STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
NASHVILLE, TENNESSEE 37243-0348

INSTRUCTIONAL BULLETIN NO. 09-03

Regarding New Intersection Sight Distance Standard Drawings

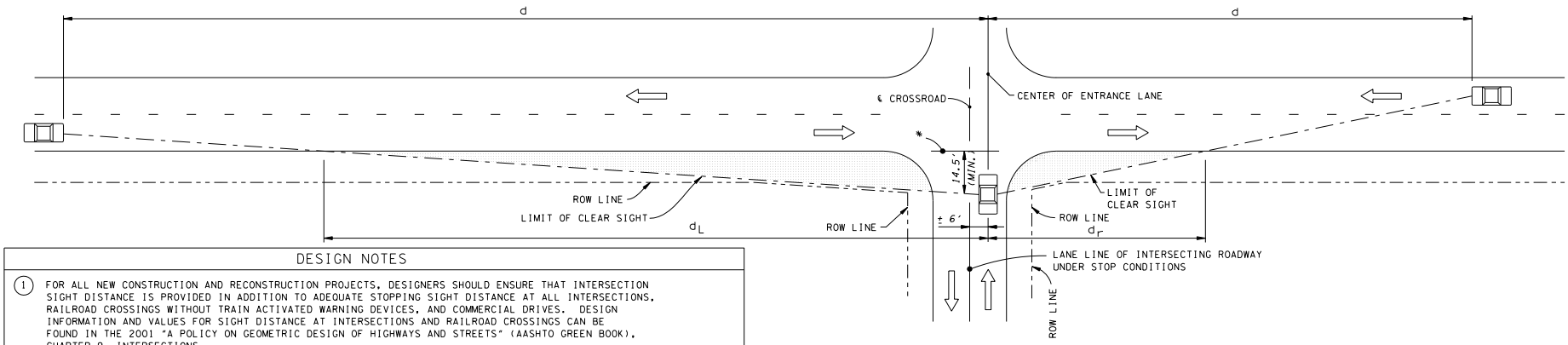
Effective immediately, for all new construction and reconstruction projects, designers should use the new Intersection Sight Distance Standard Drawings to ensure that intersection sight distance is provided in addition to adequate stopping sight distance at all intersections, railroad crossings without train activated warning devices, and commercial drives. Refer to IB 08-13 for an additional guidance.

Copies of the new standard drawings are attached.

DRAWING NUMBER	CURRENT REVISION DATE	DESCRIPTION
RD01-SD-1		Intersection Sight Distance Design and General Notes
RD01-SD-2		Intersection Sight Distance Landscape for Obstructions
RD01-SD-3		Intersection Sight Distance 2-Lane Roadways
RD01-SD-4		Intersection Sight Distance 5-Lane and 4-Lane Undivided Roadways
RD01-SD-5		Intersection Sight Distance 4-Lane Divided Highways
RD01-SD-6		Intersection Sight Distance 6-Lane Divided Highways
RD01-SD-7		Intersection Sight Distance For Passive Railroad Highway Grade Crossings

Original signed by Jeff C. Jones
Jeff C. Jones, Civil Engineering Director
Design Division

April 3, 2009
JCJ:MJA:arh



ORIGIN OF CLEAR SIGHT LINE ON MINOR ROAD, STOP CONDITIONS

* EDGE OF MAJOR ROAD TRAVELED WAY. THE TRAVELED WAY IS THE PORTION OF THE ROADWAY FOR THE MOVEMENT OF VEHICLES, EXCLUSIVE OF SHOULDERS, PARKING SPACES AND MARKED BICYCLE LANES.

DEFINITIONS

d =CLEAR LINE SIGHT DISTANCE

d_r= CLEAR LINE OF SIGHT DISTANCE TO THE RIGHT

d_L= CLEAR LINE OF SIGHT DISTANCE TO THE LEFT

d_m= DISTANCE MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO A POINT ON THE MEDIAN CLEAR ZONE LIMIT OR HORIZONTAL CLEARANCE LIMIT FOR THE FAR SIDE ROADWAY OF THE MAJOR ROADWAY (SEE SHEET RD01-SD-5)

DESIGN NOTES

(1) FOR ALL NEW CONSTRUCTION AND RECONSTRUCTION PROJECTS, DESIGNERS SHOULD ENSURE THAT INTERSECTION SIGHT DISTANCE IS PROVIDED IN ADDITION TO ADEQUATE STOPPING SIGHT DISTANCE AT ALL INTERSECTIONS. RAILROAD CROSSINGS WITHOUT TRAIN ACTIVATED WARNING DEVICES, AND COMMERCIAL DRIVES. DESIGN INFORMATION AND VALUES FOR SIGHT DISTANCE AT INTERSECTIONS AND RAILROAD CROSSINGS CAN BE FOUND IN THE 2001 "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" (AASHTO GREEN BOOK), CHAPTER 9, INTERSECTIONS.

