Chapter

2

DESIGN CONTROLS AND CRITERIA

2.1 INTRODUCTION

This chapter presents the primary design controls and criteria that are integral to the development of any highway project. Understanding the traffic characteristics, providing for all transportation modes, selecting the appropriate design vehicle and design speed, and determining the access management strategy are all key to successfully delivering a project that meets the goals and values of Practical Design. Each of these design controls and criteria are discussed separately in the sections of this chapter; however, the intent is that all these considerations should be taken holistically for the best possible outcome.

2.2 TRAFFIC CHARACTERISTICS

Roadway designers need a basic understanding of traffic flow and characteristics (including bicycle, pedestrian, freight and transit) to be able to develop safe and effective facility designs. This understanding is as fundamental to sound design as geometric, hydraulic, or structural considerations. Designers don't necessarily need to be experts on analysis, but they do need to be familiar with basic concepts in order to develop projects that will meet agreed upon goals and objectives.

There are four major components that affect the character and flow of traffic:

1. Vehicles (including autos, trucks, bikes, pedestrians, and transit)
2. Facility character and functional requirements (not the same as Functional Class)
3. Drivers/Users
4. Traffic Demand that is to be accommodated (again, for all types of traffic)

Additionally, there are other factors that affect the four main components, including:

1. Weather/Seasonal Variations
2. Completeness of the facility network (Arterials, Collectors, Locals)
3. Overall context/location (Rural, Suburban, Urban) and development patterns
4. Availability of Transit/Park & Ride, etc.
5. Intermodal connections (such as Rail to Highway, Highway to Ports)

Analysis of traffic data (for all modes) can be complex and is subject to many variables. Designers need to consult with ODOT's Transportation Planning Analysis Unit (TPAU) and Region Traffic Units to get a clear understanding of traffic data and characteristics. Since traffic staff are always included as members of Project Teams, they can provide specific and detailed guidance to design personnel. Decision making on projects needs to be a collaborative effort - designers should also communicate back the "physical world" perspective during decision making and design. Neither traffic nor geometric design is an exact science, so allowances are necessary to accommodate the inherent uncertainties.

Tools are available to aid design personnel in understanding traffic needs and analysis. Chapter 2 of AASHTO *"Policy on Geometric Design of Highways and Streets - 2011"* has an excellent detailed discussion on Traffic Characteristics – it is written with designers in mind. TPAU has developed an *"Analysis Procedures Manual"*. This document provides current methodologies, practices, and procedures for conducting long term analysis for ODOT plans and projects.

2.3 ACCOMMODATION AND DESIGN FOR PEDESTRIANS AND BICYCLISTS

ORS 366.514 requires that ODOT, cities and counties provide walkways and bikeways wherever a highway, road or street is being constructed, reconstructed, or relocated. They are not required if:

1. Scarcity of population or other factors indicate an absence of any need;
2. Costs are excessively disproportionate to need or probable use; or
3. Where public safety is compromised. The designer should start with the assumption that accommodation is required, and seek an exemption only where it is obvious that one of the three above exceptions applies. The designer should also reference planning documents to see if prior efforts have already established if sidewalks or bikeways are needed.

On a simple preservation project additional accommodation is not required. As part of the practical design process, the project charter will identify the purpose and need of the project, including any required accommodation for pedestrians and bicyclists.

The Americans with Disabilities Act (ADA) is a federal Civil Rights law that mandates both the private and public sectors to make their facilities accessible. For ODOT, that means that pedestrian facilities must be built so people with mobility, visual or cognitive limitations can easily use them. Consult the most current ADA Standards for Accessible Design and Public Right-Of-Way Accessibility Guidelines in addition to the information provided in this manual.

One of ODOT's three goals tied to the agency mission statement is to "improve Oregon's livability and economic prosperity". Many ODOT highways operate as the "Main Street" in a community. Shopping districts with the most comfortable and pleasurable pedestrian walking environments have shown to be the most successful. Therefore, comprehensive pedestrian design, rather than basic accommodation should be considered in Special Transportation Areas (STAs – see Chapter 6) and downtown districts. Bicycle tourism is a significant industry in Oregon that also impacts Oregon's livability and economic prosperity. Comprehensive bicycle facility design, rather than basic accommodation should be considered along designated bicycle routes.

Refer to Chapter 13 for design standards of pedestrian and bicycle facilities. The following principles should be considered when designing pedestrian and bicycle facilities.

2.3.1 DESIGN PRINCIPLES FOR PEDESTRIANS

1. Pedestrians tend to take the shortest route between two points. The pedestrian's path of travel should be direct with minimal out-of-direction travel.

    - Pedestrian walkways should not meander.
    - Provide walkways on both sides of a street. When sidewalk is provided on one side of the street, but not the other, most pedestrians tend to stay on the side without sidewalk, rather than cross the street; the sidewalk itself does not lure most pedestrians to cross the street.
    - The typical maximum distance pedestrians walk are as follows: 1 mile for work commute, ½ mile for transit and other trip purposes.

2. Pedestrian travel patterns are less predictable than those of bicyclists or motorists.
3. About 50 percent of pedestrian traffic is shopping-related. About 11 percent is commute-related. Peak pedestrian volumes are not during the peak commuter times for motor vehicles, they usually occur near the noon hour.
4. Designs must accommodate pedestrians of varying abilities and disabilities.

    - Obstructions in walkways reduce the effective width for pedestrians and can make walkways inaccessible for persons with disabilities.

5. Regular pedestrian crossing opportunities should be provided in business districts.

    - All legs of an intersection should be open to pedestrians.
    - All legs of an unmarked intersection are crosswalks.
    - When a crosswalk is striped across one leg of an intersection, the un-striped, opposite leg is no longer a lawful crosswalk.

2.3.2 DESIGN PRINCIPLES FOR BICYCLISTS

1. Bicycle accommodation is required on all highways, except those described in OAR 734-020-0045.

    - Bike accommodation should be continuous on both sides of the roadway.

2. Bicycles are vehicles and should be accommodated as roadway users where possible.

    - The path for bicyclists should be direct, logical and close to the path of motor vehicle traffic, making bicyclist movements visible and predictable to motorists.
    - Safe on-street bicycle accommodation includes bicycle-safe drainage grates and adjusting manhole covers to street grade.

3. Designs may also accommodate bicyclists of lesser abilities.

    - Only in rare cases should bicyclists be required to proceed through intersections as pedestrians.
    - Oregon law (ORS 814.420) requires bicyclists to use a bike path or bike lane, rather than the roadway travel lanes, if a bike path or bike lane is provided.

