
Super Two Highways

Design Manual
Chapter 6
Geometric Design

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General Guidance

Super Two Highways provide improved safety and mobility on two lane roadways by providing passing opportunities for faster moving vehicles, reducing the potential for a head on crash with oncoming traffic. Passing opportunities are created by providing passing lanes at regular intervals. The length of passing lanes is adjusted depending on traffic volumes on the route. Since traffic volumes can vary within a corridor, passing lane spacings and lengths must be applied to individual segments of the corridor, rather than the whole corridor, to ensure proper operation of a Super Two facility.

Targeted Corridors

Two lane rural portions of several routes within the state are being targeted for Super Two enhancements. These routes are identified as **Corridors Targeted for Mobility and Safety Improvements** in Chapter 5 of the *Iowa in Motion 2045 State Transportation Plan (STP)* prepared by the Office of Systems Planning.

Non-targeted Corridors

Super Two enhancements may be applied to other two lane corridors not identified in the STP; however, the application of these enhancements must be approached by preparing a Planning Study for the corridor. The Planning Study should be prepared by the Office of Location and Environment.

When evaluating a corridor for Super Two enhancements, consideration should be given to adding improvements (such as flattening horizontal curves or profile grades, adding partial width paved shoulders (if warranted), adding left and right turn lanes (if warranted), etc.) to the portions of the corridor without passing lanes to enhance safety and operations in those areas.

Passing Lane Location

When reviewing a corridor for passing lane locations, avoid the following locations if possible:

- Areas of reduced speed adjacent to incorporated areas of municipalities.
- Areas with six or more accesses per mile in one direction of travel.
- Bridges or multiple barrel reinforced concrete box culverts to avoid the added expense of widening or lengthening existing structures.
- At-grade railroad crossings.
- Areas where the Right of Way (ROW) line is shared with a railroad, unless there is sufficient room within the existing ROW to accommodate the passing lane and not impact drainage.
- Four legged intersections with paved approaches on all four legs.
- Horizontal curves with advisory speeds less than the posted speed limit of the roadway.
- Curves with limited horizontal sight distance.
- Environmentally sensitive areas.
- Within one mile of the ramps at interchanges.

When determining passing lane locations, consideration needs to be given to passing lane locations for the opposing direction of traffic. Figure 1 shows different passing lane location configurations for opposing traffic lanes.

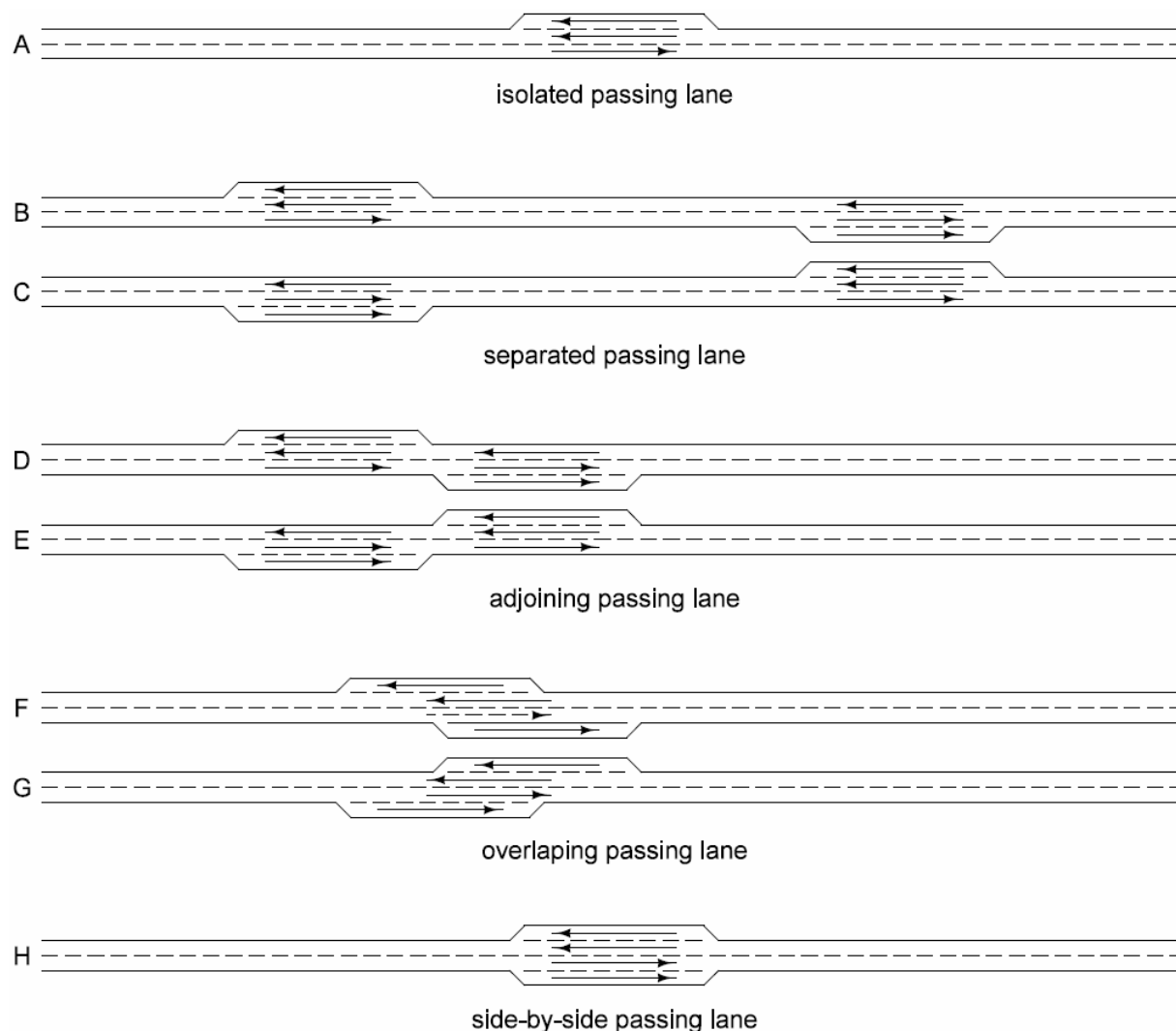


Figure 1: Passing lane location configurations for opposing traffic lanes.