(2) INTERSECTION SIGHT DISTANCE SHOULD ALSO BE PROVIDED AT ALL PRIVATE DRIVES AND FIELD ENTRANCES WHEN FEASIBLE. IN THE EVENT THAT INTERSECTION SIGHT DISTANCE CANNOT BE ACHIEVED, THE DESIGNER SHALL VERIFY THAT STOPPING SIGHT DISTANCE IS PROVIDED. INTERSECTION SIGHT DISTANCE SHOULD ALWAYS BE PROVIDED FOR A LEFT TURN MOVEMENT FROM THE MAJOR ROAD INTO A PRIVATE DRIVE OR FIELD ENTRANCE.

(3) DESIGNERS SHOULD CONSIDER ALL FEATURES THAT COULD LIMIT ADEQUATE SIGHT DISTANCE INCLUDING BUILDINGS, PARKED VEHICLES, HIGHWAY STRUCTURES, ROADSIDE HARDWARE, HEDGES, TREES, BUSHES, UNMOWED GRASS, TALL CROPS, WALLS, FENCES, SLOPES, AND THE TERRAIN ITSELF. THE DETERMINATION OF WHETHER AN OBJECT CONSTITUTES A SIGHT OBSTRUCTION SHOULD CONSIDER THE HORIZONTAL AND VERTICAL ALIGNMENT OF BOTH INTERSECTING ROADWAYS, AS WELL AS THE HEIGHT AND POSITION OF THE OBJECT. IN MAKING THIS DETERMINATION, THE ASSUMED DRIVER'S EYE SHOULD BE 3.5 FT. ABOVE THE SURFACE OF THE INTERSECTING ROAD FOR PASSENGER CARS. FOR LANDSCAPING, THE MATURE SIZE OF THE ITEM SHALL BE USED.

(4) IN AREAS OF LIMITED RIGHT-OF-WAY ACQUISITION SUCH AS A CURB AND GUTTER SECTION, ADDITIONAL RIGHT-OF-WAY MAY NEED TO BE ACQUIRED TO ENSURE THAT INTERSECTION SIGHT DISTANCE CAN BE ACHIEVED OR MAINTAINED. IN THE EVENT THAT IT IS NOT FEASIBLE TO OBTAIN MINIMUM INTERSECTION SIGHT DISTANCE OR TO ACQUIRE ADEQUATE RIGHT-OF-WAY TO ENSURE INTERSECTION SIGHT DISTANCE CAN BE MAINTAINED, THE DESIGN MANAGER WILL DOCUMENT IN THE PROJECT FILE THE REASON AND STEPS TAKEN TO MITIGATE. INTERSECTION SIGHT DISTANCE IS NOT ONE OF THE THIRTEEN CONTROLLING ELEMENTS OF DESIGN AS DETAILED IN SECTION 3-110.02 OF THE ROADWAY DESIGN GUIDELINES; THEREFORE, DESIGN EXCEPTIONS NEED NOT BE SUBMITTED.

(5) DESIGNERS SHALL SHOW SIGHT LINES FOR ALL INTERSECTIONS IN THE DESIGN CADD FILE. SIGHT LINES SHALL ONLY BE SHOWN ON THE PRESENT AND PROPOSED LAYOUT SHEETS WHEN RIGHT-OF-WAY IS REQUIRED FOR THE PURPOSE OF ESTABLISHING OR MAINTAINING INTERSECTION SIGHT DISTANCE. SIGHT LINES SHOULD ALSO BE SHOWN FOR ALL INTERSECTIONS AND DRIVES ON ALL LANDSCAPING PLANS.

(6) THE MINIMUM DRIVER EYE SETBACK OF 14.5' FROM THE EDGE OF THE TRAVELED WAY MAY BE ADJUSTED ON ANY INTERSECTION LEG ONLY WHEN JUSTIFIED BY A SITE SPECIFIC FIELD STUDY OF VEHICLE STOPPING POSITION AND DRIVER EYE POSITION.

(7) FOR SIGNALIZED INTERSECTIONS SIGHT DISTANCES SHOULD BE DEVELOPED BASED ON AASHTO "CASE D-INTERSECTIONS WITH TRAFFIC SIGNAL CONTROL". AT SIGNALIZED INTERSECTIONS, THE FIRST VEHICLE STOPPED ON ONE APPROACH SHOULD BE VISIBLE TO THE DRIVER OF THE FIRST VEHICLE STOPPED ON EACH OF THE OTHER APPROACHES. LEFT-TURNING VEHICLES SHOULD HAVE SUFFICIENT SIGHT DISTANCE TO SELECT GAPS IN ONCOMING TRAFFIC AND COMPLETE LEFT TURNS. APART FROM THESE SIGHT CONDITIONS, THERE ARE GENERALLY NO OTHER APPROACH OR DEPARTURE SIGHT TRIANGLES NEEDED FOR SIGNALIZED INTERSECTIONS. HOWEVER, IF THE TRAFFIC SIGNAL IS TO BE PLACED ON TWO-WAY FLASHING OPERATION (I.E. FLASHING YELLOW ON THE MAJOR-ROAD APPROACHES AND FLASHING RED ON THE MINOR-ROAD APPROACHES) UNDER OFF-PEAK OR NIGHTTIME CONDITIONS, THEN THE APPROPRIATE DEPARTURE SIGHT TRIANGLES FOR CASE B, BOTH TO THE LEFT AND TO THE RIGHT, SHOULD BE PROVIDED FOR THE MINOR-ROAD APPROACHES. IN ADDITION, IF RIGHT TURNS ON A RED SIGNAL ARE TO BE PERMITTED FROM ANY APPROACH, THEN THE APPROPRIATE DEPARTURE SIGHT TRIANGLE TO THE LEFT FOR CASE B2 SHOULD BE PROVIDED TO ACCOMMODATE RIGHT TURNS FROM THAT APPROACH.

