stops on limited access highways:

1. Buses are not allowed to stop on a curve or a hill where visibility is less than 500 feet. Any existing bus stop locations that have less than the minimum 500 foot visibility must be moved to a compliant site to provide safety to the bus riders and roadway users. If no other stop location is possible, it shall be signed with a "SCHOOL BUS STOP AHEAD" sign (S3-1).

2. No school bus may pull over to the left-hand side of the road to load or unload children.

3. School children are not allowed to cross any roadway having three or more marked traffic lanes, or any highway divided into separate roadways, as described in RCW 46.61.150.

C. **Coordination with School Districts and Approval Process –** WSDOT works cooperatively with the Office of Superintendent of Public Instruction (OSPI) to implement a school bus stop approval and inventory process based on the WAC rules. The region works with the individual school districts to assure that school bus stops on limited access facilities meet those requirements. Figure 7-2 provides a sample Proposed School Bus Stop Worksheet that the regions and the school districts may use cooperatively to assess and approve potential bus stops on partial or modified access controlled routes. The worksheet also provides the basic information the State Traffic Engineer's office needs to maintain the required bus stop inventory. Figure 7-3 illustrates the school bus stop approval and inventory process.

D. **School Bus Stop Inventory –** WAC 468-58-030 instructs WSDOT to maintain a list of school bus stops on limited access highways. The regions shall maintain the list of limited access school bus stop inventory. The information is provided to the State Traffic Engineer. This inventory may be collected at the beginning of each school year, relocations of stops and when new stops are established.

7-11 Interpretive Signs/Markers

Agreement GM 869 (Figure 7-12) between WSDOT and the Washington State Parks and Recreation Commission provides the procedures and guidelines for developing and maintaining interpretive signs and markers placed along the state highway. These markers depict the state's natural and manmade history and are often located at designated pullouts of rest areas. The agreement documents the department's responsibilities in locating and providing access to these markers. Use this process when new roadways, viewpoints or rest areas are being constructed or where a construction project includes an interpretive marker location. Contact the regional Accounting Services Office for agreement information.

7-12 "Memorial" Highways and Bridges

Per RCW 47.01.420, the Transportation Commission may, by resolution, name a highway or bridge to commemorate a person or group that has contributed significantly to Washington's nation's well-being. (Facility Naming Policy). Typically, the Commission receives a Joint Memorial from the Washington State Legislature.

The Regional Administrator may also nominate a person or group to be honored through the naming process. Supporting information is supplied to the Office of the Secretary who reviews the request and forwards it to the Transportation Commission. The support information may include one of the following:

- Letters of support from state and federal legislators representing area of the facility;
- Resolutions passed by local, publicly elected bodies in the area of the facility;
- Supportive action by or letters from local organizations such as local chambers of commerce or service clubs.

Another type of memorial designation is the "Blue Star" Memorial Highway. It was first initiated after World War II to memorialize veterans, and now honors all members of the armed services. "Blue Star" Memorial Highways are a project of the National Garden Clubs and request often originate from a local club. The Regional Administrator must present requests for designation to the Transportation Commission. Markers are not installed until the designation is received.

Marker plaques are 41 × 45 inches. The sign mounting and base size, style, and location are determined on an individual basis and approved by the region.

Plaques or signs memorializing highways or bridges are typically installed in rest areas, scenic overlooks, recreational areas, or other appropriate locations with a parking area, and where the installations are not visible to mainline traffic. Where there is no appropriate site off the main roadway, the MUTCD provides that one memorial sign per direction may be installed along the mainline, provided it does not affect safety or efficiency of traffic flow.

The Governor or the legislature approves request to dedicate a facility to a cause, rather than a person.

7-13 Pedestrian Crossing Limited Access Highways

WAC 468-58-030 contains provisions concerning the approval of pedestrian crossings of limited access highways. These provisions:

A. Prohibit at-grade pedestrian crossings of fully controlled limited access highways.

B. Permit crossing of multi-lane partially controlled or modified control limited access highways only where grade crossings are provided.

C. Permit crossing of two lane, partially or modified control limited access highways at mailbox locations.

D. Permit crossing of two lane, partially or modified control limited access highways at points designated for school children to cross as follows:

- On two lane highways, at the school bus, when the bus is stopped in the traveled lane to load or unload students and its sign and signal lights are displayed as required by RCW 46.61.370.
- On two lane highways, at least 100 feet from a school bus loading zone which is adjacent to the traveled lane and was established by school district, who determined that stopping in the traveled lane is hazardous.

7-14 Shoulder Driving for Slow Vehicles

Regional Administrators may designate sections of a two lane state highway to be a "shoulder-driving area" to allow slow-moving vehicles to drive onto improved shoulders so faster vehicles can pass (RCW 46.61.428).

For specific highway characteristics of shoulder driving, refer to *Design Manual* Chapter 1270:

A. When designing a shoulder for shoulder driving, locate where stopping and decision sight distance is desirable and outside of sharp horizontal curves. A minimum length of 600 feet of paved shoulder must be available.

B. The structural strength of the paved shoulder must be adequate to support traffic. Contact the region Materials Lab for an evaluation of the structural capacity of the shoulders.

C. When barriers or other roadside objects are present, the minimum width shall be 12 feet. The shoulder width depends on the vehicles that will be using the shoulder. Where trucks will be the primary vehicle using the shoulder, use a 12-foot width; when passenger cars are the primary vehicle, a 10-foot width may be used.

D. When the route has been identified as a local, state, or regional significant bike route, shoulder driving for slow vehicles is undesirable.

E. Signing for shoulder driving is required. Install guideposts when shoulder driving is to be permitted at night. Signing requirements for designated shoulder driving zones are shown in the Chapter 2.

7-15 Figures

Figure 7-1 Sample Permit to Place Banner (Page 1 of 2)

Washington State Department of Transportation

Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

Date

RE: Banner Placement on SR_____.

Name
Street Address
City, State, Zip Code

Dear

This letter is in response to your request to place a banner across SR _____, at or near milepost ____.___ for your _____ event.

PERMIT TO PLACE BANNER

The Washington State Department of Transportation conditionally approves your request to place a banner, only under the conditions following:

1. The banner message is limited to name, date, and event sponsor. Commercial advertising is not allowed (RCW 47.42.020 and WAC 468-95-148). *Non-commercial informational messages not associated with an event are allowed.*

2. A vertical clearance of at least 20 feet must be maintained between the roadway surface and the bottom of the banner (RCW 47.36.030 and WAC 468-95-148).

3. The banner may not be installed more than 30 days before the event and shall be removed not more than three days after the event (WAC 468-95-148). *(Note: the duration for informational banners is determined and stated here case by case.)*

4. The banner may not interfere with or obstruct the view of any traffic control device, or impair the operation of transportation management systems or illumination (RCW 47.36.030 and WAC 468-95-148).

5. The banner may not be directly illuminated in any manner (RCW 47.36.180). Incidental illumination from existing street lights is allowed.

6. If the banner is to be attached to utility company-owned poles, include a copy of the utility company's completed permitting correspondence when you sign and return this permit to the department.

7. Write in the company names of the manufacturer and/or supplier for newly manufactured banners and the installer. (You may omit the names of the manufacturer and/or supplier if the banner has been used in previous years, and you note that on the first line.)

   Manufacturer/Supplier: _____

   Installer: _____

Figure 7-1 Sample Permit to Place Banner (Page 2 of 2)

By signing below, *(event sponsor)* agrees to indemnify and hold harmless the State of Washington and the Washington State Department of Transportation, its officers and employees from any and all claims, actions, or damages of any type or nature which may accrue to be or be suffered by any person, persons, or property, by reason of the action or omissions of the event sponsor, its agents, employees, contractors, or any person whomever, arising out of or in connection with any acts or activities authorized by the Permit for injuries, bodily injury, death, or property damage, including all costs of defense and attorneys' fees. This obligation shall not include such claims, costs, damages, or expenses which may be caused by the sole negligence of the State or its officers or employees.

If *(event sponsor)* agrees to these terms, please have the duly authorized representative of *(event sponsor)* or *(name of city or town)* sign this permit and return it to the Washington State Department of Transportation at *(mailing address or fax number)*.

Sincerely,

(Regional Signing Authority)
(Title)

Signature and Title of Authorized Official

Phone Number and Email Address

Place

Date

By my signature, I affirm under penalty of perjury under the laws of the State of Washington that I am authorized to bind the *(event sponsor)* to the terms and conditions of this Permit.

XX:yy

cc: File
Headquarters
Maintenance Area

Figure 7-2 Proposed School Bus Stop Worksheet

WAC 468-58
School Bus Stop Inventory

Partial and Modified Limited Access Controlled

Highways Inventory Items – School District

Information

Date: _____

DOT Region: _____

School District: _____

School District Contact Person (*Phone #, Mailing and E-mail Addresses*)

_____

_____

_____

_____

State Route Number: _____

Milepost (*and approximate distance and direction to nearest intersection*)