Configuration A is intended to be used where a passing opportunity is only needed in one location. Configurations B and C are the preferred pattern for the locations of the passing lanes. If adjustments for the passing lane locations are necessary, configurations D (tail to tail) and E (head to head) may be used. Of the two, Configuration D is preferred over Configuration E. Configurations F and G are typically the result of the passing lanes functioning as a combination passing/climbing lane or in areas where other constraints prevent offsetting the passing lanes. The use of Configuration H gives the appearance that the roadway in the area of the passing lane is a four lane undivided section, so it should only be used when constraints on the project prevent offsetting the passing lanes as shown on the other configurations.

In areas where hilly terrain exists, passing lanes should be placed on ascending grades to allow the passing lane to function as a combination passing lane/climbing lane.

Passing Lane Design

Typical Section

Passing lanes should consist of a 12 foot wide preferred, or 11 foot wide acceptable, lane and a 6 foot wide preferred, 4 foot wide acceptable, shoulder. Because the majority of the traffic will be in the outside lane, and only passing traffic will be in the inside lane, the shoulder should be a combination paved/granular shoulder or full width paved shoulder. A granular shoulder should not be considered for passing lanes. Refer to the Rural Two-Lane Highways criteria in Section [1C-1](#) for additional information for the non-passing lane portion of the Super Two highway.

Passing Lane Spacing

Preferred spacing between passing lanes is 4 to 5 miles. This spacing is based on the desire to provide passing opportunities with uniform spacing between each passing opportunity in one direction. The length between passing lanes may be adjusted up to 0.50 miles to avoid items in the list of features to avoid, or to avoid impacts to other features in the corridor (utilities, accesses, etc.). The absolute minimum distance between passing lanes is 3.5 miles.

Passing Lane Lengths

As Figure 2 shows, passing lanes are introduced using a diverge taper and are dropped using a merge taper. Figure 2 also shows reference locations for the distance between passing lanes.

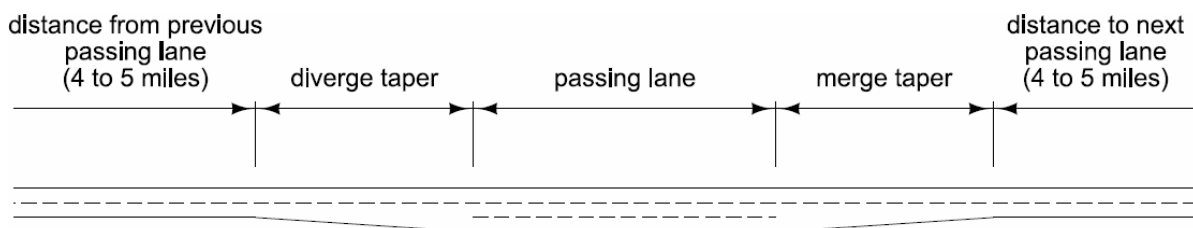


Figure 2: Passing lane components.

The diverge taper should be developed using a 15:1 taper rate. The length of the merge taper depends on the design speed of the roadway and should be based on the length of taper and taper rates for dropping lanes found in Section [6C-1](#).

The length of the passing lane is based on the Average Annual Daily Traffic (AADT) or the Vehicles Per Hour (VPH) volumes for the roadway and are shown in Table 1.

Table 1: Passing Lane Lengths*.

AADT	VPH	length min. (miles)	length max. (miles)
1000	100	0.50	0.50
2000	200	0.50	0.60
3000	300	0.60	0.80
4000	400	0.80	1.50
5000	500	1.00	1.75

* The lengths in this table do not include the length of the diverge taper or the merge taper.

When a passing lane will also function as a climbing lane, the lengths shown in Table 1 should be extended to aid trucks in climbing the grade.

Intersections and Turn Lanes Within the Passing Lane

Paved Intersections

Avoid placing passing lanes in areas with a paved intersection. If it cannot be avoided, an offset right turn lane should be provided in addition to the passing lane. This is to prevent turning traffic from shadowing traffic in the through/passing lanes, thus impacting the intersection sight distance for vehicles on the side road. A left turn lane providing storage length, and preferably a length for deceleration, should also be provided in the area of the passing lane to avoid impacting passing maneuvers in the through lane. The development of the additional width for the left turn lane should be accomplished using the guidance in Section [6C-1](#). If a passing lane is only provided in one direction of travel at the intersection, the turn lane warrants in Section [6A-1](#) should be used to determine if turn lanes should be provided in the direction of travel without the passing lane.

Unpaved Intersections

It is acceptable to place passing lanes through unpaved intersections, and in some instances will be necessary due to the passing lane length.

Signs and Pavement Markings

Standard Road Plan [PM-222](#) shows layouts for the necessary signing and pavement markings for passing lanes and intersections with passing lanes.

Chronology of Changes to Design Manual Section: 006C-002 Super Two Highways

7/27/2021	Revised Included more considerations when adding improvements to portions of the corridor.
4/29/2019	NEW New.