4. Bicyclists are affected by steep grades more than motorists or pedestrians are.

2.4 DESIGN VEHICLES

In selecting the appropriate design vehicle, many factors must be considered such as the number and type of trucks, functional classification of the highway, freight route designation, and the effect on other modes including pedestrians and bicycles. The design vehicle is typically the largest vehicle that normally uses the highway without a special permit. After determining the appropriate design vehicle, a decision needs to be made as to the level of design accommodation to be made. For example, at an intersection, will the radii be designed for the design vehicle or to accommodate the design vehicle? The concept of designing for the design vehicle is to provide a path for the vehicle that is free of encroachments upon other lanes. Providing a design that accommodates the design vehicle means that some level of encroachment upon other lanes is necessary for the vehicle to make a particular movement (see Figure 8-1). A balanced design approach takes into consideration more than just the amount of room the design vehicles requires. For example, what is the intended operating speed of the facility? Fully designing for a large design vehicle may result in higher than desired speeds. What is the context? In a traditional downtown, it is desirable to provide priority to pedestrians over other modes. An example of an intersection that would need to be designed for the design vehicle with no encroachment into adjacent lanes would be a rural stop controlled intersection with a state highway, the highway being two lane or multi-lane with higher speeds and/or high traffic volumes. If a traffic study concludes that finding a gap in multiple traffic flows is not possible, the intersection would need to be designed for the design vehicle so it can turn into a single lane. Other factors to consider are the effects on pedestrians and bicycles: For example, large turning radii at intersections result in long crossing distances and longer exposure times for pedestrians negatively impacting safety. Also, with larger radii, motorists tend to take turns at higher speeds. So, designing for a large design vehicle tends to make the intersection less safe for most of the users of the intersection. Therefore, rather than designing for the design vehicle, the design should normally accommodate the design vehicle in consideration of the overall safety of the highway.

In addition to the design vehicle, the occasional larger vehicle may need to use the highway. Coordination with the Motor Carrier Transportation Division is required to determine if any vehicles larger than the design vehicle are allowed on a highway by permit and what level of accommodation needs to be provided.

2.5 DESIGN SPEED

Design speed is a selected speed used to determine the various geometric design features of the roadway. The selected design speed should be consistent with the speeds that drivers are likely to expect on a given highway. The design speed of a project may have a direct impact on the cost, safety, and quality of the finished project. With the exception of local streets, the chosen design speed in rural areas should be as high as practicable to attain a specified degree of safety, mobility, and efficiency while taking into consideration constraints of environmental quality, social and political impacts, economics, and aesthetics. In urban situations, the design speed should generally be equal to or higher than the posted speed of the particular section of roadway and consider land use, pedestrian needs, safety, and community livability. Care must be taken to not confuse design speed with operating speed, posted speed, 85th percentile speed, or running speed. See AASHTO's "*Geometric Design of Highways and Streets - 2011*" for a detailed explanation of each of these different kinds of speeds.

The selection of a design speed for any given project is dependent on several factors. These factors include traffic volume, geographic characteristics of an area, functional classification of the roadway, number of travel lanes, 85th percentile speed, roadway environment, adjacent land use, and type of project being designed. Design speeds are generally selected in increments of 5 mph.

When selecting an appropriate design speed, the roadway section in question as well as adjacent sections to the proposed project are considered. Within the project, the chosen design speed should be applied consistently throughout the section keeping in mind the speed a driver is likely to expect. This is very important when dealing with horizontal and vertical alignments, superelevation rates, and spiral lengths. For example a project with a selected design speed of 55 mph may consist of multiple horizontal curves. All horizontal curves should be designed for 55 mph along with the appropriate superelevation and spiral length for the design speed. The proper use of design speed creates consistent roadways and expectations for the driver. Due to economical or environmental reasons all curves may not be able to achieve the desired design speed. In those cases it is important that the driver be advised of the lower speed condition ahead with the use of curve warning signs.

Finally, selecting the appropriate design speed for a particular section must consider transition areas from rural to urban environments. Providing a smooth and clear transition from high rural speed conditions to urban environments is critical in controlling drivers' perceptions of the areas they are entering. These transitions alert users of the changing environment, and control vehicular speeds as they enter various urban environments. The most common and effective transitions are those that establish a different roadway culture such as sidewalks, buffer strips, and raised medians. Another common technique for transition areas is visual narrowing of the roadway. This can be accomplished with raised islands, buffer strips, and landscaping.

Chapter 13 discusses design speed on shared-use paths

2.5.1 85TH PERCENTILE SPEED

The 85th percentile speed is that speed at or below which 85 percent of the drivers operate their vehicles. The 85th percentile speed assists in determining the posted speed. However, the posted speed and the 85th percentile speed may not be the same. The posted speed may be set below the 85th percentile speed. All non-statutory posted speeds are determined by a speed study. The designer should check with the Technical Services Traffic-Roadway Section for speed study information when using 85th percentile and posted speeds in design. Measuring the 85th percentile speed in the field can provide additional information for consideration in selecting the appropriate design speed and is strongly recommended.

2.5.2 SELECTING PROJECT DESIGN SPEED

Design standards for design speeds of the different highway sections are located in the following chapters:

1. Freeway (Urban and Rural) Chapter 5
2. Urban Non-Freeway Chapter 6
3. Rural Non-Freeway Chapter 7

For all projects on state highways, the design speed is selected by the Region Roadway Manager in cooperation with Technical Services Roadway Staff. This only applies to private developments if they include any construction on the highway, other than the access itself. Where mitigation impacts the cross-section or alignment of the highway such as a channelization, widening or striping, the design speed must be approved by the Region Roadway Manager before any permit is issued.

The selected design speed for non-freeway 3R and Single Function projects is the same as the posted speed in most cases. However, there may be occasions where the Region’s goals for a section of roadway would call for selecting a design speed that is higher than the posted speed.

2.6 ACCESS MANAGEMENT

2.6.1 INTRODUCTION

Access management is a tool available to designers, planners, and other transportation professionals to improve traffic safety, capacity, and efficiency while promoting economic development. The benefits of managing access to highways are well documented. Good access management techniques and strategies when designed properly along state highways will reduce the overall number of crashes and increase the highway's capacity. This section is not an exhaustive description of all the rules, laws, and techniques related to access management, but outlines some of the basic concepts, definitions, and appropriate tools for use on Oregon State Highways.

There are several documents that designers, planners, and field staffs are encouraged to review to get a big picture understanding of access management. These include:

1. OAR 734 Division 51 – These are the administrative rules that the Department must comply with in carrying out the access management in permitting, planning, and project delivery.
2. Project Delivery Leadership Team Operational Notice PD-03 and PD-03(A) describe the accountabilities and deliverables for access management during project development.
3. Access Management Manual - This document manual consists of three volumes covering legal, technical, and procedural information and resources for the department's access management program. Volume 1, Chapter 3 entitled Guidelines and Resources for Access Management in Project Development provides guidance for implementation of project delivery operational notices PD-03 and 03(A). Volume 2 of the manual houses technical papers on various aspects of access management such as sight distance, access spacing, interchange management, functional intersection areas, and medians. Volume 3 is a user's guide for the Central Highway Approach/Maintenance Permit System (CHAMPS). CHAMPS is a computer-based system that is used by department staff to document the permitting process and issue approach permits.

This section is not intended to be a detailed discussion of approach road design. For more detail on approach road or median design refer to Sections 8.3 and 4.3 respectively.

2.6.2 DESIGN TOOLS

2.6.2.1 RIGHT IN – RIGHT OUT ONLY

Restricting an approach road to right turns in and out only is accomplished by the installation of a non-traversable median. In urban environments this median should be a raised curb style. In more rural environments the median could be raised curb, median barrier, or depressed median. Controlling the median with a non-traversable design is the only design that provides a positive reinforcement of the turn restrictions. For more information on median design, refer to Section 4.3. For more information on approach road design, refer to Section 8.3. Figure 2-1 and Figure 2-2 show some examples of median designs limiting approach roads to right turns only. Figure 2-3 shows the benefits of median control involving pedestrians.