_____

_____

Direction of Travel: _____

Stop on/off Roadway: _____

Bus Stop Times: a.m./p.m.: _____

Inventory Items – WSDOT Information

Limited Access Type _____

Stopping Sight Distance _____

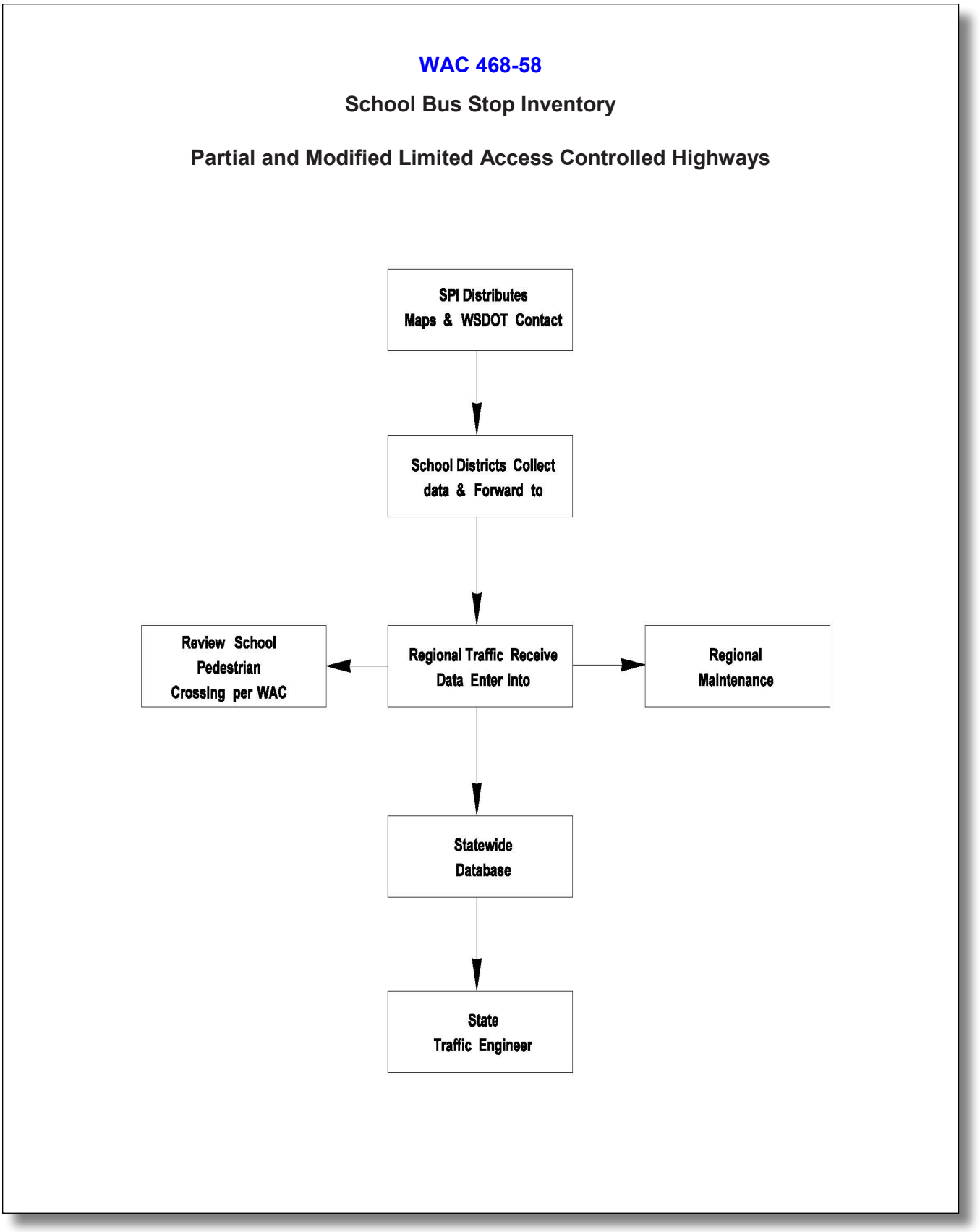
Signed – "School Bus Stop Ahead" _____

Regional Approval_____ Date

_____

By _____

Figure 7-3 Proposed School Bus Stop Worksheet



Highway Special Event Documentation

Joint Policy Guidelines

Letter of Acknowledgement

Letter of Agreement

Exhibit A – Insurance

Exhibit B – Traffic Control

Exhibit C - Filming

Prepared by:

Maintenance & Operations
John Nisbet Traffic Operations
January 2020

Figure 7-4 Memorandum of Understanding (Page 1 of 3)

Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

MEMORANDUM OF UNDERSTANDING
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
AND THE
WASHINGTON STATE PATROL

JOINT POLICY GUIDELINES FOR EVENTS ON STATE HIGHWAYS

It is the intent of the Secretary of the Washington State Department of Transportation (WSDOT) and the Chief of the Washington State Patrol (WSP) to enter into a Memorandum of Understanding to establish guidelines and define responsibilities for special events operations on state highways. These guidelines provide reasonable and consistent criteria for agreements that sanction the following events on state highway rights of way: filming, bicycle and pedestrian events, parades, and any other event that may disrupt the normal flow of traffic, or increase risk to the traveling public. These provisions apply to state highways where both WSDOT and WSP have jurisdiction.

Certain events may impact normal traffic operations to the extent that special traffic control efforts will be required, while other events may have a minimal impact. WSDOT and WSP shall follow these general guidelines with regard to the event operations on state highways.

1. Event coordinators proposing use of a state highway for event operations shall notify the appropriate WSDOT Regional Office and provide pertinent information about the operational requirements of the event. Initial contact may be made by phone; however, a written letter of request is required within 48 hours of initial contact. The form is found on WSDOT's web site. Notification information shall include: state highway number, state highway milepost limits, or nearest intersections with state highway, dates and times of event, number of participants expected, and a description of the purpose and scope of the event, including any proposed closure of any portion of a state highway.

2. Based on the event description provided in the request for approval, WSDOT will determine the potential for impact on normal traffic operations. WSDOT may consult with the WSP to determine impacts on traffic law enforcement. Considerations include, but are not limited to characteristics of the state highway, scope of the event, and any scheduled construction or maintenance work that may conflict with event operations. On an event basis, WSDOT and WSP may prohibit the use of particular roadways or prohibit specific aspects of an event. Approval will not be granted for the use of state highways at high volume locations or during days/times when events will adversely affect vehicular traffic.

Figure 7-4 Memorandum of Understanding (Page 2 of 3)

3. Events that can be lawfully conducted within the Rules of the Road, RCW 46.61, receive concurrence as to the acceptability of the event by way of a Letter of Acknowledgment. This letter recognizes the location and time of the event and may include information about operational restrictions on specific sections of a state highway or route revisions that may be required due to conflicts with construction or maintenance operations.

   WSDOT approval is required if it is determined that an event has potential impact on normal traffic operations, or includes special traffic control. Event permittee shall submit traffic control plans that adequately accommodate anticipated traffic conditions. Such plans must have written approval by WSDOT Region's traffic engineer(s) and are coordinated by the State Traffic Engineer for inter-regional events. All traffic control devices must conform to the Manual on Uniform Traffic Control Devices (MUTCD). Personnel executing traffic control plan must be certified flaggers or off duty police officers, to be provided exclusively by the event permittee.

   Approved traffic control plans, including any restrictions and/or prohibitions on the event, and liability issues shall be documented by way of a written Agreement between WSDOT and the event permittee. If approved by WSDOT, the agreement shall be signed by WSDOT and the event permittee prior to commencement of the event. WSDOT may conduct a joint review with WSP prior to signing the proposed agreement document. This practice allows expert review by both agencies and ensures concurrence on all traffic control requirements necessary to safely conduct event operations. WSDOT and WSP have no obligation to approve or permit any event if the event Agreement has not been signed by WSDOT and the event permittee, or the event Agreement has been altered by the event permittee without express consent of WSDOT. WSDOT reserves the right to postpone or deny approval of any event when an event permittee requests approval without sufficient advance notice, as determined by WSP or WSDOT.

4. Operational decisions and/or emergency situations may require road/lane closures to be opened immediately. WSP is responsible for traffic enforcement, and has final authority regarding the location and specific time of day that any road/lane closures, or any other part of the traffic control plan may be implemented.

5. Any costs incurred by WSDOT and/or WSP during implementation or operation of the event shall be the responsibility of the event permittee. WSDOT and WSP shall submit separate billings to the event permittee to recover individual agency costs and are to be paid within 30 days from the receipt of the billing.

6. WSDOT regulations and policies do not allow bicycling, running, or walking events on limited access highways.

Figure 7-4 Memorandum of Understanding (Page 3 of 3)

The foregoing does not preclude the WSP and WSDOT from developing additional guidelines and operational procedures to address specific issues of mutual concern related to the use of state highway rights of way for event operations.

_____ _____

JOHN R. BATISTE
Chief, Washington State Patrol Date

_____ _____

JOHN NISBET
Director, Maintenance and Operations Programs, Date
Washington State Department of Transportation

APPROVED AS TO FORM:

_____ _____

ASSISTANT ATTORNEY GENERAL Date
FOR THE WASHINGTON STATE PATROL

APPROVED AS TO FORM:

_____ _____

ASSISTANT ATTORNEY GENERAL Date
FOR THE WASHINGTON STATE DEPARTMENT OF
TRANSPORTATION

Figure 7-5 Letter of Acknowledgement for Event Operation on State Highway

Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

(Date)
(Name and address of event permittee)

Re: (Event on SR____)

Dear:

Thank you for your recent inquiry regarding your proposed (event type/name) at (event location) scheduled for (event dates).

Because the (event type/name) appears to have only minimal potential for traffic impact on state highways, we do not anticipate that special traffic control efforts are necessary.

(Note any special conditions here such as route or procedural restrictions).
(Give information specific to event type, as appropriate. Examples shown below) It is recommended you check our website prior to the event for any construction or maintenance conflicts that may occur during your event (http://www.wsdot.wa.gov/traffic/trafficalerts).

(Pedestrian/runners are prohibited on the interstate system but may lawfully use other roadway shoulders by facing traffic as prescribed in the Rules of the Road (RCW 46.61) Support vehicles may not travel in the lane or shoulder at slow speeds in order to stay with or behind event participants or (As a reminder, bike riders assume the risk for their own safety when traveling on the state's highways. Roadway conditions, traffic volumes, and weather changes require review of the rout for suitability. Each rider should have adequate bicycling skills and know the Rules of the Road).

I suggest that you provide a (event name) itinerary to all local authorities having jurisdiction where the (event name) traverses county roads or city streets. For these areas, the local authorities determine if special traffic control and permits will be required.

Best wishes for a successful (event name).

Sincerely,

State or Region Traffic Engineer
(As applicable)

Figure 7-6 (Filming, Parade, Bicycle, Pedestrian, etc.) Agreement (Page 1 of 7)

Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

(Filming, Parade, Bicycle, Pedestrian, etc.) **Event Agreement**
Agreement #

(Name and Address of EVENT PERMITTEE)

Re:
(Event Name)
Event Agreement
Event Dates

This agreement, made and entered into on this _____day of _____, 20___, by and between the Washington State Department of Transportation, hereinafter referred individually to as "WSDOT" or "Party", and _____ hereinafter referred to individually as the "EVENT PERMITTEE" or "Party", and collectively referred to as "Parties "for the purpose of staging a _____event on state highway(s) right of way.

Whereas, the EVENT PERMITTEE intends to operate an event described as follows:_____
_____
_____, hereinafter referred to as the "Event".

Whereas, WSDOT and the Washington State Patrol, hereinafter referred to as "WSP" have determined that the Event may impact traffic operations on state highway(s) to the extent that special traffic controls or other safety considerations are required; and

Whereas, WSDOT and WSP conditionally approves your Event on the highway(s) listed in the route table below, on the date or dates of _____ _____ _____, subject to the terms and conditions in this Agreement and any attached Exhibits.
(Insert Route Table Here)

NOW, THEREFORE, in consideration of the terms, conditions, performances and covenants herein set forth WSDOT and the EVENT PERMITTEE agree as follows:

Figure 7-6 (Filming, Parade, Bicycle, Pedestrian, etc.) Agreement (Page 2 of 7)

I. Administration and Procedures

A. The purpose of this Agreement is to define WSDOT's requirements and the Parties' responsibilities concerning operation of the Event on state highway right of way. This Agreement is not effective unless or until signed by WSDOT and by the EVENT PERMITTEE prior to the commencement of the Event. The Parties understand that no guarantees, representations, promises, or statements expressed or implied have been made by WSDOT except to the extent that the same are expressed in this Agreement signed by both Parties.

Any modification to the Agreement will be by written amendment to the Agreement, signed by both Parties. WSDOT reserves the right to postpone or deny operation of an Event when approval is requested without sufficient advance notice, as determined by WSP or WSDOT.

B. EVENT PERMITTEE is responsible for securing approval from local agencies or communities in unincorporated areas that may be impacted by the Event. If the Event takes place on city streets without access control that are part of state highways, EVENT PERMITTEE shall furnish WSDOT with courtesy copies of any traffic control, insurance, or liability agreements made with local agencies.

