2.1.2 Passing Sight Distance

Minimum passing sight distance value is important in determination of whether there is enough space to complete a passing maneuver. Although the most of the vertical curves, including the one studied in this research, have no passing zones, this distance has to be examined in order to establish the correct boundaries of the danger zone (which will be defined in next section).

The minimum passing sight distances are given on Table-I.3. According to speed of the passing and passed vehicle (with regards to 55-mph design speed of the vertical curve), passing sight distance would be between 1950 ft and 2300 ft of clear sight. Although there is no distinction made for vertical curves, the vertical curve length studied in this project is much shorter than the required safe passing distance.

2.3 Distance for Overtaking Maneuver at Different Speeds

Another measure that should be taken into consideration is the distance required for overtaking maneuvers. Although such a maneuver is prohibited by no-passing zone at this vertical curve, we should be able to prove that the sight distance of the entire curve is not long enough, even if there is no risk of a head-on collision.

The total distance for an overtake maneuver is given on Table-I.4. For the design speed groups between 50 and 70 mph, such maneuver would require a clear distance of 1900 to
2400 ft (distance segments $d_1$, $d_2$, $d_3$, $d_4$, and maneuver flow is given on Figure-A.1 in Appendix A).

As it can be seen from the profile map of the vertical curve, there is not enough clear sight distance for completion of an overtake maneuver at this particular location.

**2.4 Curve Lengths for Stopping and Passing Sight Distances**

As it is described in Appendix A, curve length is important for a safe stopping distance on a curve. Based on the geometric analysis of curve length calculations given in Appendix A, Table-I.3 shows the required curve lengths for different design speeds.

In these calculations, the eye height and the object height on the road surface are applied as 3.5 ft. Since our objective is to have a clear sight of a vehicle (smallest is a motorcycle with a driver on it), object height is considered as 3.5 ft. In most calculations, an average vehicle height on the road surface is accepted as 4.25, however a lower value like 3.5 ft. will assist to ensure in finding a safe curve length.

The required length at this curve for an average speed group of 60 mph. is 912 ft. In conjunction with grade percents and the design speed, it is clear that the vertical curve on
Rt. 114 doesn’t have enough curve length for a safe stopping distance. This could be a contributing factor in fatal accidents, along with excessive speed and passing violations.