CITY OF DUBLIN
DIVISION OF ENGINEERING
ADMINISTRATIVE POLICY AND PROCEDURE

SUBJECT: Intersection Sight Distances	**Date Initiated: 6/26/95** **Last Revision Date: 5/10/18** **Policy No: 08-013** **Page 1 of 10**

The following is an update to the previous policy dated September 24, 2008 pertaining to the clear line of sight at intersections of streets and major driveways. This revised policy, which is based on American Association of State Highway and Transportation Officials (AASHTO), the Ohio Department of Transportation (ODOT) design procedures, and the City of Columbus General Policy and Procedure, is to be used as the basis for an update to the codified ordinances. The primary goal of this revised policy is to provide for safe turning movements by providing clear visibility zones at intersections clear of obstructions such as trees, walls, signs, buildings, etc. This policy is not intended for determining traffic controls at intersections. The need for traffic controls is to be assessed by the rules and regulations contained in the Ohio Manual on Uniform Traffic Control Devices and as recommended by the City Engineer. This policy shall be in effect immediately.

Applicability:

The application of intersection sight distance and stopping sight distance shall extend to all proposed and existing public street intersections and all proposed and existing intersections of private streets and drives with public streets, including multi-family and commercial entrances. This also includes local to local intersections such as those within proposed subdivisions. The City of Dublin requires that both intersection and stopping sight distances be shown with the geometrics on the final construction drawings and be analyzed during the Traffic Impact Study process.

Height Restrictions within Designated Intersection Sight Triangles:

Visual obstructions within intersection sight triangles shall be limited to a height of no more than two and a half (2.5) feet. A driver eye height of three and a half (3.5) feet and an object height of three and a half (3.5) feet shall be applied (AASHTO and ODOT). Overhanging branches or other elevated obstructions may not be any lower than ten (10) feet within the intersection sight triangle.

I. Stop Sign Controlled Intersections

In determining the area of the sight triangle for intersections with stop sign control, the following criteria shall be used:

A. **Stop control:** The sight triangles for a stop controlled minor road with left turns allowed shall be based on Figures 1 & 2 and Table 1. The left turning movement requires a longer intersection sight distance than the right turning movement; therefore, the criteria for the left turn conditions apply.