C. EVENT PERMITTEE is responsible for all costs incurred by WSDOT and WSP. WSDOT and WSP shall submit separate billings to EVENT PERMITTEE to recover individual agency costs and such billings shall be paid by EVENT PERMITTEE within 30 days from EVENT PERMITTEE's receipt of each billing. If the operations of the Event require substantial use of WSDOT and/or WSP labor, equipment, or materials as determined by WSDOT and/or WSP, then the EVENT PERMITTEE is required to enter into a separate cost reimbursement agreement with WSDOT and/or WSP. The cost reimbursement agreement with WSDOT guarantees reimbursement of all Event related costs to WSDOT and shows costs associated with the Event that must be paid by the EVENT PERMITTEE. WSDOT and/or WSP's "Costs" shall include, but not limited to, labor costs, equipment related costs, and indirect costs for services, such as; traffic control, maintenance operations and work zone safety or other highway operations activities.

D. EVENT PERMITTEE is responsible for cleaning up immediately after operation of the Event and returning any and all state highway facilities to the state or condition that existed prior to the Event. This work is to be done at EVENT PERMITTEE'S expense and to the satisfaction of WSDOT.

Figure 7-6 (Filming, Parade, Bicycle, Pedestrian, etc.) Agreement (Page 3 of 7)

E. Any base of operations, or storage or staging area for the Event shall be located outside the state's right of way. Prior authorization from WSDOT shall be required for any base of operations, storage or staging areas to be located within the right of way.

F. The EVENT PERMITTEE shall include WSDOT and WSP in their waiver or release of damages signed by the Event participants. For those Event participants who are minors, the release must be signed by the parents or guardians of the participant minor.

> **I, (_____*NAME OF PARTICIPANT*_____), DO HEREBY RELEASE, DISCHARGE, AND HOLD HARMLESS THE WASHINGTON STATE TRANSPORTATION COMMISSION, THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION, THE WASHINGTON STATE PATROL, AND THEIR OFFICERS, AGENTS, AND EMPLOYEES FROM ALL CLAIMS, DEMANDS, AND CAUSES OF ACTIONS OF EVERY KIND WHATSOEVER FOR ANY DAMAGE, LOSS, OR INJURIES KNOWN OR UNKNOWN, FORESEEN OR UNFORESEEN WHICH MAY RESULT FROM MY PARTICIPATION IN THE (_____*NAME OF EVENT*_____), INVOLVING STATE HIGHWAYS, KNOWN OR UNKNOWN, FORESEEN OR UNFORESEEN.**

G. The EVENT PERMITTEE is required to comply with all laws and regulations concerning its use of state highway right of way for the Event, and to ensure that the Event participants comply with such laws and regulations.

II. Insurance

A. The EVENT PERMITTEE, at solely his or her expense, shall obtain and keep in force during the term of the Event, general liability insurance coverage in an amount no less than $1 million per occurrence (combined single limit of liability) and $2 million in the aggregate. If vehicles are used as part of the event operation, a minimum commercial automobile liability coverage in the amount no less than $1 million per occurrence. The insurance policies shall be with companies or through sources approved by the State Insurance Commissioner pursuant to Chapter 48.05, RCW. For legal description and additional conditions see Exhibit A, attached hereto and made a part hereof.

III. Indemnity

A. EVENT PERMITTEE its successors, or assigns, will protect, save, and hold harmless WSDOT, its authorized agents, and employees, from all claims, actions, costs, damages, or expenses of any nature whatsoever by reason of the acts or

Figure 7-6 (Filming, Parade, Bicycle, Pedestrian, etc.) Agreement (Page 4 of 7)

omissions of EVENT PERMITTEE, its assigns, subtenants, agents, contractors, licensees, invitees, employees, or any person whomsoever arising out of or in connection with the Event and/or this Agreement, whether those claims, actions, costs, damages, or expenses result from acts or activities occurring on or off state highway right of way. EVENT PERMITTEE further agrees to defend WSDOT, its agents, or employees, in any litigation, including payment of any costs or attorney's fees, for any claims or actions commenced, arising out of, or in connection with acts, or activities related to the Event and/or this Agreement, whether those claims, actions, costs, damages, or expenses result from acts or activities occurring on or off state highway right of way. This obligation shall not include such claims, costs, damages, or expenses which may be caused by the sole negligence of WSDOT, its authorized agents, or employees; provided that, if the claims or damages are caused by or result from the concurrent negligence of (a) WSDOT, its agents, or employees, and (b) EVENT PERMITTEE, its assigns, subtenants, agents, contractors, licensees, invitees, or employees or involves those actions covered by RCW 4.24.115, this indemnity provision shall be valid and enforceable only to the extent of the negligence of EVENT PERMITTEE or EVENT PERMITTEE's assigns, subtenants, agents, contractors, licensees, invitees, or employees.

B. WAIVER. EVENT PERMITTEE agrees that its obligations under this Section extend to any claim, demand, and/or cause of action brought by, or on behalf of, any of its employees or agents while occupying state highway right of way for any purpose. For this purpose, EVENT PERMITTEE hereby waives with respect to WSDOT only, any immunity that would otherwise be available to it against such claims under the Industrial Insurance provisions chapter Title 51 RCW.

C. The indemnification provisions contained in this Section shall survive the termination or expiration of this Agreement.

IV. Venue

A. In the event that any party deems it necessary to institute legal action or proceedings to enforce any right or obligation under this Agreement, the parties hereto agree that any such action or proceeding shall be brought in Superior Court in Thurston County, Washington, and EVENT PERMITTEE herein submits to jurisdiction thereunder.

Figure 7-6 (Filming, Parade, Bicycle, Pedestrian, etc.) Agreement (Page 5 of 7)

Agreement Event Name
Date of Event
Page 5

V. Traffic Control (When required)

A. WSDOT has determined that a traffic control plan is necessary for this Event and has been previously reviewed by WSDOT and are attached hereto as Exhibit B and by this reference incorporated into this Agreement. All components of the traffic control plan shall conform to the standards of the Manual on Uniform Traffic Control Devices (MUTCD). If a portion of the Event occurs within city limits, the EVENT PERMITTEE shall submit a copy of traffic control plans to the city. In addition, traffic control plans shall meet the following requirements and restrictions:

1. EVENT PERMITTEE is responsible for acquiring all traffic control devices, and shall have all traffic control devices installed per the traffic control plan prior to commencement of the Event.

2. EVENT PERMITTEE shall ensure that traffic control operations requiring flagging shall be performed by certified flaggers, or off-duty law enforcement officers.

B. For Events that WSDOT has determined a full closure or rolling slowdown will be used, the following requirements shall be met:

1. Events requiring a rolling traffic break (intentional slowing of traffic through a moving roadblock, provided by WSP) shall operate at a speed greater than 35 mph on full access control highways. In no event shall any vehicle exceed the regulatory speed limits, provided that emergency vehicles are exempt from this requirement when responding to an emergency.

2. The EVENT PERMITTEE is required to provide notification of a road closure, at least 72 hours in advance, to all fire and law enforcement departments, ambulance companies, and transit agencies that would be affected by the closure. The EVENT PERMITTEE is required to comply with RCW 47.48.020 and with any subsequent amendments thereto. Notice of closure signs that EVENT PERMITTEE shall post under purview of this statute shall state at a minimum, 'SR or Ramp__ TO BE CLOSED *day, date, time* AT *location.*', provided that EVENT PERMITTEE shall insert the day, date, time and post at each end of the state highway, county road, or city street or portion thereof to be closed or restricted. The signs shall have 6-inch minimum size capital black letters on a white background with a black border and shall be fabricated so the sign will not be affected by weather conditions.

Figure 7-6 (Filming, Parade, Bicycle, Pedestrian, etc.) Agreement (Page 6 of 7)

3. WSDOT shall inform EVENT PERMITTEE if a pre-event meeting is required. The EVENT PERMITTEE shall ensure that WSDOT, WSP, local agency and a representative from emergency services are in attendance of the meeting that is mutually agreed upon. The purpose of the meeting is to highlight Event logistics, traffic control plans and discuss emergency response communication and protocol. The meeting shall take place prior to the commencement of the Event.

EVENT PERMITTEE and WSDOT agree that operational decisions and/or emergency situations may require road/lane closures and rolling slowdowns to be opened or ceased immediately. WSP is responsible for traffic enforcement, and has final authority regarding the location and specific time of day that any road/lane closures and rolling slow down, or any other part of the traffic control plan may be implemented. Neither WSDOT nor WSP shall be liable for any damages, or loss arising from the decision to reopen lanes during the Event closure.

Figure 7-6 (Filming, Parade, Bicycle, Pedestrian, etc.) Agreement Page 7 of 7

Agreement Event Name
Date of Event
Page 7

EVENT PERMITTEE shall indicate concurrence by signing and returning the enclosed copy of this Agreement to WSDOT address, email (insert *your* email address) or fax number. Failure to do so, or any alteration of this document, will render this agreement invalid. If EVENT PERMITTEE has any questions or concerns, the EVENT PERMITTEE shall contact (*WSDOT contact*) at (*telephone #).* WSDOT may change the name of the WSDOT contact and telephone number by notifying EVENT PERMITTEE and without a written amendment.

The undersigned acknowledge that they are authorized to execute this Agreement and bind their respective entities to the obligations set forth herein.

EVENT SIGNATURE

_____
SIGNATURE

_____
PRINTED NAME

_____
TITLE AS OFFICE WITH (event name)

_____
DATE

WSDOT SIGNATURE

_____
SIGNATURE

_____
DATE

John Nisbet, P.E.
State Traffic Engineer
Washington State Department of Transportation
HQ Traffic Office Division
PO Box 47344
Olympia Washington 98504-7344
Fax: (360) 705-6826

Figure 7-7 Exhibit A - Insurance for Event Operation on State Highways (Page 1 of 3)

Exhibit A

II. Insurance

1. Commercial General Liability (CGL) Insurance written under ISO Form CG0001 or its equivalent with minimum limits of $1,000,000 per occurrence and $2,000,000 in the aggregate providing bodily injury, property damage, and personal injury coverage for the state of Washington for any liabilities, including all costs of defense, arising out of the use of state highways for the Event. These coverage limits may be obtained through any combination of primary, umbrella or excess policies.

2. Commercial Automobile Liability Insurance providing bodily injury and property damage liability coverage for the state of Washington for all owned and nonowned vehicles assigned to or used in the performance of the Event with a combined single limit of not less than $1,000,000 per occurrence. This coverage may be any combination of primary, umbrella or excess policies with the State named as an additional insured or designated insured in connection with EVENT PERMITTEE and the Event.

