

### 2.6.3 Sight Distance

Sight distance criteria used in this manual is adopted from the A.A.S.H.T.O. publication of 2004.

All intersections or connections to county roads (hereafter referred to as access) are subject to the requirements of this section. Access includes, but is not limited to, new roads, single driveways, Use-In-Common (UIC) Driveways, and site entrance aprons. Existing access shall also be subject to the requirements of this section if it will be used by new development or expansion of existing facilities. It is the responsibility of the person or entity creating the proposed access, new development, or expansion of existing facilities to provide required sight distance.

#### 2.6.3-1 Stopping Sight Distance

A.A.S.H.T.O. defines stopping sight distance as the length of the roadway ahead that is visible to the driver. Stopping sight distance is the sum of:

1. The distance traversed by the vehicle from the instant the driver sights an object necessitating a stop to the instant the brakes are applied; and
2. The distance needed to stop the vehicle from the instant brake application begins.

The criteria used by A.A.S.H.T.O. and adopted by Carroll County for computing stopping sight distance is as follows:

Height of Driver's eye = 3.5 feet

Height of Object = 2.0 feet

The equation for stopping sight distance is:

$$d = 1.47 Vt + 1.075 \frac{V^2}{a}$$

t = brake reaction time, 2.5 sec.

V = design speed, mph

a = deceleration rate, ft/s<sup>2</sup> – 11.2 ft/s<sup>2</sup>

## Effects of Grade on Stopping Sight Distance

When grades are  $\pm 3\%$

$$d = 1.47Vt + \frac{V^2}{30\left(\frac{a}{32.2} \pm G\right)}$$

- V = design speed, mph  
 t = brake reaction time, 2.5 sec.  
 a = deceleration rate,  $\text{ft/s}^2 - 11.2 \text{ ft/s}^2$   
 G = percent of grade divided by 100

All other sight distance calculations and evaluations shall be in accordance with the latest version of *A.A.S.H.T.O. A Policy on Geometric Design of Highways and Streets*.

Posted Speed (mph)	Assumed Design Speed (mph)	Stopping Sight Distance (ft)
25	35	250
30	40	305
35	45	360
40	50	425
45	55	495
50	60	570
55	65	645

**Table 2.00 – Stopping Sight Distance**

### 2.6.3-2 Sight Distance for Passing

A driver of a vehicle should be able to see a sufficient distance ahead, clear of traffic, to complete a passing maneuver without cutting off the passed vehicle in advance of meeting an opposing vehicle during the maneuver. It is measured based on a height of eye of 3.5 feet and a height of object of 3.5 feet. Ordinarily, passing sight distance is provided only at places where combinations of alignment and profile do not require the use of crest vertical curves and is applicable only to two lane rural major collectors and minor arterial type roadways. These types of roadways will be determined by the Carroll County Functional Classification. A copy of this document can be obtained from the Carroll County Department of Public Works.

Exhibit 3-7 of the *A.A.S.H.T.O. A Policy on Geometric Design of Highways and Street, 2004 version* shows the minimum passing sight distances for various design speeds.

### 2.6.3-3 Sight Distance at Intersections

Intersections should be carefully situated to avoid steep profile grades and to ensure adequate approach sight distance. An intersection should not be situated on a short-crest vertical curve, just beyond a short-crest vertical curve, or on a sharp horizontal curve. When there is no practical alternate to such a location, the approach sight distance on each leg should be checked carefully. Where necessary, back slopes should be flattened and horizontal or vertical curves lengthened to provide additional sight distance. Sight distance is also provided at intersections to allow the drivers of stopped vehicles a sufficient view of the intersecting highway to decide when to enter the intersecting highway or to cross it.

$$ISD = 1.47 V_{\text{major}} t_g$$

ISD = Intersection Sight Distance  
 $V_{\text{major}}$  = Design Speed (mph) – posted speed limit + 10 mph  
 $t_g$  = time gap for major road

$t_g$  = 7.5 passenger car (utilize for all cases except where substantial volumes of heavy vehicles enter the major road)  
 = 9.5 Single-unit truck  
 = 11.5 Combination truck

Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and grades 3 percent or less.