Note: The addition of any median treatment will need to be investigated for freight mobility issues and comply with ORS 366.215, Creation of state highways; reduction of vehicle-carrying capacity. For guidance in complying with ORS 366.215, see ODOT guidance document "*Guidelines for Implementation of ORS 366.215, No Reduction of Vehicle-Carrying Capacity and the ODOT Highway Mobility Operations Manual*".

Another design option that may be considered in some situations is the use of a "pork chop" design. A pork chop design consists of a channelization island, usually raised curb that directs traffic in the intended direction. The channelization island tries to discourage turn movements by angling the entry and exit so that left turn movements are uncomfortable. The problem with the pork chop design is that passenger vehicles are still physically able to make left turn movements. Most pork chop designs that do not include a non-traversable median design have a very high rate of non-compliance for the restricted movements. Therefore, a pork chop design should still include a non-traversable median design as well. Where a non-traversable median is not practical or is unacceptable, the designer should attempt to maximize the entry and exit angles to make left turn movements as difficult as possible. Figure 2-4 shows a pork chop design concept with median control.

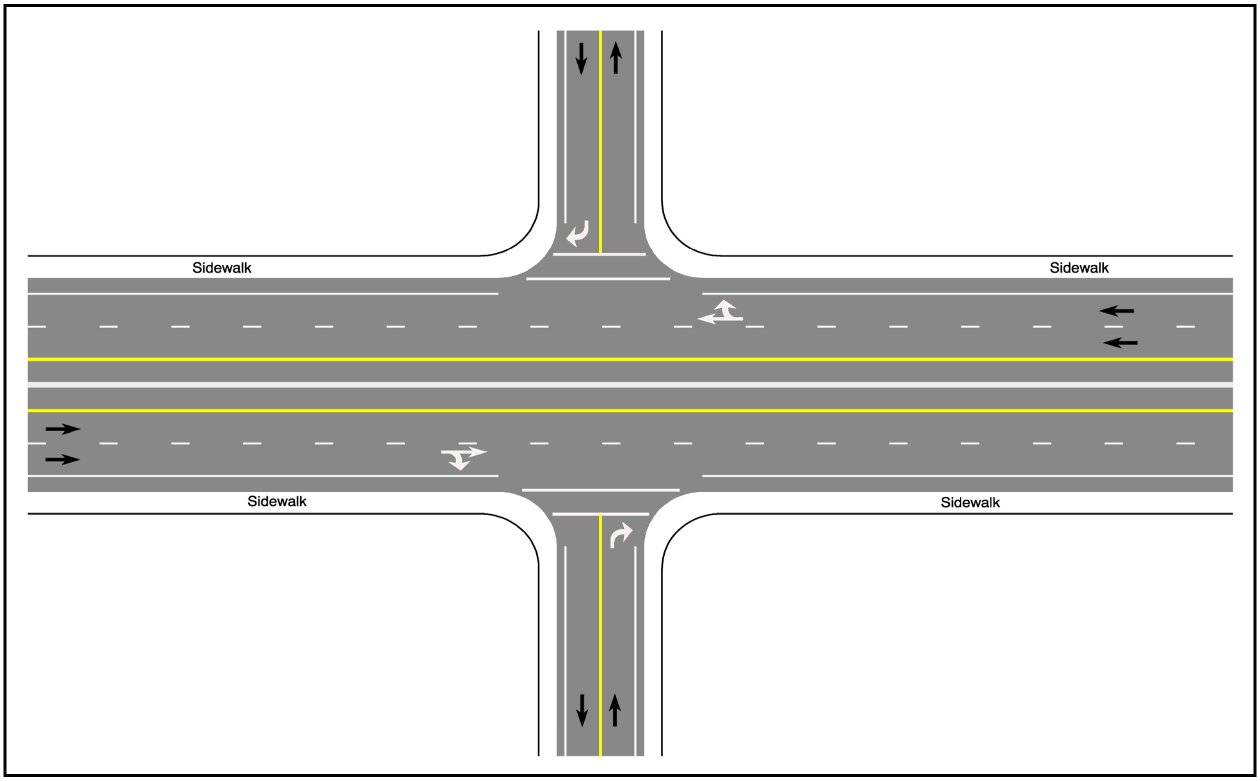


Figure 2-1: Median Detail: Right In Right Out

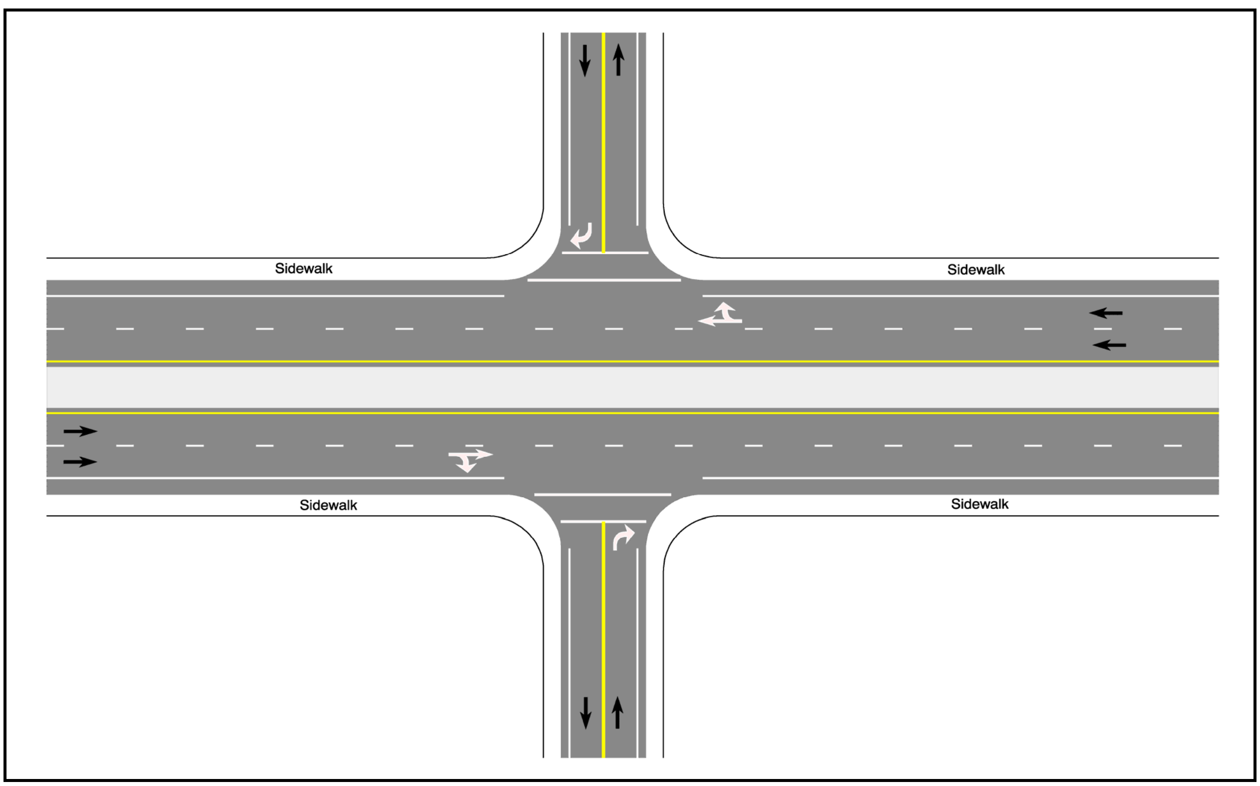


Figure 2-2: Raised Median Detail: Right In Right Out

2.6.2.2 RIGHT IN – RIGHT OUT WITH LEFT IN

From a traffic analysis perspective, the left turn out movement from approach roads usually operates worse than all other movements. This is because in the hierarchy of turn movements, the left turn out from an approach road is the last priority. In addition, the left turns from an approach road usually experience a higher number of accidents than the other movements. Because of these factors, there are several situations where eliminating a left turn out movement from an approach road is the preferred design solution. The only effective design option for this technique is a non-traversable median. Generally the preferred median style is raised curb. Median barrier is not applicable to this design technique. When designing this type of median it is critical to physically exclude the left turn out movement. The basic concept of this design is to extend a traffic separator along the right edge of the left turn entering traffic. This separator should extend back away from the approach road far enough so that passenger vehicles cannot physically turn left from the approach road. The design still must accommodate the appropriate design vehicle. Figure 2-5 illustrates this design concept.