3. The EVENT PERMITTEE shall be Named Insured and the State, the Governor, the Commission, the Secretary, the Department of Transportation, all officers and employees of the State, and their respective members, directors, officers, employees, agents and consultants (collectively the "Additional Insureds") shall be included as Additional Insureds for all policies and coverages specified in this Section. Said insurance coverage shall be primary and non-contributory insurance with respect to the insureds and the Additional Insureds. Any insurance or self-insurance beyond that specified in this Agreement that is maintained by any Additional Insured shall be in excess of such insurance and shall not contribute with it. All insurance coverage required by this Section shall be written and provided by "occurrence-based" policy forms rather than by "claims made" forms. All endorsements adding Additional Insureds to required policies shall be issued on (i) form CG 20 26 or a form deemed equivalent by WSDOT, providing the Additional Insureds with all coverages required under the Commercial Automobile Liability.

4. If the EVENT PERMITTEE maintains, at any time, coverage limits for itself in excess of limits set forth in this section, then those additional coverage limits shall also apply to WSDOT and the Additional Insureds. This includes, but is not limited to, any coverage limits provided under any risk financing program of any description, whether such limits are primary, excess, contingent or otherwise.

1

Figure 7-7 Exhibit A - Insurance for Event Operation on State Highways (Page 2 of 3)

5. Events sponsored by self-insured cities or towns, will need to provide documentation of the city/town self-insurance policy that is equivalent or greater than the requirements as stated above.

6. All insurance policies and coverages required under this shall contain a waiver of subrogation against WSDOT, the State, any Additional Insured and their respective departments, agencies, boards, and commissions, and their respective officers, officials, agents, and employees for losses arising from any action by or on behalf of the EVENT PERMITTEE. This waiver has been mutually negotiated by the parties.

7. Where applicable, the EVENT PERMITTEE shall cause its Subcontractor to provide insurance that complies with all applicable requirements of the EVENT PERMITTEE-provided insurance as set forth herein, in circumstances where the Subcontractor is not covered by the EVENT PERMITTEE-provided insurance. In the event that a Subcontractor is required to provide insurance, the EVENT PERMITTEE, WSDOT, and any Additional Insureds shall be added as an additional insured, for primary and non-contributory limits of liability under each Subcontractor's Commercial General Liability, Commercial Automobile Liability and, any other coverage's which may be required herein.

8. Unless specifically noted otherwise, the Parties to this Agreement do not intend by any of the provisions of this Agreement to cause the public or any member thereof or any other Person to be a third party beneficiary of the Agreement. Nothing in this Agreement authorizes anyone not a party to this Agreement or a designated third party beneficiary to this Agreement to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Agreement. It is the further intent of WSDOT in executing this Agreement that no individual, firm, corporation or any combination thereof which supplies materials, labor, services, or equipment to the EVENT PERMITTEE for performance of work at the Event shall become thereby a third party beneficiary of this Event. The Agreement shall not be construed to create a contractual relationship of any kind between WSDOT and a Subcontractor or any other Person except the EVENT PERMITTEE.

9. The EVENT PERMITTEE's Protective Insurance policy shall not be subject to a deductible or contain provisions for a deductible. The Commercial General Liability and Commercial Automobile Liability Insurance policy may, at the discretion of the EVENT PERMITTEE, contain such provisions. If a deductible applies to any claim under these policies, then payment of that deductible will be the responsibility of the EVENT PERMITTEE, notwithstanding any claim of liability against WSDOT.

10. With the exception of the Commercial Automobile liability coverage, no policies of insurance required under this section shall contain an arbitration or alternative dispute resolution clause applicable to disputes between the insurer and its insureds. Any and all

Figure 7-7 Exhibit A - Insurance for Event Operation on State Highways (Page 3 of 3)

disputes concerning (i) terms and scope of insurance coverage afforded by the policies required hereunder and/or (ii) extra contractual remedies and relief which may be afforded policy holders in connection with coverage disputes, shall be resolved in Washington Superior Court in Thurston County Washington, applying Washington law.

11. Prior to Event, the EVENT PERMITTEE shall file with the Department of Transportation, HQ Traffic Operations, P.O. Box 47344, Olympia, WA 98504-7344, ACORD Form Certificates of Insurance evidencing the minimum insurance coverage's required under these Specifications. Within thirty (30) days of the Event, the EVENT PERMITTEE shall provide WSDOT with complete copies of all insurance policies required under this section.

12. The EVENT PERMITTEE shall provide written notice to WSDOT and any Additional Insured, by facsimile transmission, electronic mail or U.S. Mail, notice of any policy cancellation within two business days of receipt of cancellation.

13. Failure on the part of the EVENT PERMITTEE to maintain the insurance as required, or not to provide certification and copies of the insurance prior to the time specified in Subsection 11 above, shall constitute a material breach of Contract upon which WSDOT may deny the application. (Proof of insurance and indemnification of WSDOT is required prior to issuing the Letter of Agreement).

3

Figure 7-8 Exhibit B – Example Traffic Control Plan for Event Operation on State Highways

TCP 1 Typical One-Lane, Two-Way Traffic Control with Flaggers

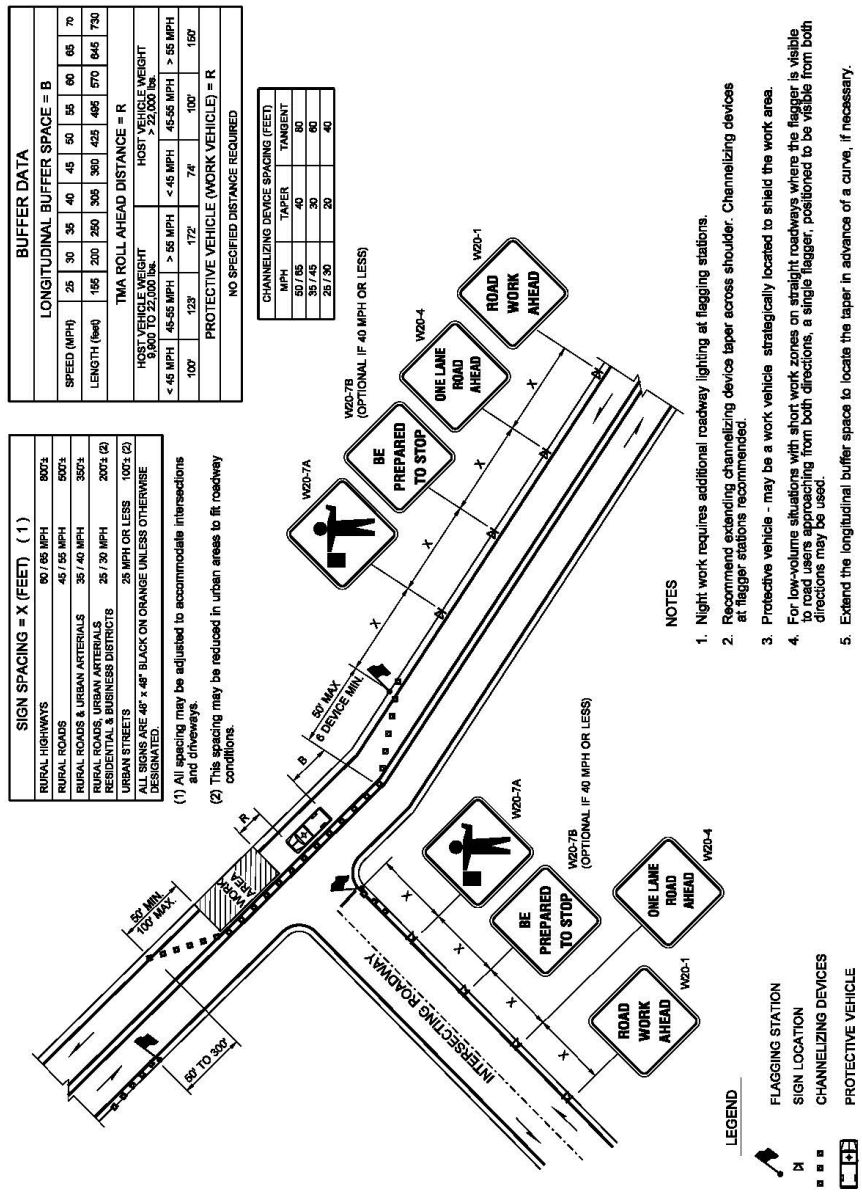


Figure 7-9 Exhibit C – Filming Event Agreement for Event Operation on State Highways

Exhibit C
FILMING EVENT AGREEMENT
Agreement #

In combination with the Letter of Agreement comprises a complete understanding between the Washington State Department of Transportation (WSDOT), the Washington State Patrol (WSP), and the EVENT PERMITTEE.

1. The film production company shall be in direct contact with Washington Filmworks Office (WFO) regarding location filming on state highways. The WFO may initially direct a filming event permittee to the appropriate WSDOT region's filming liaison. A production company with previous experience filming on state highways under the sanction of WSDOT and WFO may contact the appropriate WSDOT regional office directly. A courtesy copy of any correspondence and/or written agreement between WSDOT, WSP and the film production company shall be provided to WFO. Contact WFO at http://washingtonfilmworks.org/.

2. Stunts, accidents, or pyrotechnics that may cause damage to state property or disrupt traffic flow shall not be allowed. Use of pyrotechnics must meet all statutory requirements. No liquid or solid materials may be placed on the highway except as approved by WSDOT and identified in this exhibit. (*Insert Specific Information)*

3. Any filming involving the use of any aircraft or drone shall be done in accordance with FAA regulations.

4. *Insert specific information regarding additional restrictions, prohibitions, or requirements imposed on approved filming operations.*

Figure 7-10 Application For Transit Stop Permit (WSDOT Form 510-017)

Washington State Department of Transportation

Application For Transit Stop Permit

(Not for use on Managed Access Highways within an incorporated City or Town)

Name and Address of Agency	State Route	Milepost	☐ Left ☐ Right
	County		
	☐ Managed Access Highway ☐ Limited Access Highway		

Proposed Facility Location *(more than one location may be included with this Application, but only for the same State Route)*

Public Land Survey System (PLSS)

1/4 of the 1/4 of Section Township N, Range ☐ E ☐ W

The Washington State Department of Transportation is hereinafter referred to as the "STATE," the Transit Stop Permit applicant is hereinafter referred to as the "AGENCY," and the Transit Stop is hereinafter referred to as the "FACILITY."
The AGENCY requested FACILITY will be:

☐ New Stop ☐ Existing Stop being modified or upgraded; Will the FACILITY have or require Utilities? ☐ Yes ☐ No

Type of Stop is: ☐ Pullout / Outside the Highways Traveled Lane ☐ In-Lane / within the Highways Traveled Lane

Has the AGENCY conducted a Safety and Operational Review as required by WAC 468-46-010? ☐ Yes ☐ No

Will the FACILITY have a shelter? ☐ Yes ☐ No If yes, the overall square footage of the FACILITY will be: _____

Are Plan Sheets showing the FACILITY and any amenities being submitted with this application? ☐ Yes ☐ No

Transit Stop Permits are issued at no cost to the AGENCY, provided the STATE's effort to prepare the permit, including any field inspection that may be needed, is routine or minimal as determined by the STATE. In the rare occurrence when the AGENCY requested FACILITY will result in the STATE expending addition time and resources beyond what would normally be expected for a typical transit stop review, the STATE may require a reimbursable account be established with the AGENCY to recoup those extraordinary expenses.