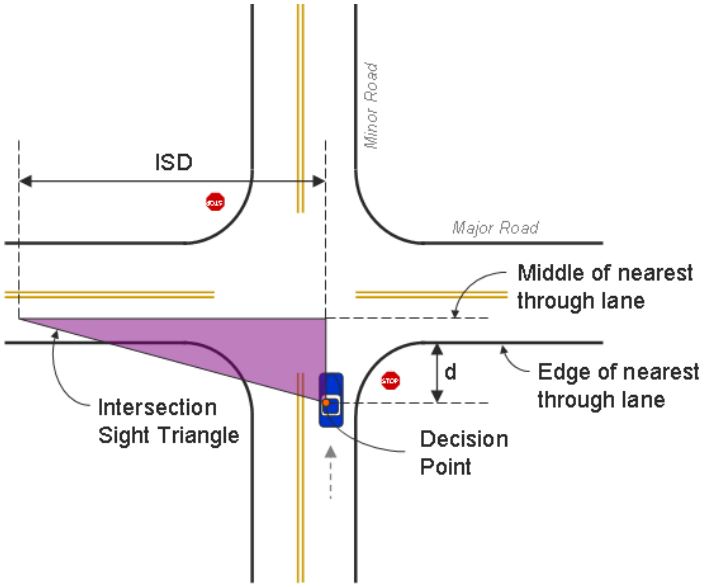

Figure 1. Left turners looking left

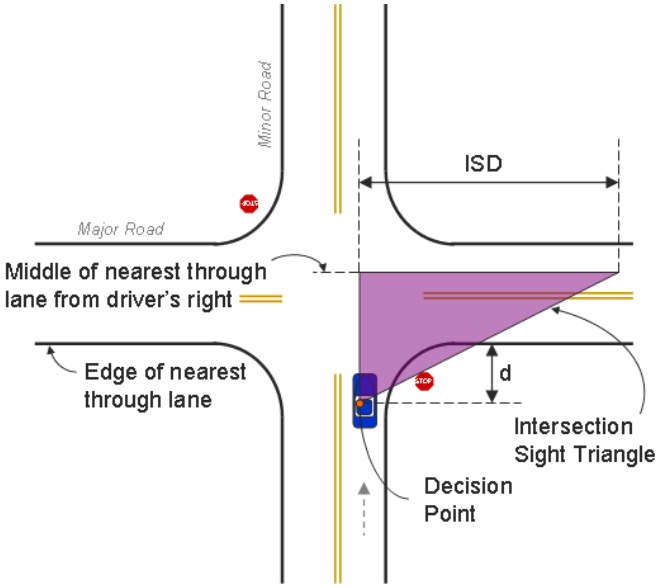

Figure 2. Left turners looking right

ISD = Intersection Sight Distance;
see Table 1 and Table 2

d = Distance from the edge of nearest through lane to the decision point;
18 ft preferred, 14.5 ft minimum (AASHTO 2011)
Use 18 ft unless otherwise approved by the City Engineer

Table 1. Intersection Sight Distance for Stop Controlled Intersections Right and Left Turners, Looking Right and Looking Left								
Design Speed of Major Road (mph)	20	25	30	35	40	45	50	55
Decision Point "d" (ft)	18							
ISD: Intersection Sight Distance (ft) *Based on the equation below*	225	280	335	390	445	500	555	610

Intersection Sight Distance = Design Speed (mph) x1.47 x Time Gap (sec)

- *Design Speed is 5 mph over the posted speed limit, unless otherwise approved by the City Engineer*
- *1.47 is the conversion from mph to fps*
- *Time Gap is 7.5 sec for a turning vehicle to enter a 2-lane major road without a median* from a minor road with 3% or less grade***

  ** If the major road is multi-lane or has a median, add 0.5 sec per additional 12 feet crossed to turn left*

  *** If the minor road grade is >3%, add 0.2 sec per percent grade above 3*

Based on AASHTO – Geometric Design of Highways and Streets (2011) and ODOT L&D Section 200.

B. Right out only, stop control: The sight triangle for a stop controlled intersection with only right turns allowed from the minor road shall be based on Figure 3 and Table 2.

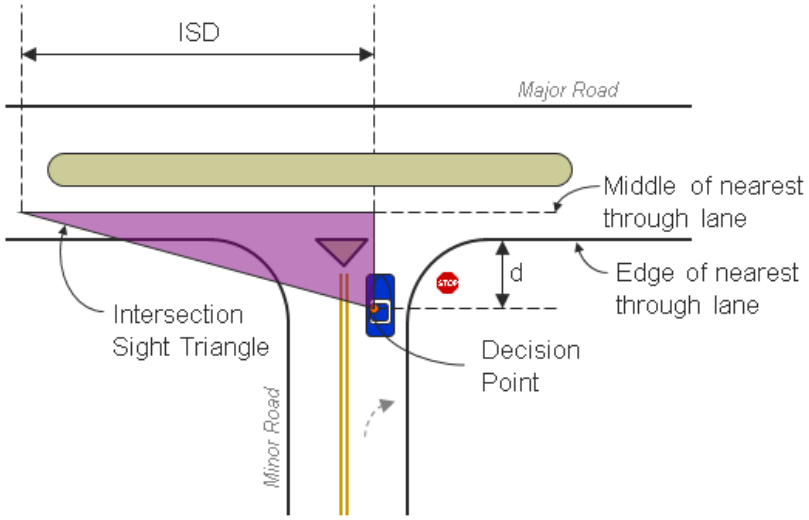

Figure 3. Right turners looking left

ISD = Intersection Sight Distance; see Table 2

d = Distance from the edge of nearest through lane to the decision point; 18 ft preferred, 14.5 ft minimum (AASHTO 2011) Use 18 ft unless otherwise approved by the City Engineer

Table 2. Intersection Sight Distance for Right Out Only
Right turners looking left