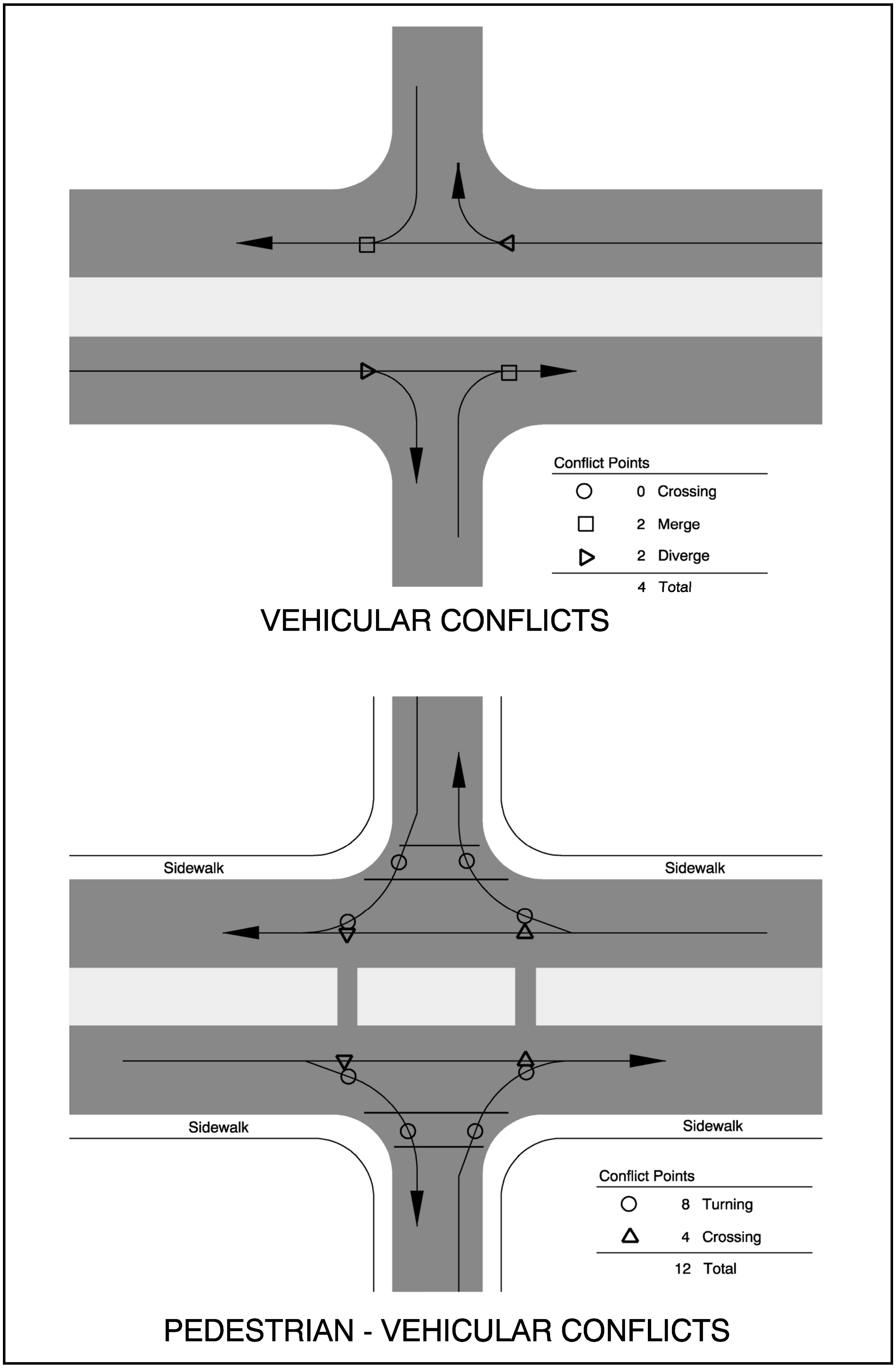


Figure 2-3: Vehicle-Pedestrian Conflict

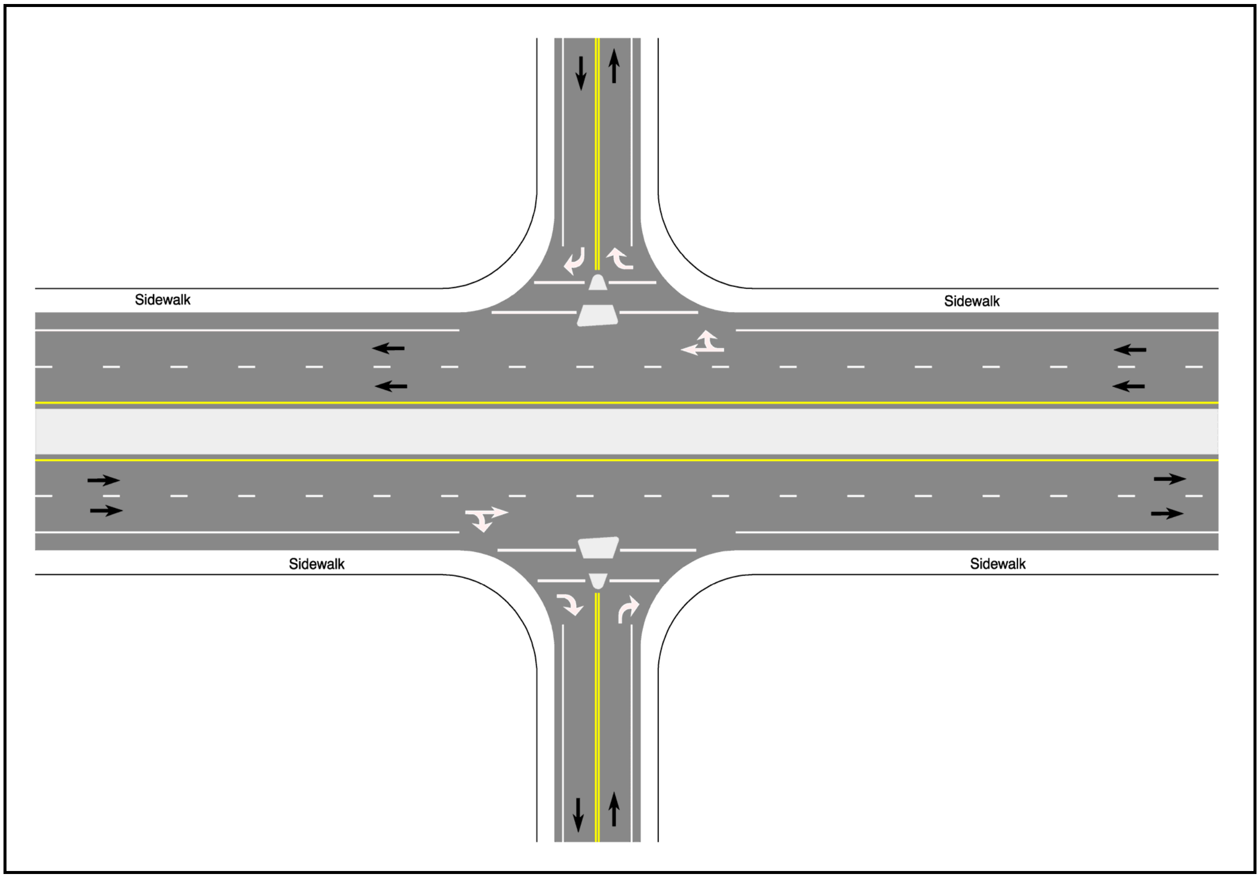


Figure 2-4: Pork Chop with Non-Traversable Median

2.6.2.3 OPPOSING APPROACHES WITH LEFT IN

In many urban environments, approach roads will be directly opposite from each other. In some situations, eliminating left turns out of the approaches is desired. In these cases, the appropriate design is very similar to the design described in "Right Out with Left In" for a single approach restricting left turns out. The difference is the median design now accommodates opposing left turn traffic. The concept remains the same however, physically eliminate the ability for passenger vehicles to make a left turn out movement. The difference is the traffic separator must now "snake" through the intersection transitioning from one side of the median to the other using reversing curves. The curvature is determined by the design vehicle. It is preferred with this technique to obtain additional width of the traffic separator in the middle of the median. This will provide additional visual guidance through the intersection. Figure 2-6 illustrates the use of this design concept.