The transit stop FACILITY shall not exceed 1,000 square feet in size within the state highway right-of-way, with or without a transit stop shelter; otherwise a STATE prepared Air Space Lease will also be required. The 1,000 square feet includes structures such as standing pads, shelter pads with or without a shelter whichever is greater in size, and any sidewalks or pathways that are integral to the transit stop. It does not include the roadway pavement for the stopped transit vehicles, utilities, or sidewalks or pathways that are part of the state highway system.

The STATE, in recognition of the AGENCY's authority to receive and discharge passengers on the state highway system on limited access facilities or on managed access facilities outside of incorporated cities and towns pursuant to RCW 46.61.560 and WAC 468-46-010, but subject to RCW chapters 47.50 and 47.52, will review the AGENCY's application to construct, operate, upgrade, and maintain the transit stop FACILITY at the above described location in exchange for the highway safety and operational benefits received, provided that the AGENCY accepts all the terms, provisions, and exhibits that the STATE will make a part of the Transit Stop Permit.

Applicant (Agency) Information (if different from above)

Applicant Agency Name		
Mailing Address		
City	State	Zip

Applicant Contact Information (required)

Print Name	Print Title
Phone	Email
Signature	Date

DOT Form 510-017
Revised 01/2017

Figure 7-11 Transit Vehicle Stop Zone Review Checklist

WSDOT
Transit Vehicle Stop Zone Review Checklist
Region_____

Agency submitting request_____ Date of request_____
Contact Person_____ Phone Number_____ FAX _____
Mailing Address_____ E-mail_____

Transit Stop Location

State Route_____ Milepost (nearest crossroad)_____ Existing Transit Stop – Yes No
Previously Approved – Yes No Pullout In lane Placement at intersection: Far side (preferred) Near side Mid block
Curb lane traffic volume-peak hour_____ Bus volume-peak hour_____ Passenger volume-peak hour_____
General Condition_____

Roadway Geometry

Number of roadway lanes_____ (include turn lanes) Direction of travel_____
Horizontal Alignment: Horizontal Curve - Left Right or Tangent
Vertical Alignment: Vertical Curve - Sag Crest or Grade%
Topography: Flat Rolling Hills Steep Hills
Existing Slope: Ditch_____ Cut_____ Fill_____

Existing Location Features

Existing Shoulder:
Width_____ft. Surface material/depth_____/_____ Condition_____
ADA Landing Pad – Yes No Size (5' x 8' minimum size)_____ft. x _____ft.
Existing street lighting – Yes No Condition of existing vegetation_____

Speed

Operational Speed_____mph Posted Speed_____mph Design Speed_____mph

Stopping Sight Distance

Field Measurement: 1)_____ft. 2)_____ft. Ave)_____ft.
Is SSD criteria met at location – Yes No Advance Transit Stop Sign required – Yes No

Pullout Considerations

Is pullout recommended in the General Condition Criteria – Yes No Is R/W available – Yes No
Comments_____

Pedestrian/Bicyclist Consideration

Pedestrian/Bicyclist sight distance on approach_____ft. Pedestrian/bicyclist sight distance on departure_____ft.
Paved waiting area – Yes No Walkway access – Yes No Bicycle facility access – Yes No
Distance to intersection_____ft. Traffic signal – Yes No Crosswalk – Yes No
Refuge area – Yes No Number of Lanes to cross_____ Crossing distance_____ft.
Connected to pedestrian/bicyclist network – Yes No

Collision History Review:_____
Comments:_____
Should Transit Stop Be Approved? - Yes No
Reviewed by_____ **Date**_____

Figure 7-12 Interpretive Signs/Markers Agreement (Page 1 of 4)

GM 869

INTERPRETIVE SIGNS/MARKERS AGREEMENT

THIS AGREEMENT dated this 9th day of March, 1976, between the WASHINGTON STATE HIGHWAY COMMISSION, hereinafter referred to as Highways, and the WASHINGTON STATE PARKS AND RECREATION COMMISSION, hereinafter referred to as Parks, is being entered into to implement chapter 19, laws of 1967, Extraordinary Session, codified as RCW 43.51.750, entitled, "PRESERVATION OF HISTORIC PROPERTIES".

For the purpose of this agreement, interpretive signs or markers shall include all devices depicting the state's natural and man-made history, providing for the understanding, enjoyment, and education of the public. They are comprehensive in subject treatment, generally providing information to explain the who, what, when, why and how of the event(s) being interpreted.

IT IS HEREBY AGREED AS FOLLOWS:

1. Highways shall give adequate advance notice to Parks of its tentative plans to locate new highways, as well as its plans for viewpoints and rest areas on existing state rights-of-way, prior to actual construction of such proposed highways or sites in order that Parks may study the proposed highway route and sites to determine whether these areas are located on or near areas of interpretive interest. Parks will likewise give Highways adequate notice of its plans to locate interpretive signs or markers along state highway rights-of-way, and will also notify Highways of where interpretive interests are located off highways.

2. Both parties will cooperate in choosing the location of markers along state rights-of-way. In the interest of public safety, Highways shall make the final determination as to the location of sites on existing or proposed state rights-of-way.

3. In the event an interpretive sign or marker site is selected for a location on land which is not part of an existing highway right-of-way, or right-of-way proposed for highway development, Highways and Parks shall jointly determine the nature and extent of each agencies' obligation for acquisition, development, and maintenance of said land, including roadways necessary to reach the marker site.

4. Highways shall construct and maintain necessary turnouts, parking areas, and placing of various signs within the highway rights-of-way to indicate the interpretive signs or markers, and shall maintain the site area. Parks shall furnish and maintain the signs or markers. The number and location of the markers and signs within the confines of the site area shall be mutually agreed upon by Highways and Parks.

Figure 7-12 Interpretive Signs/Markers Agreement (Page 2 of 4)

5. In the event that a marker must be moved in order that subsequent highway construction may be carried on, Highways shall incur the entire expense of relocation.

6. Other signs, such as those naming local points of interest or for local travel information, shall be the responsibility of Highways, Parks shall provide advice and counsel when requested by Highways as to appriateness of style, design, and text.

7. The markers covered by this agreement shall be those listed in Attachment Number 1 and hereinafter amended subject to paragraphs 1, 2, and 3 of this agreement.

8. This agreement will be fulfilled to the extent that funds are available to each party for the purposes set forth herein.

9. This agreement supersedes and replaces the Interpretive Markers Agreement entered into between Highways and Parks dated September 23, 1969.

WASHINGTON STATE DEPARTMENT OF HIGHWAYS

By _____
William A. Bulley

WASHINGTON STATE PARKS AND RECREATION COMMISSION

By Charles H. Odegaard 3/14/70
Charles H. Odegaard, Director

APPROVED AS TO FORM:

_____
Assistant Attorney General
State of Washington
Department of Highways

_____
Assistant Attorney General
State of Washington
Parks and Recreation Commission

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Figure 7-12 Interpretive Signs/Markers Agreement (Page 3 of 4)

ATTACHMENT NUMBER 1

TO

INTERPRETIVE MARKERS AGREEMENT

MARKER	REMARKS
Deception Pass	Approaches maintained by Highways. Site maintained by Parks in conjunction with maintenance of view points.
Mount Baker	Approach and site maintained by Highways
David Douglas	Approach and site maintained by Highways
Dry Falls	Approach maintained by Highways. Site maintained by Parks (interpretive center) except for snow and ice control performed by Highways on reimbursable basis.
Chief Joseph	Approach and site maintained by Highways
Old Mining Arrastra	Approach and site maintained by Highways
Earthquake Point	Approach and site maintained by Highways
Fort Okanogan	Approach and site maintained by Highways
Destruction Island	Approach and site maintained by Highways
Juan de Fuca	Approach and site maintained by Highways
Discovery Bay	Approach and site maintained by Highways
Totem Symbols	Approach and site maintained by Highways
Mount Rainier	Marker removed to be refurbished by State Parks. To be relocated by Highways to Scatter Creek rest area on I-5.
The Tacoma Narrows	Approach and site maintained by Highways
Hood Canal	Approach and site maintained by Highways
Fort Vancouver	This marker is located next to an Information Center on I-5 in Vancouver. Site Maintenance is performed by the City; approaches from I-5 are maintained by Highways.
First Sawmill	Previously located next to weight station east of Vancouver. Marker being relocated by Highways reason of construction of interchange on I-205.
Columbia River	Approach and site maintained by Highways
Bruceville-Bruceport	Approach and site maintained by Highways
Cowlitz Landing	Approach and site maintained by Highways
Fort Columbia	Approach and site maintained by Highways
Lewis & Clark - Camas/Washougal	Approach to markers from city street other than state highway. Maintenance performed by city.
Spearfish	Approach and site maintained by Highways SR 14 at MP 86.1
Willie Keil's Grave	Approach and site maintained by Highways SR 6 MP 4.4

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Figure 7-12 Interpretive Signs/Markers Agreement (Page 4 of 4)

Attachment Number 1 to Interpretive Markers Agreement - Page 2

MARKER	REMARKS
Point Vancouver or Point Broughton	Marker to be installed east of Washougal on SR 14. Highways will maintain
Lewis and Clark - Clarkston	Approach and site maintained by Highways - removed for highway relocation - should be relocated by Highways on SR 12, MP 431.9
Wai-I-Lat-Pu	Approach and site maintained by Highways
Lewis and Clark - Alpowa Summit	Approach and site maintained by Highways
Fort Walla Walla	Approach and site maintained by Highways
Sacajawea - Ainsworth	Approach and site maintained by Highways
Indian Painted Rocks - Yakima	Approach and site maintained by Highways
Ah-Wah-Tum	Approach and site maintained by Highways
Ginkgo Petrified Forest	To be relocated to Ryegrass Hill Safety Rest Area by Highways
Indian Timothy Bridge	Approach and site maintained by Highways - Parks currently developing marker
Celilo Falls	Approach and site maintained by Highways SR 14, MP 93.55
Steptoe Butte	Approach and site maintained by Highways
Kamiak Butte	Approach and site maintained by Highways
The Mullan Road	Approach and site maintained by Highways
David Thompson	Approach and site maintained by Highways

GM869

Chapter 8 Highway Advertising Control

8-1 General

The department is directed by state law to regulate advertising signs that are visible to Interstate, Primary, and Scenic state highway systems. The Headquarters Traffic Operations Office is responsible for administering the program and often works with Region Traffic and Maintenance staff in reporting and verification of advertising signs. Advertising messages may be displayed by one of several methods:

- **Billboards and other highway advertising signs** may display business logos and advertising print along selected areas of state highways, outside state-owned right of ways. See *Highway Advertising Control* M 22-95.
- **Advertising venues** exist at a number of rest areas along Interstate highways, and at several Ferry Division locations.
- **Motorist Information Signs** display logos for specific types of motorist services on regulated signs within the right of way. See the program website for more information.

8-2 Highway Advertising Signs

Federal and state laws regulate signs located on private property or on public right of ways other than state highway right of ways, which are visible to certain state highways. Many of the laws and regulations are written to express what may be done rather than what may not be done. Thus, signs installed contrary to what the law allows are illegal. The department uniformly applies the regulatory provisions to support traffic engineering principles, for procedural efficiency, and to treat the business community equitably.