Design Speed of Major Road (mph)	20	25	30	35	40	45	50	55
ISD: Intersection Sight Distance (ft) *Based on the equation below*	195	240	290	335	385	430	480	530

Intersection Sight Distance = Design Speed (mph) x1.47 x Time Gap (sec)

- *Design Speed is 5 mph over the posted speed limit, unless otherwise approved by the City Engineer*
- *1.47 is the conversion from mph to fps*
- *Time Gap is 6.5 sec for a turning vehicle to turn right from a minor road with 3% or less grade**

  ** If the minor road grade is >3%, add 0.2 sec per percent grade above 3*

Based on AASHTO – Geometric Design of Highways and Streets (2011) and ODOT L&D Section 200.

C. Stop control with on-street parking: The sight triangle for a stop controlled intersection with on-street parking on the major road shall be based on Figures 4 and 5, and Table 3.

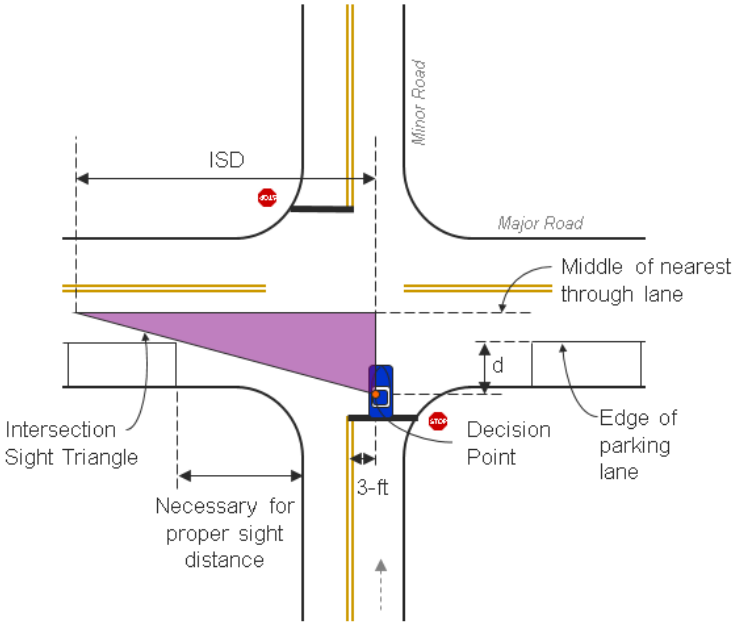

Figure 4. Right and left turners looking left

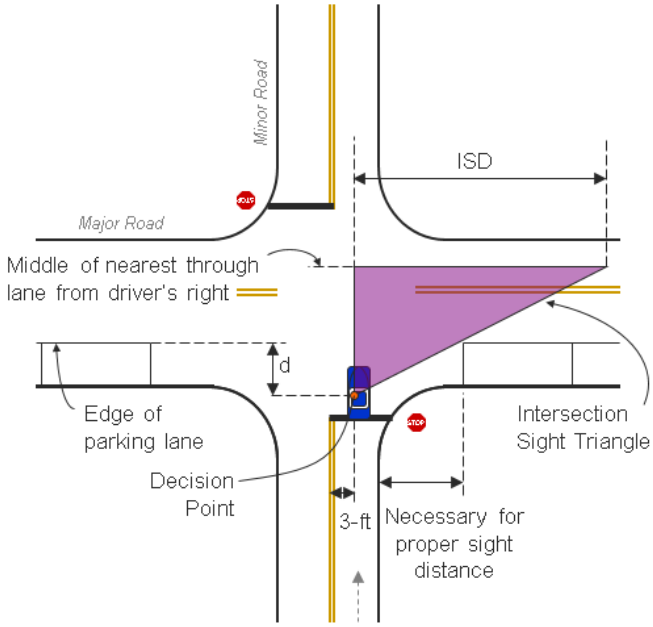

Figure 5. Left turners looking right

ISD = Intersection Sight Distance

d = Distance from the edge of parking lane to the decision point; 10 ft to 14.5 ft, see Table 3.