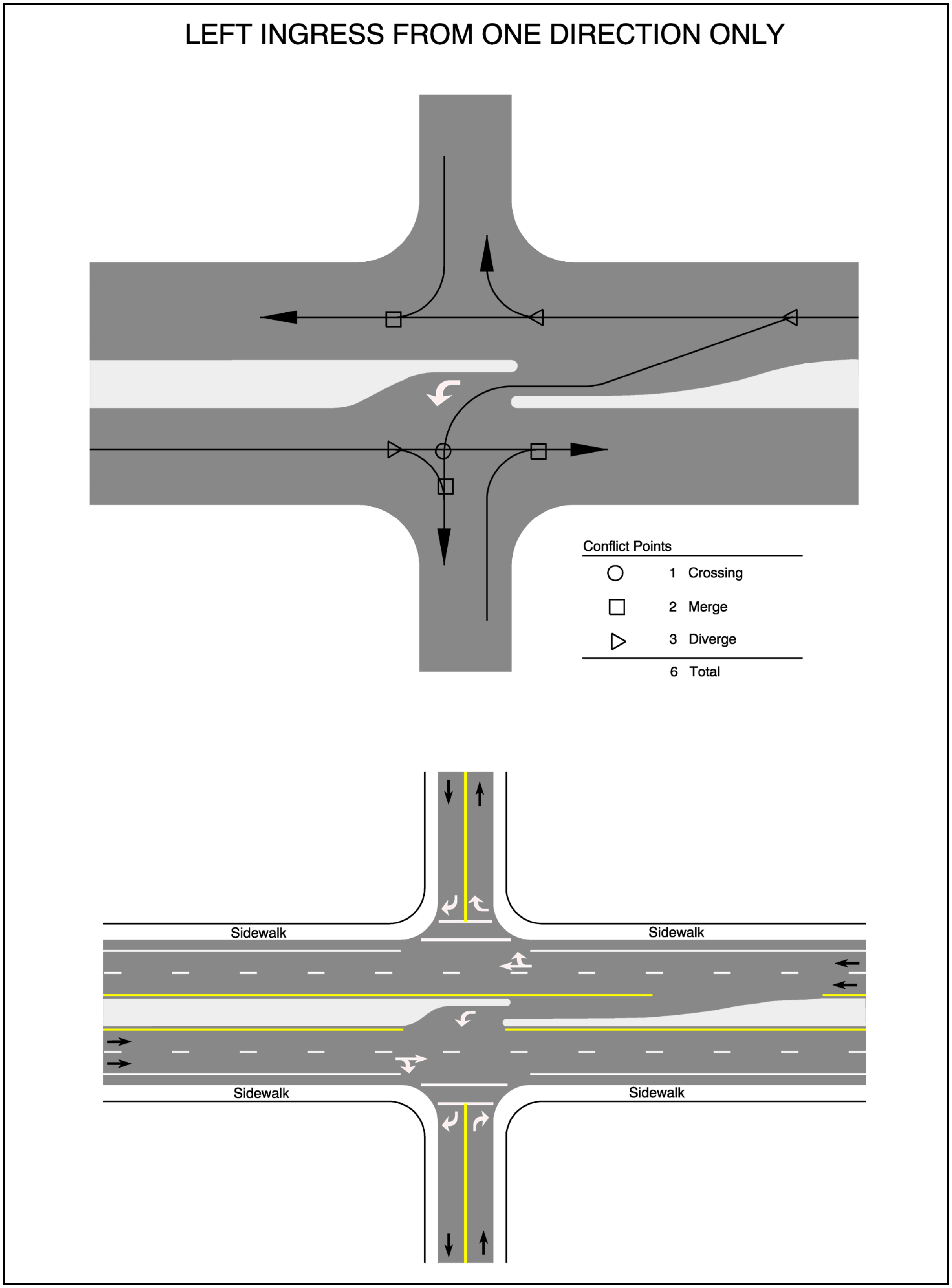


Figure 2-5: Left Ingress from One Direction Only

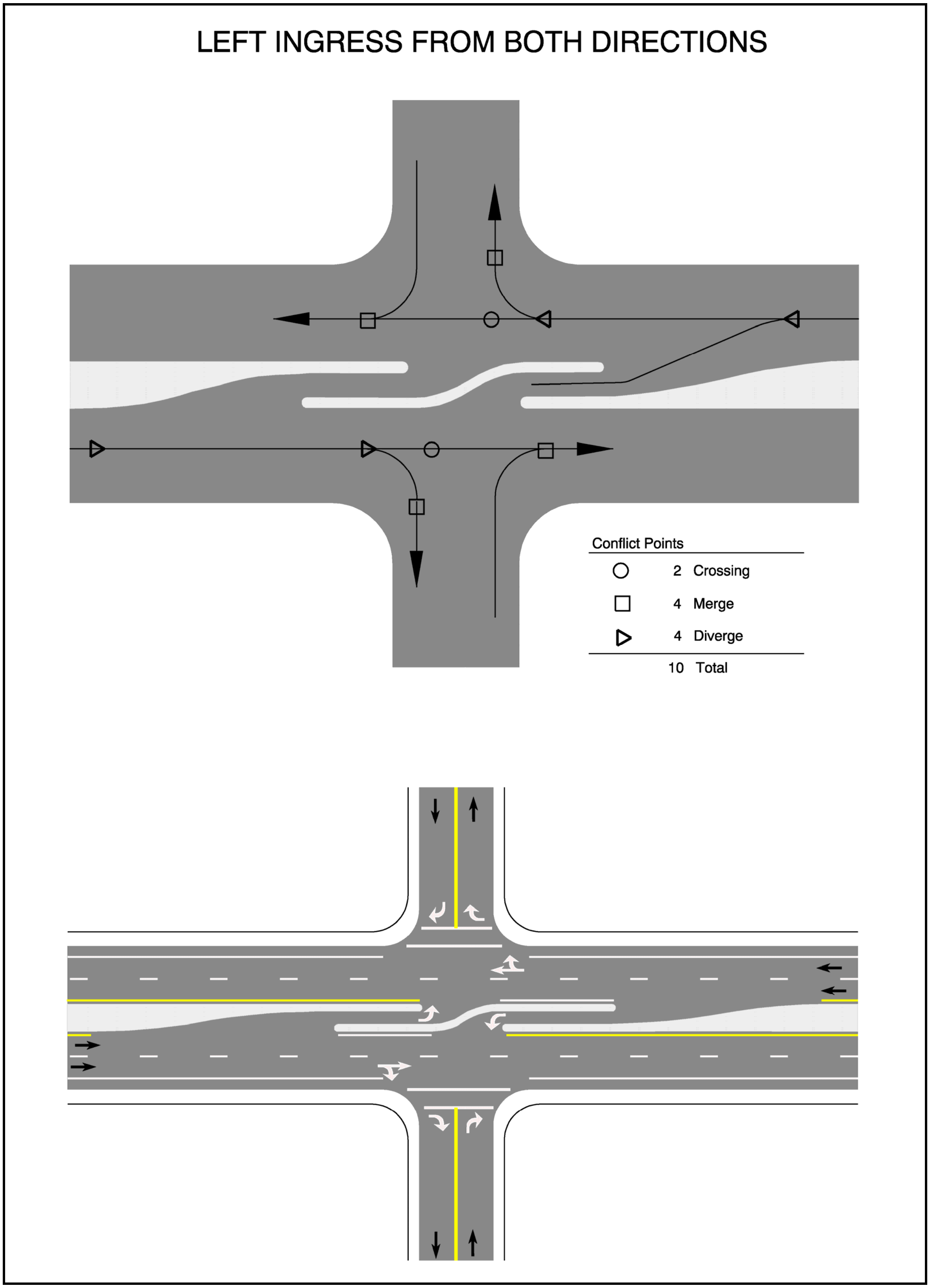


Figure 2-6: Left Ingress from Both Directions

2.6.2.4 OFFSET APPROACHES

Primarily, this design option is used in rural or fringe areas where spacing between approach points is large. This design tool is implemented where a four-leg intersection is experiencing significant operational and safety problems. By separating the intersection into two individual intersections, the number of conflicts is reduced which should improve the safety of the intersections. If this design option is chosen, the intersection needs to be split in the correct direction. The approaches should be offset to the right in order to eliminate the back to back left turn queue conflict. The amount of the offset will vary depending upon the highway volume, approach road volume, surrounding land uses, speed of the highway, and direction of the offset. The designer needs to consider the functional area of each intersection and the amount of weaving traffic. In addition, the Region Access Management Engineer and Traffic-Roadway Section should be contacted when considering offset approaches. For more information on offset intersections refer to Section 8.2.

2.6.2.5 FRONTAGE ROADS

Frontage roads are a very useful design to eliminate or restrict direct highway access from a section of highway. The frontage road needs to be designed to accommodate the volume and type of traffic anticipated. Two of the most important elements of the frontage road design are the connection to the highway and turning roadway. The connection needs to be designed to accommodate the allowable turning movements for the appropriate design vehicle. If trucks are to use the frontage road, they must be considered in the design. Secondly, the design of the connection to the frontage road is critical. Usually, this connection is a turning roadway, but may be an intersection. The connection needs to provide off-tracking room for trucks using the frontage road. The design needs to consider the roadway alignment and width to make sure trucks can physically make the turns required. Finally, frontage roads should be offset from the highway so as to not interfere with highway operations. The frontage road must be physically separated from the highway by use of barriers, fencing, or ditches. The separation between the highway and frontage road edges of pavement must be at least 40 feet, but preferably 50 feet or more. The design also needs to consider clear zone requirements and the effect of headlight glare on both roadways.