A. United States Code, Title 23, Section 131 – Federal laws provide direction to the states through the Federal Highway Administration and the Code of Federal Regulations regarding highway advertising along Interstate and National Highway System (NHS) non-Interstate highways, and at safety rest areas. The states are required to comply with these federal laws and regulations or become subject to a 10 percent reduction in federal aid highway funds.

B. RCW 47.42 – State law, which may be referred to as either the *Highway Advertising Control Act*, or the *Scenic Vistas Act of 1971* or the Act, authorizes and directs the department to regulate highway advertising signs visible to Interstate, non-Interstate NHS, and Scenic highways in accordance with federal and state regulations. The purpose of the Act is to enhance roadside scenic beauty while assuring that information of specific interest to travelers is presented safely, reasonably, and effectively. RCW 47.42 does not regulate advertising sign installations adjacent to other state highways, county roads, or city streets.

C. WAC 468-66 and M 22-95 – The department's manual, *Highway Advertising Control* M 22-95, contains the RCW and WAC rules, regulations, and figures that can be used to help interpret specific laws and regulations, maps to identify the various classes of the state highway system, and graphic appendices that illustrate some of the more complex regulatory language.

D. Classification of Signs and Specific Provisions – WAC 468-66-050 describes the eight advertising sign classifications authorized by the *Highway Advertising Control Act*, and places specific restrictions on each sign type. The information in this section helps traffic operations staff address matters pertaining to these eight sign types.

Type 1 – Directional or other official signs or notices divided into three categories:

Type 1a – Directional Signs – Publicly or privately owned places may contain directional information about publicly or privately owned places that feature:

- natural phenomena
- historical, cultural, scientific, educational, or religious sites
- areas of scenic beauty
- outdoor recreation areas

Type 1b – Official Signs – Official signs shall be erected and maintained by public officers or public agencies, such as a county, city, or county commissioners, for the purpose of carrying out an official duty or responsibility. Official signs shall be located within the governing jurisdiction of the public officer or public agency.

Type 1c – Service Activity Signs – These signs contain only a group name, the location and meeting schedule. These organizations must be nonprofit, such as service clubs or religious organizations. The WAC duplicates a federal regulation that limits the maximum size of Type 1c signs to eight square feet.

Type 2 – For Sale or For Lease Signs – "FOR SALE" or "FOR LEASE" signs shall only advertise the sale or lease of the parcel or real property upon which the sign is located. The property owner or owner's agent name and phone number shall not be displayed more conspicuously than the message "FOR SALE" or "FOR LEASE." WAC 468-66-050(2) allows only the name of the property owner or owner's agent, and their respective phone number as well as the for sale or lease message.

Type 3 – On-Premise Signs – These signs are divided into four categories and also regulate electronic signs visible to the state highway system:

Type 3a – This on-premise sign advertises the activity conducted, or products available, on the property where the sign is located.

Type 3b – This is a business complex on-premise sign that displays the name of a shopping center, mall, or business combination.

Type 3c – This future site on-premise sign is allowed on properties where a planned business will be operating within a year. Signs will typically display the message "future site of" or similar wording.

Type 3d – This temporary political campaign sign expresses a property owner's endorsement of a political candidate or ballot issue.

Electronic Signs – Electronic signs may be used only to advertise activities conducted, or goods and services available, on the property on which the signs are located (Type 3 signs); or, to present public service information as defined in WAC 468-66-010(20).

Type 4 Off-Premise signs – The business or activity advertised on a Type 4 sign shall be within 12 air miles of the sign.

Type 5 Off–premise signs – The off-premise advertising message displayed on the sign must be of specific interest to the traveling public, as described in WAC 468-66-050(5)(b). There is no geographic proximity limitation, such as the 12 air mile limit imposed on Type 4 signs.

Type 6 "Landmark" Signs – These are advertising signs of historic or artistic significance that were lawfully in place prior to October 22, 1965. Currently, there are no permitted Type 6 signs visible to state highways.

Type 7 Public Service Signs Located On School Bus Shelters – Currently, there are no permitted Type 7 signs visible to state highways.

Type 8 Temporary, Seasonal Agricultural Signs – These signs give directional information to specific agricultural activities, and are regulated through a permit process administered by the region. Specific requirements are found in WAC 468-66-050(8).

Signs Subject to Authorizing Permits – State law and the WAC exempt Type 1, 2, and 3 signs from the permit requirements; therefore, permits are required for sign Types 4 through 8. The vast majority of permits issued are for Type 4 and Type 5 signs. Only a small number of Type 8 sign permits have been issued throughout the state. To date the department has not issued any permits for Type 6 and Type 7 signs; however, the WAC includes these as signs that must be placed under permit.

A department issued permit does not preempt the permit holder's responsibility to comply with local agency rules, regulations, and ordinances pertaining to signs and sign structures (RCW 47.42.070). Accordingly, a department issued permit only grants a permit holder the right to erect a sign if it is also authorized under local law.

Inventories – The Headquarters Traffic Office maintains an electronic database inventory of all Type 4, 5, and 8 sign permits. Access to the database is available to region users upon request. The inventory is revised when the Headquarters Traffic Office receives notification from a permit holder or when changes are discovered during field review. The inventory is updated when:

- New permits are issued.
- Existing permits are rescinded or revoked.
- Sign or property owners have changed.
- Signs are modified from their original size.
- The sign or property owner removes signs.

8-3 Advertising at Rest Areas and on Washington State Ferries

Advertising at State Highway Rest Areas – Businesses may purchase advertising space on displays in 20 rest areas located along Interstate 5, Interstate 90, Interstate 82, US 2, and US 395. The rest area advertising program features lighted display kiosks. In rest areas, the only requirement is that services advertised be of interest to travelers. For more information about this program, contact:

Storeyco, Inc. PO Box 357
East Olympia, WA 98540
360-412-0066 or 800-558-7867
www.storeyco.com

Advertising on Washington State Ferries – Businesses may purchase advertising space on several Washington State ferry runs and at 20 terminals. The state ferry advertising program features lighted display boards and video/digital ads. For more information about this program, contact WSDOT's sales contractor:

Certified Folder Display, Inc.
2407 South 200th Street
SeaTac, WA 98198
206-870-2470
weldonv@certifiedfolder.com
www.certifiedfolder.com
800-799-7373

Chapter 9 Traffic Planning, Safety, Operations, and Design

9-1 Overview

9-1.1 *General*

The Traffic Office can be involved in planning studies, safety analysis, project design, and operations. This chapter contains information that can be helpful when working in the above project phases.

The Manual on Uniform Traffic Control Devices (MUTCD) is used as a resource for projects that include traffic items.

9-1.2 *Transportation Systems Management and Operations (TSMO)*

While the activities that the Traffic Office can be involved with may seem to happen in isolation from other distinct efforts, the decisions made at any one stage affects project lifecycles and all elements of the multimodal transportation system from cradle to grave. Viewing these types of efforts and how they influence WSDOT's ability to deliver, maintain, and operate the transportation system as a whole is foundational to the definition of TSMO as applied in Washington. TSMO covers a broad range of categories and associated strategies that encompass a better balance approach to transportation engineering, planning, and operational activities with a look toward the future and keeping both the maintainability and sustainability in mind. For more detailed information, visit TSMOWA.org.

9-1.3 *Maintenance*

Whether reviewing an existing facility or constructing a new project it is important to consider impacts to maintenance. Working with the maintenance division allows the traffic office to implement projects such as Low Cost Enhancements (LCEs) more readily.

9-1.4 *Active Transportation*

In each area of Planning, Safety, Design, and Operations multimodal and active transportation should be considered. Active Transportation has resources for the safety and mobility of pedestrian and bicycle traffic as well as safe routes to school. Also see Chapter 4.

9-2 Planning

Guidelines and criteria for corridor planning studies can be found *here*, the Transportation Corridor Planning Studies Guidelines and Criteria. The Traffic Office can be involved in planning studies, especially with traffic and safety analysis. The Safety Guidance for Corridor Planning Studies documentation provides more information for safety. Traffic analysis is addressed in Chapter 12.

9-3 Safety

9-3.1 *General*

The Washington State DOT requires safety analysis for all projects, the analysis is scalable depending on the scope and type of project. The Safety Analysis Guide (SAG) goes into more detail on safety analyses for each project type.

9-3.2 *I2 Program*

Every biennium the HQ Traffic Office develops lists for potential safety projects based on a statewide network screening, these are the Crash Analysis Location/Crash Analysis Corridor/Intersection Analysis Location (CAL/CAC/IAL) lists. The locations on the lists require region input and sometimes analysis to determine if there are viable cost effective safety countermeasures. If the region determines that a countermeasure can be applied, more detailed analysis will be completed to develop a Crash Analysis Report (CAR), which will then be presented to the I2 Panel for endorsement.

The HQ Traffic Office is responsible for the Highway Safety Issues Group (HSIG) and I2 Panel meetings which occur quarterly to discuss safety projects and practices.

HSIG involves other divisions and all regions to communicate current efforts in safety methodology, programs, and funding. The I2 Panel involves the region traffic engineers as well as other experts to discuss and endorse safety projects based on a statewide priority, from the CAL/CAC/IAL lists.

9-3.3 *Human Factors*

When performing safety, or operational, analyses it is important to also keep in mind how the roadway users will interact with or perceive their environment and how human factors have influenced the safety performance. Currently there is no WSDOT specific manual or guidelines on human factors, however NCHRP and FHWA have research and documentation on the subject. Chapter 2 of the HSM (2010) and NCHRP Report 600, (Human Factors Guidelines for Road Systems, 2nd Edition, 2015) are valuable resources that can be used to perform human factors task analysis and specific human factors considerations during design.

9-3.4 *Target Zero*

Washington State has committed to the Target Zero plan, in an effort to reduce fatal and serious injury crashes to zero. The Washington Traffic Safety Commission (WTSC) prepares a Target Zero report every three years detailing trends in crashes statewide at the state and local agency levels. This report helps guide where to spend resources, such as prominent crash types

9-4 Design

9-4.1 *General*

Whether reviewing design plans or developing a Low Cost Enhancement (LCE) the *Design Manual* and *Standard Plans* are important resources to have. When reviewing design plans it is important to evaluate not only how the facility will operate, but how maintenance will be performed as well. Consult the area and signal maintenance crews as needed.

In general projects originating from the Traffic Office will be LCEs. These projects must be documented per Traffic Office procedures. Design Bid Build (DBB) contracts must be documented per the *Design Manual*.

9-4.2 *QBOD*

The QBOD is a version of the Basis of Design specifically for Q projects. The Policy and template can be found *here*.

9-4.3 *Signals, Illumination, and ITS*

Guidance and information on electrical design and implementation can be found *here*.

9-5 Operations

9-5.1 *General*

The traffic office is responsible for project reviews as well as operational policies and implementation of various elements of statewide traffic control, ITS deployments, LCEs, etc. on state facilities, employing TSMO principles with a focus on safety and mobility.