Adjustments:

Multilane Highways: For left turns onto two-way highways with more than two lanes, add 0.5 seconds for passenger cars or 0.7 seconds for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.

Minor Road approach grades: If the approach grade is an upgrade that exceeds 3 percent; add 0.2 seconds for each percent grade for left turns.

Table 2.01 as adopted from A.A.S.H.T.O. is to be used for the design of intersecting roads in Carroll County.

Posted Speed (mph)	Assumed Design Speed (mph)	INTERSECTION SIGHT DISTANCE REQUIRED (FT)		
		One Lane Crossed	Two Lanes Crossed	Three Lanes Crossed
25	35	390	415	440
30	40	445	475	500
35	45	500	530	565
40	50	555	590	625
45	55	610	650	690
50	60	665	710	750
55	65	720	765	815

**Table 2.01 – Intersection Sight Distance**

Intersection sight distance measured from a point on the minor road at least **15 feet** from the edge of the major road pavement and measured from a **height of eye at 3.5 feet** on the minor road to a **height of object 3.50 feet** on the major road. For single use driveways that will access an existing county roadway the intersection sight distance can be measured from a point on the minor road at least 10 feet from the edge of the major road pavement.

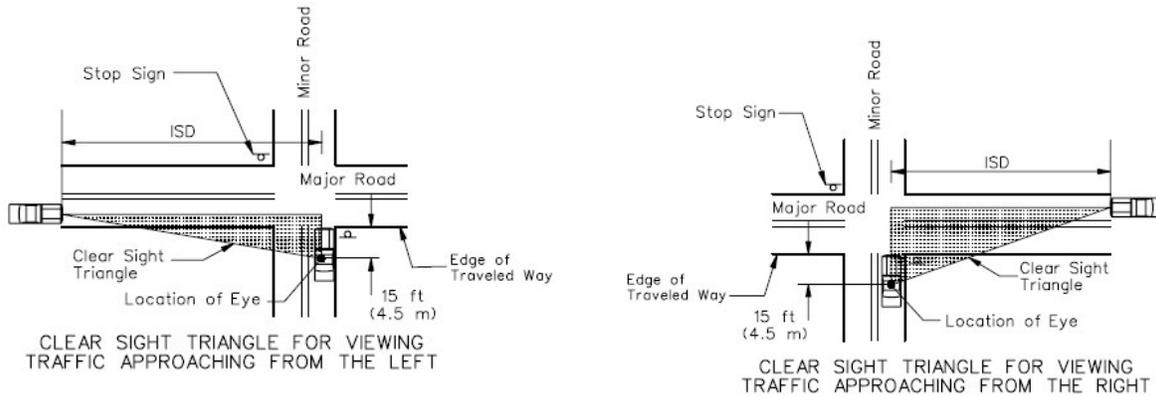


Exhibit 2-00 Intersection Sight Triangles  
(Source: Bureau of Local Road and Streets, IDOT)

ADJUSTMENT FACTORS FOR SIGHT DISTANCE BASED ON APPROACH GRADE														
Approach Grade (%)	Design Speed (mph)													
	15	20	25	30	35	40	45	50	55	60	65	70	75	80
-6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2
-5	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2
-4	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
-3 to +3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+4	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+5	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+6	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Exhibit 2-01 Grade Adjustments

**2.6.3-4 Variances**

Should there be instances where sight distance requirements can not be met, the Developer or his representative may submit a Request for Variance to Sight Distance Requirements (request). The request must be written and must:

- a. Describe all circumstances or features restricting sight distance, and state their location relative to the proposed access.
- b. Explain why the access can not, or should not, be relocated.
- c. Contain any photographs, diagrams or other relevant information.
- d. Describe remedial measures which will be taken to maximize sight distance.

- e. State both the required minimum sight distance, and the sight distance which would be provided with completion of remedial measures.

Requests shall be submitted to the Bureau of Engineering for review. Review will include an onsite investigation and evaluation of the specifics and circumstances cited in the request. Upon completion of review the request, along with recommendations of the Bureau, will be forwarded to the Director of Public Works who may then:

- \* approve the request, or
- \* approve it with conditions or modifications, or
- \* disapprove it

Documentation of the final decision will be issued by the Bureau of Engineering.