Table 3. Intersection Sight Distance for Stop Controlled Intersections With On-Street Parking

Design Speed of Major Road (mph)	20	25	30	35	40	45	50	55
Decision Point "d" (ft)	10					14.5		
Method	SSD				Average of SSD and ISD	ISD		
ISD: Intersection Sight Distance (ft) *Based on the following equations*	115	155	200	250	375	500	555	610

20-35 mph Stopping Sight Distance (d) = 1.47Vt + 1.075V^2/a

Where:

- *1.47 is the conversion from mph to fps*
- *V= Design Speed (mph) outside the Bridge Street District is 5 mph over the posted speed limit, unless otherwise approved by the City Engineer*
- *V within the Bridge Street District = Design Speed is the posted speed limit, unless otherwise approved by the City Engineer*
- *t= brake reaction time, 2.5 sec*
- *a= deceleration rate, 11.2 ft/sec^2*

Based on AASHTO – Geometric Design of Highways and Streets (2011).

45-55 mph Intersection Sight Distance = Design Speed (mph) x1.47 x Time Gap (sec)

- *Design Speed outside the Bridge Street District is 5 mph over the posted speed limit, unless otherwise approved by the City Engineer*
- *Design Speed within the Bridge Street District is the posted speed limit, unless otherwise approved by the City Engineer*
- *1.47 is the conversion from mph to fps*
- *Time Gap is 7.5 sec for a turning vehicle to enter a 2-lane major road without a median* from a minor road with 3% or less grade***

  ** If the major road is multi-lane or has a median, add 0.5 sec per additional 12 feet crossed to turn left*

  *** If the minor road grade is >3%, add 0.2 sec per percent grade above 3*

Based on AASHTO – Geometric Design of Highways and Streets (2011), ODOT L&D Section 200, and City of Columbus General Policy and Procedure.

D. **Right out only, stop control with on-street parking:** The sight triangle for a minor stop controlled approach, with only right turns allowed, and on-street parking on the major road shall be based on Figure 6, and Table 4.

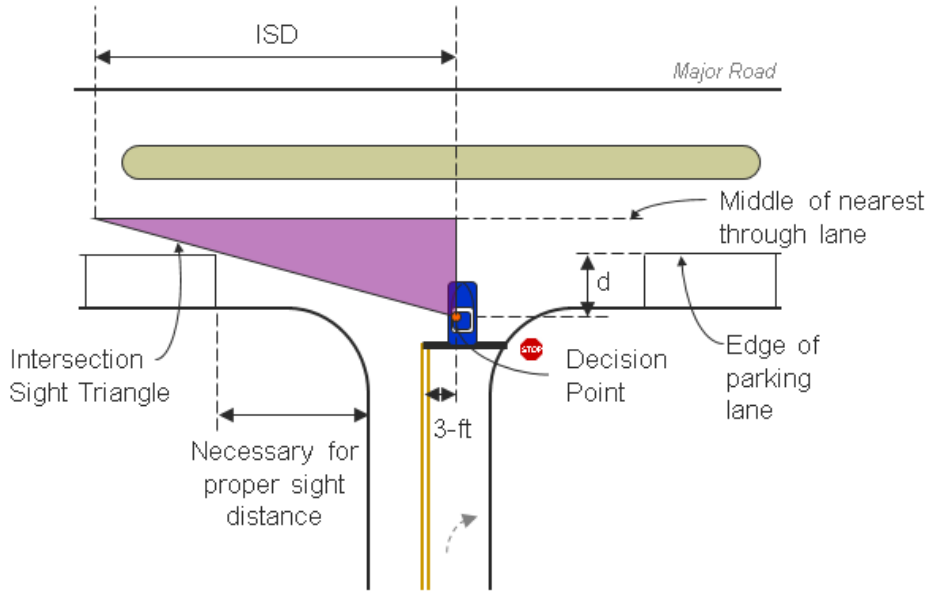

Figure 6. Right turners looking left

ISD = Intersection Sight Distance

d = Distance from the edge of parking lane to the decision point; 10 ft to 14.5 ft, see Table 4.