Another option involving the location of the frontage road is to locate the frontage road on the back side of the adjacent properties. This option may be more appealing from a visual standpoint allowing the properties to front the mainline roadway while the parking lot and frontage road are located further away from the mainline roadway. This option may also provide for better mainline/frontage road traffic operations. See Figure 2-7 for frontage road examples.

2.6.2.6 U-TURNS

Where a section of highway contains a non-traversable median for an extended length, there may be a need to accommodate U-Turning traffic. There are several design techniques available to accommodate U-Turns. The first option is at an intersection without a jug-handle. This design option generally requires widening the highway in one quadrant of the intersection to accommodate the required turning space of vehicles. Designs need to consider the type of vehicle using the U-Turn. In many situations, trucks will be prohibited from using this style of U-Turn. The widening can make use of a far side bus stop, or can be tapered. All U-Turns using this type of design technique at a signalized intersection must have the approval of the State Traffic-Roadway Engineer.

A second design option for accommodating U-Turning traffic is the use of a jug-handle. There are two options for jug-handle U-Turn designs. One option is the left side jug-handle. The left side jug-handle is a turning roadway alignment located on the left side of a highway. U-Turning traffic makes a left turn from the highway into the jug-handle. The jug-handle circulates the traffic back to the highway where vehicles re-enter the traffic stream as right turns through normal gaps in traffic flow. This style of jug-handle can be used at an existing "T" intersection or mid-block. The jug-handle is only compatible with a right side "T" intersection, which may or may not be signalized.

The other jug-handle design option is the right side jug-handle. The right side jug-handle is located on the right side of the highway. U-Turning traffic makes a right turn off the highway into the jug-handle, and then loops around to the left. The vehicles then make a left turn across the highway. This movement may or may not be signalized. As with the left side jug-handle, the right side jug-handle is only compatible with a "T" intersection. In this case, however, the intersection is only on the left side of the highway. Additionally, this type of jug-handle can be used at a mid-block location. The major disadvantage of this style is traffic must make a left turn across both directions of highway traffic and is therefore less efficient and may also have additional safety risks. See Figure 2-8 and Figure 2-9 for U-Turn treatments.