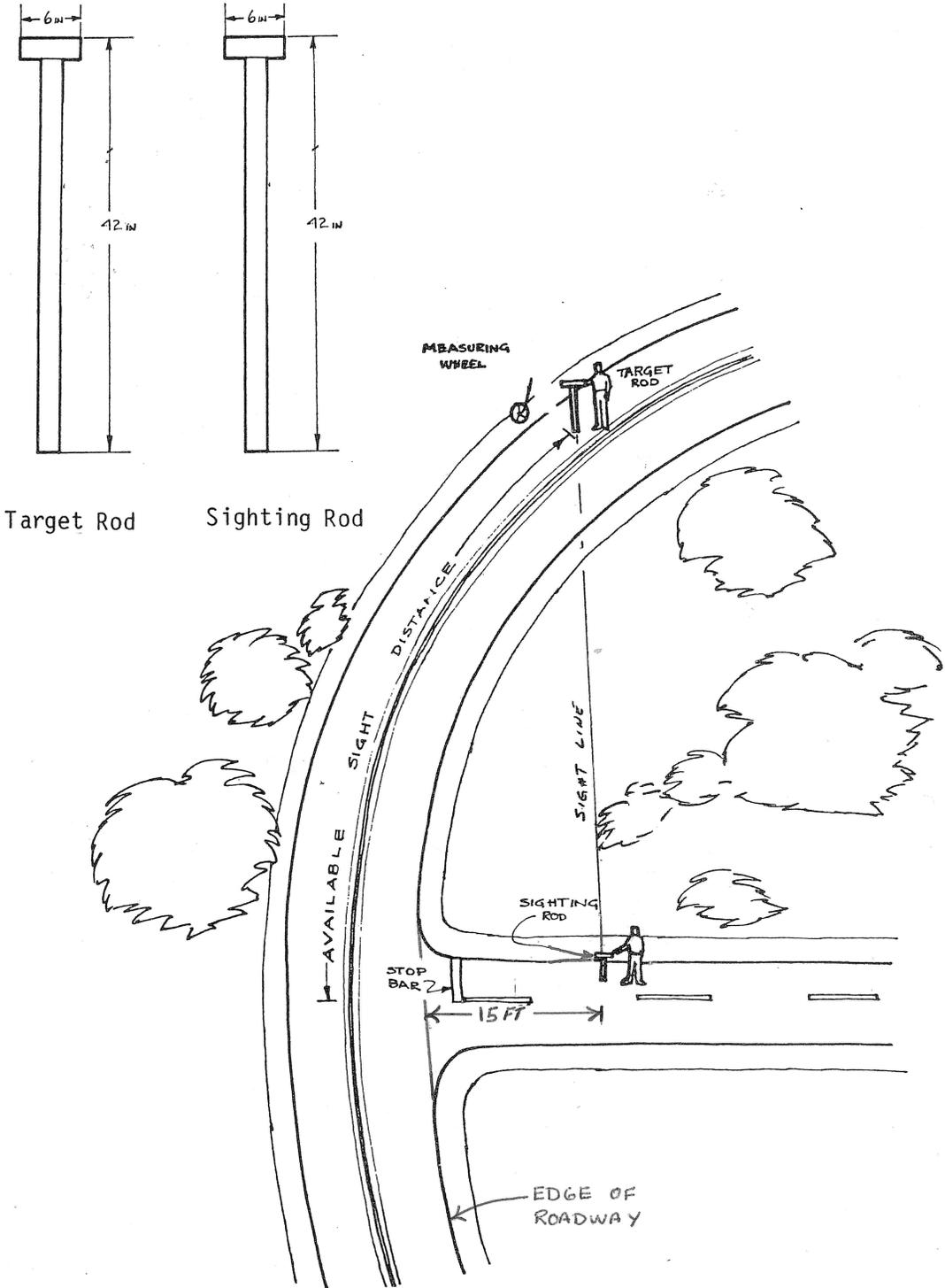


Exhibit 2-03 Intersection Sight Distance Measurement  
Adopted from FHWA