9-5.2 *Traffic Systems and other Statewide Electrical Systems*

Traffic Electrical Systems manages standards and policies for all highway lighting, traffic signal, intelligent transportation system (ITS; includes Commercial Vehicle Program field equipment), and associated power distribution systems. This includes the entire life cycle of this equipment, from initial selection, through planning, design, construction, and maintenance, to replacement and/or removal. The HQ Traffic Office is developing a manual specific to lighting, traffic signal, and ITS regarding the design, construction, material, and maintenance standards of these systems. For training and current resources consult headquarters and the Traffic Design – Signals, Illumination and ITS website.

9-5.3 *Intelligent Transportation System (ITS) and Corridor Operations*

ITS and Corridor Operations focuses on the coordination and utilization of technology to manage a corridor, maximizing safety and efficiency. Activities include optimizing traffic signals, operating ramp meters and active traffic management systems, integrated corridor management, and using traffic cameras, traffic data collection systems, road/ weather information systems, and variable message signs to provide up to date information to travelers. Included in this effort is the operation of six year-round traffic management centers across the state and one winter operations center at Snoqualmie Pass, supported by software, web application IT development, and maintenance staff.

Each Regions' Traffic Management Center (TMC) has its own standard operating procedures/ guidelines and system standards and is subject to specific regional ITS architectures, systems engineering, and concept of operations documents. However, overarching agency policies exist for certain systems, activities, and functions for the sake of consistency and resiliency (in the event of statewide emergencies and continuity of operations, for instance). Some internal applications and TSMO-related tools, policies and procedures are located under Tools & Services on the intranet site.

Similarly, capabilities and systems vary among each Region regarding legacy traffic signal equipment and software. Standardization of equipment, specifications, and operational practices are underway including the increasing use of automated traffic signal performance measures (ATSPMs), multimodal detection and operations, signal preemption and priority treatment.

For training and current resources consult the HQ Traffic Office.

9-5.4 *Field Assessment (FA)*

A. Overview

In September of 2014 the Field Assessment program was created to replace the identification of WSDOT's safety efforts, previously implemented as spot safety investments associated with pavement preservation and in alignment with FHWA's stewardship agreement at the time. Field assessments are a programmatic approach to review all state highways to identify safety improvement opportunities, evaluate potential benefits and risks, and develop lower cost spot safety enhancements that can be incorporated into a paving project.

By systematically reviewing all highways using a consistent statewide approach, Region Field Assessment engineers are able to identify potential fatal and serious crash reduction opportunities, address emerging crash trends, and recommend incremental solutions.

The Field Assessment program is comprised of two Field Assessment engineers in each region and a headquarters program manager.

B. Methodology

Annually, each region Field Assessment team reviews 270 miles of state highways. Field assessment evaluations may include: identification of striping and signing needs, rumble strips, channelization, curve mitigation, lane use, and pedestrian and bicycle operations. Community and local law enforcement outreach are key elements of the program. As part of the analysis, the Field Assessment program conducts a traffic engineering review and crash analysis for the location or corridor being surveyed.

Several miles of these assessments are conducted in advance of paving projects (2-3 years) in an attempt to incorporate solutions into the paving projects to minimize traffic impacts. Once solutions have been identified and prioritized, Region Traffic and Program Management work together to coordinate identified solutions to be included into P1 Pavers. This makes for an efficient use of traffic control and contractor construction.

C. Benefits

By analyzing highway segments for potential crash reduction, selecting appropriate countermeasures, and then prioritizing them, we are in alignment with WSDOT's Sustainable Highway Safety Program.

These reviews provide a consistent statewide approach in crash risk reduction for the P1 Paving program.

9-5.5 *Transit/Public Transportation*

Transit and public transportation can have a large impact on operations and should be a consideration for traffic reviews and projects. The Public Transportation Division has further information on sustainable transportation, park and rides, and other transit related topics. The Public Transportation Division can help find ways to reduce transportation demand and to improve access for people.

9-5.6 *Traffic Impact Analysis (TIA)*

When new developments occur the traffic office may need to perform analyses for traffic and potentially safety impacts from the increased volumes. Safety impacts will need to be addressed especially if the impacted facility has been identified on the CAL/CAC/IAL lists. The *Developer Services Manual* has information relating to TIAs. Specific details on TIAs can be found in the *Design Manual* Chapter 320.

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Chapter 10 Intersection Control Evaluation

10-1 Introduction

Intersection Control Evaluations (ICE) are data-driven, performance-based framework used to objectively screen alternatives and identify an optimal geometric and control solution for an intersection. ICE studies can include more than one intersection including corridors as needed. ICE policy is intended to be flexible, adaptable, and provide a transparent multimodal decision making process.

Intersection Control Evaluations and their purpose have evolved since "intersection control" choices have shown to be so critical to reducing crashes and increasing efficiency of our transportation system. This process also extends to multi-modal aspects being considered as our transportation system has become more focused on the people carrying capacity of a facility, not solely the vehicle capacity.

The data driven process as outlined in *Design Manual* Chapter 1300 (currently titled Intersection Control Type in 2018 version) is a final recorded decision by the Region Traffic Engineer with concurrence from the State Traffic Design Engineer on those projects and their intersection control choice(s) selected. Projects that require ICE documentation are usually alterations of existing intersections or new intersections being proposed on the system within a project.

A signed and approved ICE document is the requirement. It is scalable and flexible in content to achieve a selection supported by data. It should be noted that in previous design and guidance documents, ICE has also been called ICA (Intersection Control Analysis) and ICT (Intersection Control Type).

10-2 References

- *Design Manual* Section 1300.05
- FHWA Intersection Control Evaluation website

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Chapter 11 Traffic Engineering Records Management

11-1 Overview

This chapter describes the guidelines for managing traffic engineering records. A records management system must comply with state and Washington State Department of Transportation (WSDOT) record-keeping rules, and provide for record storage in easily accessible locations. Both paper records and electronic records are equally subject to public record laws and the retention rules provided by these guidelines.

11-2 WSDOT's Record Management Guidelines

A. Originals and Copies – The office that creates the original document is responsible for the maintenance, retention, and destruction of the document, except:

- When an original document is sent to another office/division/region within WSDOT, the office receiving that original assumes the responsibility for the maintenance, retention, and destruction of the document.
- When an original document is sent outside WSDOT, the copy made for the WSDOT sender's file becomes the original and must be maintained accordingly.
- When the content of a copy is changed, the resultant copy becomes a new original and must be maintained accordingly. However, a copy that has not been changed is not subject to a retention schedule.

B. Two Types of Retention Schedules

1. The Washington Secretary of State's general records retention schedule covers records that represent the operations of all state agencies.
2. The WSDOT unique retention schedule covers records created specifically for WSDOT. This schedule is managed by the department's Records and Information Services Office.

   Public records may not be destroyed until they have been retained for the minimum time period identified in the retention schedule (see Section 11-4).

C. Paper Record Destruction – Shred paper records having confidential and/or sensitive information. The Records Destruction Log (WSDOT Form 720-025) must be completed and signed by the Records and Information Services Office prior to destruction.

Paper records not having confidential and/or sensitive information may be recycled.

11-3 Secretary of State's Office, General Records Retention

The Secretary of State's general records retention schedules identify 47 record series titles, arranged into six functional areas. The six categories cover records relating to audit, contracts and purchasing, general office operations (non-executive), executive level documents, legal files, legislative relations, and administrative material.

Specific items within each category have an assigned retention period and may have special instructions for the items after the retention period has elapsed.

11-4 Traffic Engineering Records Retention

Retention schedules are based on WSDOT and Secretary of State guidelines and must be approved by the Office of Records and Retention, the Secretary of Transportation and the Secretary of State. This section covers records relating to Traffic Operations (Office Number 175) and displays the latest, approved records retention schedule by the Office of Records and Retention, the Secretary of Transportation and the Secretary of State on February 2, 2021.

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
21-02-69620 Rev. 0	**Regional Traffic Policies, Studies, and Calendar Actions** Records relating to Regional traffic policies, studies, and calendar actions that support region decision making for traffic operation actions. Includes but is not limited to: Region Policies: • Signal Policy • Illumination Policy • Pre-Planned Detours Region Studies: • Ball Bank Studies Region Calendar Action Items: • Stop Controlled Installation • Turn Movement Restrictions • Tow-Away Zones • Weight Restrictions • Regulatory Speeds in Rest Areas, Weigh Stations, and Ferry Terminals • Pedestrian Prohibitions on Partial or Modified Access Control Highways • Roadside Parking Restrictions (except for angle parking) • Prohibitions on Fishing or Jumping from Bridges • Emergency or Construction Closures • Midblock Pedestrian Crossings • See *Traffic Manual* Chapter 6, Regulations, for a Comprehensive List of Calendar Action Items		Retain until superseded then destroy	Non-Archival

Archival?	☐ Yes	☐ No
Essential?	☐ Yes	☐ No
Exempt?	☐ Yes	☐ No
Imaged?	☐ Yes	☐ No

Description

These records are retained at the Region. All approved Region Calendar Actions shall use electronic Adobe signatures.

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
21-02-69621 Rev. 0	**Speed Related Records & Headquarters Calendar Actions** Records relating to calendar actions. Includes but is not limited to: • Regulatory Speeds (outside construction and maintenance work zones) • Computerized Listing of Posted Speed Limits • 20 mph School Speed Zones Established Under WAC 468-95-330 • Bicycle Prohibitions on Limited Access Highways • Truck Restrictions (including trucks hauling hazardous material) • HOV Lane Designations • Hard shoulder running • Angle parking on state and federal-aid highways • Parking restrictions for park and ride lots and other parking facilities • Regulation of sales within state parking facilities • Permanent weight restrictions. • See *Traffic Manual* Chapter 6, Regulations, for a Comprehensive List of Calendar Action Items		Retain until superseded then Transfer to Washington State Archives for permanent retention	Archival

Archival?	☐ Yes	☐ No
Essential?	☐ Yes	☐ No
Exempt?	☐ Yes	☐ No
Imaged?	☐ Yes	☐ No

Description

These records are retained at Headquarters. All approved Calendar Actions shall use electronic Adobe signatures.

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
21-02-69622 Rev. 0	**Safety Analysis** Records relating to safety analysis. Includes but is not limited to: • Crash Analysis Reports (CAR)s • IAL, CAL, CAC Lists and Methodology • Region Safety Studies – Supporting analysis and documentation • Field Assessment Safety Studies – Supporting analysis and documentation		Retain for 10 years after completion of study then Transfer to Washington State Archives for permanent retention	Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description The CARs, IAL, CAL, CAC Lists and Methodology are retained at Headquarters. All approved CARs shall use electronic Adobe signatures. The Region Safety and Field Assessment Safety Studies are retained at the Region.				