2.6.2.7 INDIRECT LEFT TURNS

One tool available is indirect left turns at intersections. In some situations for capacity or safety reasons, it may be desirable to remove left turning traffic. The left turns are accomplished by other connections. The first option available is the use of a right side jug-handle just like the one described for U-Turns above. Vehicles wishing to turn left actually leave the highway on the right side then cross the highway. Generally these designs are signalized to facilitate the crossing movement. Again this particular type of jug-handle is only compatible with a left side "T" intersection.

A different type of indirect left turn design uses connecting roadways. This design concept is similar to the jug-handles described in the U-Turn section. Within this type of design are several options. These include the single quadrant and double quadrant. The single quadrant design provides one connecting roadway that provides for two way traffic operation. Location of the connecting roadway is dependent upon traffic flow characteristics, adjacent roadside development, need for intersection spacing, and signalization needs. The concept of the single quadrant design is to remove all left turning traffic from a specific intersection. The traffic uses the connecting roadway to gain access to the particular street. Location of the connecting roadway is critical to the operation on the highway, particularly if both intersections are to be signalized. The designer should make sure the Traffic Management Section and TPAU have reviewed and approved this design concept prior to actual installation.

As mentioned previously, another option is the double quadrant design. This design is very similar to a jug-handle style interchange, except that the intersecting roadways are not grade separated. Again, turning traffic, generally left turns, use the connecting roadways. The roadways may provide for all movements or may be right in/out only depending upon traffic capacity and safety needs. Again, the Traffic Management Section and TPAU should review and approve this type of design prior to installation. In addition, there may be access management issues on these connecting roadways. The Region Access Management Engineer should be consulted to identify and address these issues. In many situations, these last two design alternatives may be a phased approach towards grade separation in the future.

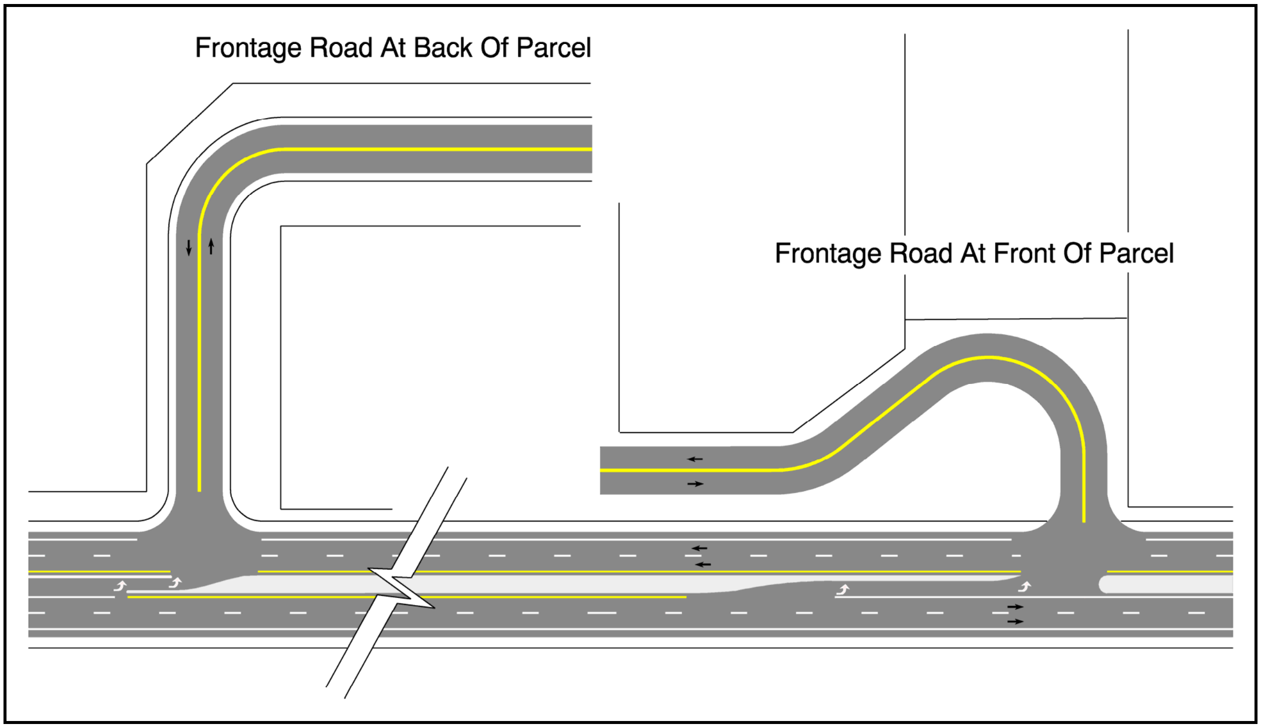
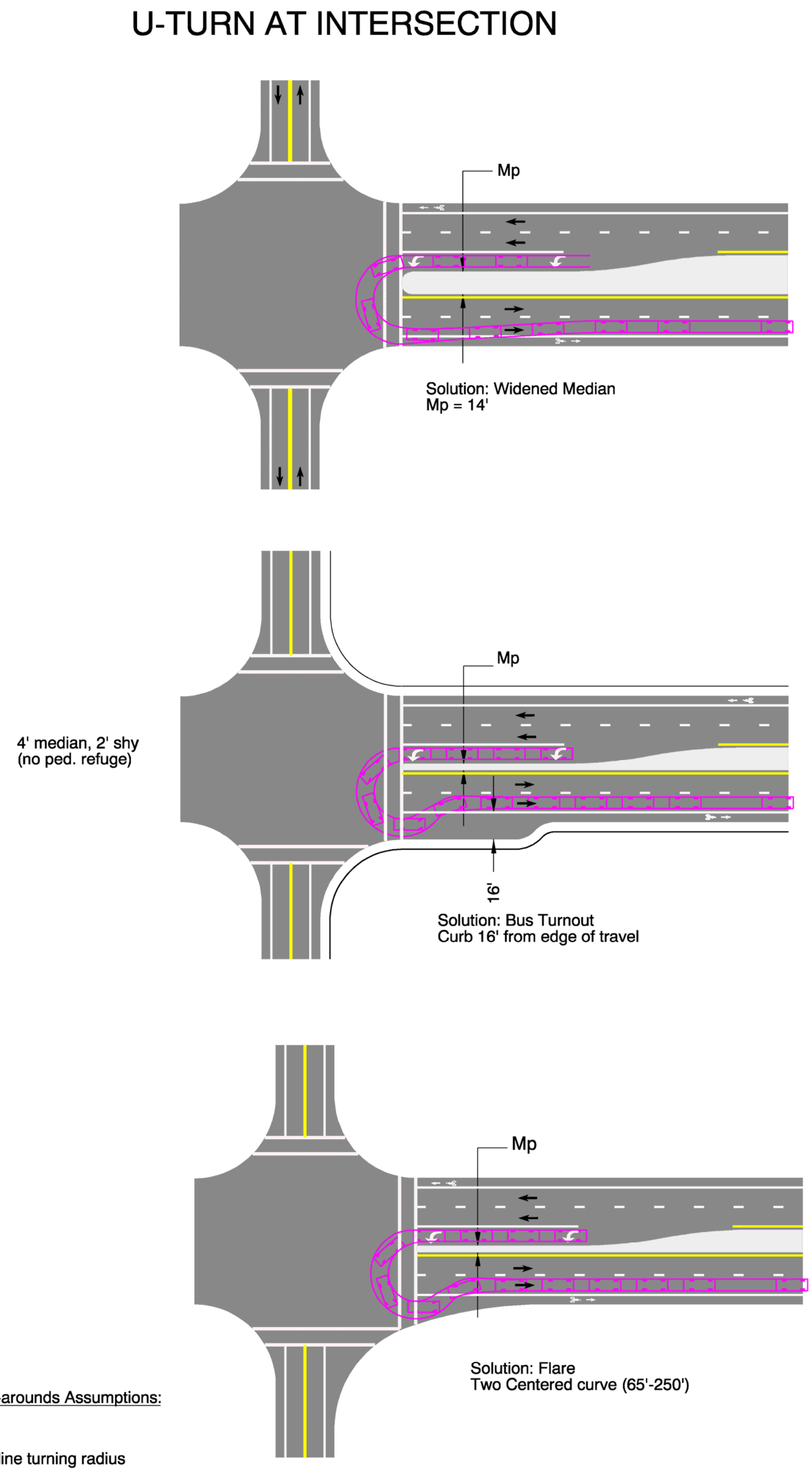