Table 4. Intersection Sight Distance for Stop Controlled Intersections for Right Out Only With On-Street Parking

Design Speed of Major Road (mph)	20	25	30	35	40	45	50	55
Decision Point "d" (ft)	10					14.5		
Method	SSD				Average of SSD and ISD	ISD		
ISD: Intersection Sight Distance (ft) *Based on the following equations*	115	155	200	250	340	430	480	530

20-35 mph Stopping Sight Distance (d) = 1.47Vt + 1.075V^2/a

Where:

- *1.47 is the conversion from mph to fps*
- *V= Design Speed (mph) outside the Bridge Street District is 5 mph over the posted speed limit, unless otherwise approved by the City Engineer*
- *V within the Bridge Street District = Design Speed is the posted speed limit, unless otherwise approved by the City Engineer*
- *t= brake reaction time, 2.5 sec*
- *a= deceleration rate, 11.2 ft/sec^2*

Based on AASHTO – Geometric Design of Highways and Streets (2011).

45-55 mph Intersection Sight Distance = Design Speed (mph) x1.47 x Time Gap (sec)

- *Design Speed outside the Bridge Street District is 5 mph over the posted speed limit, unless otherwise approved by the City Engineer*
- *Design Speed within the Bridge Street District is the posted speed limit, unless otherwise approved by the City Engineer*
- *1.47 is the conversion from mph to fps*
- *Time Gap is 6.5 sec for a turning vehicle to turn right from a minor road with 3% or less grade**

  ** If the minor road grade is >3%, add 0.2 sec per percent grade above 3*

Based on AASHTO – Geometric Design of Highways and Streets (2011) and ODOT L&D Section 200.

E. **All-way stop control:** The first stopped vehicle on one approach should be visible to the drivers of the first stopped vehicles on each of the other approaches.

II. Traffic Signal Controlled Intersections

The sight triangles for a traffic signal controlled intersection shall be described by the following conditions at each approach:

A. Signals with off peak or night time flash operations shall follow the criteria for two-way stop sign control on the red flashing approaches (Figures 1 & 2 and Tables 1 & 2).

B. Signal approaches with right turns on red allowed that are not defined by II A, shall follow the criteria for right out only, stop control (Figure 3 and Table 3).

C. Signal approaches not described by the conditions in either II A or II B shall use an intersection sight distance based on all-way stop control (ID).

III. Special Cases

The sight triangle for all types of controlled intersections shall be described as combinations of the above sight triangles. The City Engineer may review individual circumstances and field conditions on a case by case basis and apply engineering judgement, which may deviate from this policy, for the best overall solution at each location.

IV. Stopping Sight Distance

Stopping Sight Distance is based on the sum of the distance travelled during the Brake Reaction Time and the Braking Distance. Sight distances exceeding those shown below should be used as the basis for design wherever practical. Care shall be taken to ensure that the appropriate stopping sight distance is accommodated in all intersection designs (including but not limited to left turn lane designs) and discussed in the Traffic Impact Study process and clearly shown on all detailed construction drawings.

The length of crest and sag vertical curves shall be based on a driver eye height of three and a half (3.5) feet and an object height of two (2) feet (AASHTO and ODOT). Stopping sight distance shall be based on Table 5.

Table 5. Stopping Sight Distance for Crest and Sag Vertical Curves

Design Speed of Major Road (mph)	20	25	30	35	40	45	50	55
SSD: Stopping Sight Distance (ft) *Based on the equation below*	115	155	200	250	305	360	425	495

Stopping Sight Distance (d) = $1.47Vt + 1.075V^2/a$

Where:

- *1.47 is the conversion from mph to fps*
- *V= Design Speed (mph) is 5 mph over the posted speed limit, unless otherwise approved by the City Engineer*
- *t= brake reaction time, 2.5 sec*
- *a= deceleration rate, 11.2 ft/sec^2*

Based on AASHTO – Geometric Design of Highways and Streets (2011).

Approved:

City Engineer

8.8.2018
Date