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
GS 10016 Rev. 0	**Major Traffic Studies** Records relating to traffic studies and work orders. Includes but is not limited to: • Intersection Control Analysis/ Evaluation (ICE) Reports • Region State Force Work – Work Orders – Supporting analysis and documentation • Region LCE Q Projects – Supporting analysis and documentation • Region Speed Studies • Region Traffic Analysis – Traffic model files – Traffic modeling assumptions, parameters, outputs		Retain for 6 years after completion of study then Transfer to Washington State Archives for permanent retention	Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description The ICE reports are retained at Headquarters; all other records are retained at the Region. All ICE reports shall use electronic Adobe signatures.				

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
80-09-25558 Rev. 3	**Project Development and Construction Traffic Support Documentation for all Capital and Preservation Projects** Records relating to preliminary engineering records used to program projects and construction projects. Includes but is not limited to: • Project Summary Files • Vicinity Maps • Estimates • Scope of Work Agreements • Work Zone Approvals, Traffic Control Strategy, Washington State Patrol Agreements • Speed Reduction Approvals • Temporary Service Agreements • Backup Calculations ***Note:*** Final traffic records are located in Design Documentation Package (80-09-25558) and the Construction Contracts, Plans and Specifications; Final Records, As-Builts (80-04-24635		Retain for 75 years after design approval date then Transfer to Washington State Archives for permanent retention	Archival

Archival?	☐ Yes	☐ No
Essential?	☐ Yes	☐ No
Exempt?	☐ Yes	☐ No
Imaged?	☐ Yes	☐ No

Description

This is for Capital and Preservation Projects funded outside of the Q Program. All original records are sent to the Design Office.

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
GS 01050	**Agreements** Records relating to maintenance or other agreements. Instruments signed by the agency and one or more parties that set out terms and conditions to which the signing parties agree or submit. Includes but is not limited to: • Memorandum Of Understandings (MOUs) and Letter Of Understandings (LOUs) with Local Agencies and Others • Interagency, intra-agency, and inter-agency agreements • Related correspondence/ communications		6 years after termination or expiration of instrument	Non-Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description These records are retained at the Region. All approved Agreements shall use electronic Adobe signatures.				

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
81-08-28722 Rev. 2	**Traffic Operations Assets** Records relating to traffic operations assets. Includes but is not limited to: • Illumination Devices • ITS Devices • Traffic Control Signs • Sign Replacement Records • Traffic Signal File – *Manual of Uniform Traffic Control Devices* warrants – Analysis – Signal Permit – Related Support Documentation ***Note:*** The Traffic Signal File shall contain all records relating to the documentation and basis for installation of traffic signals.		3 years after life of asset then destroy	Non-Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description These records are retained at the Region. All approved Signal Permits shall use electronic Adobe signatures.				

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
88-01-41517 Rev. 1	**Records relating to Traffic Service Files (TRACTS files)** Records relating to customer traffic services inquiries. Includes but is not limited to: • Constituent Correspondence • Agency Responses • Resolutions ***Note:*** All supporting documents shall conform with the appropriate retention schedule		Retain for 10 years after end of calendar year then destroy	Non-Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description These records will be contained in the new version of the TRACTS Program.				

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
84-08-34393 Rev. 3	**Traffic Management Center (TMC) Documentation Package** Records relating to the Traffic Management Center's operations records. Includes, but is not limited to: • Routine roadway operations such as ramp metering, bridge and tunnel alerts, mountain pass reports, variable speed limit information, and maintenance notifications; • Emergency roadway operations such as detour routes, signal plans, road closure coordination, region emergency operations center activation and disaster notifications; • Washington Incident Tracking System (WITS) and incident management such as notifying/ dispatching incident response crews, ITS device operations, incident alerts, and weather monitoring alerts; • Traveler information such as ROADS/511/Web data input, highway advisory radio, and variable message sign operation; • Radio and administrative operations such as communication with field personnel, AMBER/ Silver/Blue/missing person alerts, road condition alerts, and service requirements; • Multi-agency coordination such as disseminating incident information and TMC correspondence with other agencies during an incident.		Retain for 6 years after end of fiscal year then Destroy	Non-Archival

Archival?	☐ Yes	☐ No
Essential?	☐ Yes	☐ No
Exempt?	☐ Yes	☐ No
Imaged?	☐ Yes	☐ No

Description

Database or other electronic files related to statewide and joint operational applications are inventoried and retained with Headquarters. All other systems (e.g. NG_TMS), media, and paper files are retained at the Region.

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
20-06-69497 Rev. 0	**Traffic Management Center (TMC) Closed Circuit Television (CCTV) Feed** CCTV images captured by WSDOT cameras on state highways. Feed may include all or portions of the following documentation: • Automatic image; • Video recording. Excludes: • Video footage of security incident or emergency which requires further review covered by Security Incidents and Data/Privacy Breaches (DAN GS 25008)		Retain until no longer needed for agency business, then Destroy	Non-Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description Records related to statewide and joint operational applications are retained with Headquarters. All other systems are retained at the Region.				

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
80-09-25916 Rev. 5	**Auto Traffic Recorder Data – Base Data** Records relating to daily and sub-daily travel data captured by permanent traffic recorders.		10 years after end of calendar year then Destroy	Non-Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description All records are retained at the Region.				

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
GS 50012 Rev. 0	**Records Documented as Part of More Formalized Records** Records where the evidence of the business transaction has been documented as part of another more formalized record of the agency which is retained in accordance with the current approved minimum retention period. Includes but is not limited to: • Working, rough notes, voicemail messages, text messages, social media posts, etc., • Raw data, statistics, survey responses that have been consolidated, aggregated into another record. Excludes: • Electronic records (such as emails) that have been printed to paper. ***Note:*** Electronic records need to be retained in electronic format in accordance with WAC 434-662-040.		Retain until verification of successful conversion, keying, transcription then Destroy	Non-Archival

Archival?	☐ Yes	☐ No
Essential?	☐ Yes	☐ No
Exempt?	☐ Yes	☐ No
Imaged?	☐ Yes	☐ No

Description

All records are retained at the Region.

Disposition Authority Number (DAN)	Record Title	Media Type	Retention	Disposition
81-04-27589 Rev. 1	**Radio Licenses** Provides a license to operate two-way radios and radio facilities within the State of Washington.		10 years after expiration of license	Non-Archival
Archival? ☐ Yes ☐ No Essential? ☐ Yes ☐ No Exempt? ☐ Yes ☐ No Imaged? ☐ Yes ☐ No				
Description Depending on FCC regulations, a master copy will be retained at the ITS Communications & Wireless Technology Office, at the Site and/or at the Region.				

After the retention period, the office may choose to consider the records essential and maintain them in decentralized files rather than archiving.

11-5 Key Words and Phrases

Active Records – Records that are referenced more than once per month per file drawer are considered active. Active records should be maintained in the office.

Administrative Files – Records documenting the operation, management, and administration of an office; usually distinguished from program records that relate to the office's primary functions.

Decentralized Files – Files created, used, maintained, and controlled in or near the office of record.

Design Documentation – The documents that explain design decisions and the design process followed.

Essential Records – Public records, which are needed to protect assets, obligations, and resources of state agencies, and are necessary to provide for the continuity, preservation, and operation of state government.

File Plan – A list of records sorted by category, located at a file station, which may include retention periods, file codes, methods of filing, and disposition instructions.

Inactive Records – Records with a reference rate of less than one search per file drawer per month. Such records may be transferred to an inactive records storage center.

Non-Essential Records – Records including information-only copies of documents used for reference or convenience, transmittal memos, copies of memoranda, bulletins, personal e-mails, electronic newsletters, catalogs, published reference materials, and any documents not related to agency business.

Office Files and Memoranda – Records that have solely administrative value and do not fall within the classification of official public record.

Official Public Record – A public records classification established by RCW 40.14.010(1) for records having legal or fiscal value, such as vouchers, receipts, and other documents, that prove the validity of every transaction relating to the use of public property/income. Legislative records are also official public records.

Permanent Records – Archival records that should be retained without weeding or sampling because of their legal and/or historic value.

Primary Record Copy – The original or official copy of a record.

Project (Case) Files – Groups of documents that pertain to a particular action, event, person, or place, such as a speed limit change or special event approval.

Sampling – The process of selecting records from a collection, to represent the collection as a whole, and disposing of the remainder of the records.

Weeding – The process of identifying and removing records with no, or limited, administrative, legal, fiscal, or historical value.

Working File – A file of rough notes, calculations, or preliminary drafts that are assembled and used to prepare or analyze other documents. Working files are usually retained in personal desk files or filed separately until project completion.

11-6 Inventory Record of Site-Specific Traffic Control Device Installations

Some areas have site-specific traffic control device installations to address traffic operational issues. These installations typically exceed the MUTCD, *Design Manual*, or *Standard Plans* minimums, and are intended to be maintained, as installed, until construction projects or other factors eliminate the need for the treatments.

The regional Traffic Offices should maintain an inventory record of these locations to assure that future maintenance activities retain the pattern of the treatments applied. To help assure the desired maintenance level, store the inventory in a server accessible by both regional traffic and maintenance staff and alert maintenance staff when the site- specific treatments are installed.

11-7 Executive Orders, Statutes, and Official Guidelines

A. WSDOT Executive Order E 1037, *Electronic Records and Document Management* – This executive order directs any WSDOT employee who produces, receives, distributes, or forwards an essential electronic record or document to:

1. Create, manage, and store essential electronic records, documents, and information in an easily located format.
2. Keep essential electronic records and documents according to state and department retention guidelines.
3. Delete all non-essential records or place the non-essential records in an electronic file managed by the employee. Employees will delete these files when they become outdated, the purpose of the record is fulfilled, or no longer useful to the employee.

Store essential records on a shared server so that records are accessible by all the regional Traffic Office staff. Non-essential records may be stored on a server provided for individuals.

B. Statutes and Policies

1. RCW 40.14 *Preservation and destruction of public records*
2. RCW 42.56 *Public records act*

C. Electronic Records – WSDOT Executive Order E 1037 *Electronic Records and Document Management*

D. Paper Records – Secretary of State's General Records Retention Schedules

E. Public Disclosure of Record

- WSDOT Executive Order E 1041 *E-Discovery and Preserving Evidence*

F. Other – WSDOT Executive Order E 1010 *Certification of Documents by Licensed Professionals*

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Chapter 12 Multimodal Traffic Impact Analysis Guidelines

12-1 Introduction

This chapter is intended to address state of the art issues associated with WSDOT multimodal traffic analysis. It is not intended to address the specifics of demand fore casting; mesoscopic, analytical/deterministic, stochastic microsimulation; or safety performance analyses. For those items, see the latest versions of the *Highway Capacity Manual*, WSDOT: Vissim Protocol, Synchro and SimTraffic Protocol, Sidra Brochure, Traffic Analysis Guidebook, and *Highway Safety Manual* (HSM).

Traffic analysis results are developed to produce information for decision makers; they are not intended as a stand-alone tool for making decisions. Consideration of empirical data, similar traffic situations, studies, local knowledge, and seasoned traffic engineering and planning experience can also add to a pool of traffic information that is provided to decision makers.

- Follow this link to access the *Traffic Manual* MTIAG

12-2 References

- WSDOT *Design Manual* Chapter 320
- FHWA Toolbox for Analysis
- WSDOT Design-Traffic Analysis

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