Figure 2-7: Example of Frontage Road Locations



Intersection Turn-arounds Assumptions:

1. P vehicle
2. 23' centerline turning radius
3. 4 lane divided highway with left turn refuge
4. 4' median (except widened median) with 2' shy
5. 6' shoulder/bike lane

Figure 2-8: U-Turn at Intersection

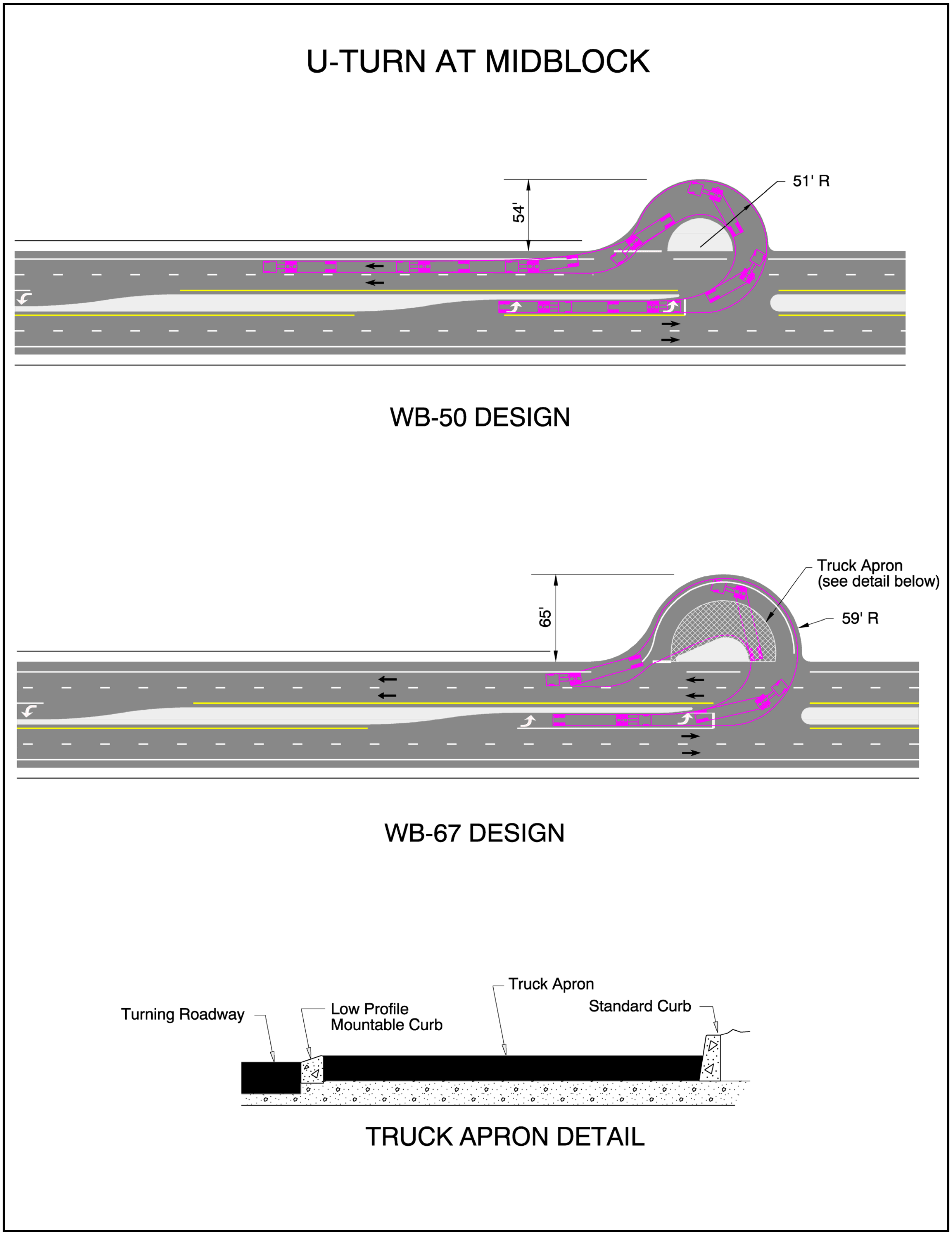


Figure 2-9: U-turn at Midblock

2.6.3 MANAGEMENT TOOLS

2.6.3.1 ACCESS CONTROL

Acquiring the access rights from properties abutting a state highway provides a high level of protection to the highway. However, acquiring access control is not justifiable in all conditions. The Department has developed guidelines for access management decisions during project development. These guidelines are contained in Transportation Operations Bulletin PD-03 and PD-03a. They attempt to focus the Department's limited resources for projects that really need access control. Additional guidance can be found in OAR 735, division 51.

2.6.3.2 GRANTS OF ACCESS

A Grant of Access is a transfer of a property right to a property owner for a right of access at a particular location. The Department must follow the requirements of OAR 734 Div. 51 when issuing Grants of Access. Obtaining a Grant of Access can be a complex process. Before even considering a Grant of Access as part of a project, the designer should contact the Region Access Management Engineer.

2.6.3.3 ACCESS MANAGEMENT PLANS

An access management plan is a useful management tool. An access management plan can be done as part of an ODOT STIP project or during a coordinated planning study. Access management plans developed in a coordinated planning process establish a plan for accessing properties in the future. An access management plan essentially is a detailed plan outlining how adjoining properties are to be accessed during project development.

2.6.3.4 ODOT PERMIT PROCESS

The ODOT Permit Process is also outlined in OAR 734 Div. 51. All approaches to a state highway built after 1949 must have an Approach Road permit to be considered legal. Through the permitting process ODOT can negotiate access designs, approach configurations, turn movement restrictions, and even shared approaches. Properties with multiple approaches can be modified to provide the minimum number needed. Again, designers should work closely with the Region Access Management Engineers when making approach permit type of decisions. The authority for issuing permits resides with the District Manager or designee.