(8) WHERE CURVATURE, SUPERELEVATION, ADVERSE SPLIT PROFILES OR OTHER CONDITIONS PRECLUDE THE USE OF STANDARD TREE SIZES AND SPACING, PROOF OF VIEW AND SIGHT DISTANCE RESTRAINTS SHOULD BE DETAILED IN THE PLANS.

(9) INTERSECTION SIGHT DISTANCE VALUES ARE PROVIDED FOR PASSENGER VEHICLES, SINGLE UNIT (SU) VEHICLES AND COMBINATION VEHICLES. INTERSECTION SIGHT DISTANCE BASED ON THE PASSENGER VEHICLE IS SUITABLE FOR MOST INTERSECTIONS. WHERE SUBSTANTIAL VOLUMES OF HEAVY VEHICLES ENTER THE MAJOR-ROAD, SUCH AS FROM RAMP TERMINALS WITH STOP CONTROL OR ROADWAYS SERVING TRUCK TERMINALS, THE USE OF TABULATED VALUES FOR (SU) VEHICLES OR COMBINATION VEHICLES SHOULD BE CONSIDERED.

(10) THE INFORMATION SHOWN IS INTENDED SOLELY FOR THE PURPOSE OF CLEAR SIGHT DEVELOPMENT AND MAINTENANCE AT INTERSECTING HIGHWAYS, ROADS AND STREETS, AND IS NOT INTENDED TO BE USED TO ESTABLISH ROADWAY AND ROADSIDE SAFETY EXCEPT AS RELATED TO INTERSECTION SIGHT CORRIDORS.

(11) THE INTERSECTION SIGHT DISTANCE TABLES DO NOT SUPERCEDE AASHTO STOPPING SIGHT DISTANCE REQUIREMENTS. THE DESIGNER MUST ENSURE THAT STOPPING SIGHT DISTANCES ARE MET.

(12) DETAILS ARE BASED ON THE AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 2001", CHAPTER 9, INTERSECTION SIGHT DISTANCE, CASES B AND F, AND THE DEPARTMENT PRACTICES FOR CHANNELIZED MEDIAN OPENINGS (LEFT TURNS ON MAJOR ROADWAYS).

GENERAL NOTES

(A) DETAILS APPLY TO BOTH RURAL AND URBAN INTERSECTIONS UNDER STOP SIGN CONTROL OR FLASHING BEACON CONTROL. FOR FULL SIGNAL CONTROLLED INTERSECTIONS SEE DESIGN NOTE NO 7.

(B) INTERSECTION SIGHT DISTANCE (d) APPLIES TO NORMAL AND SKEWED INTERSECTIONS (INTERSECTING ANGLES BETWEEN 60° AND 120°), AND WHERE VERTICAL AND/OR HORIZONTAL CURVES ARE PRESENT. SIGHT DISTANCE (d) IS MEASURED ALONG THE MAJOR ROADWAY FROM THE CENTER OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO THE CENTER OF THE NEAR APPROACH LANE (RIGHT OR LEFT) OF THE MAJOR ROADWAY. DISTANCES d_L AND d_r ARE MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE (CROSS ROAD) OF THE MINOR ROADWAY TO A POINT ON THE EDGE OF THE NEAR SIDE OUTER TRAFFIC LANE ON THE MAJOR ROADWAY. DISTANCE d_m IS MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO A POINT ON THE MEDIAN CLEAR ZONE LIMIT OR HORIZONTAL CLEARANCE LIMIT FOR THE FAR SIDE ROADWAY OF THE MAJOR ROADWAY.

(C)
1. THE LIMITS OF CLEAR SIGHT DEFINE A CORRIDOR THROUGHOUT WHICH A CLEAR LINE OF SIGHT MUST BE PRESERVED. SEE VERTICAL LIMITS OF CLEAR SIGHT DETAIL ON SHEET RD01-SD-2.
2. CLEAR SIGHT MUST BE PROVIDED BETWEEN VEHICLES AT INTERSECTION STOP LOCATIONS AND VEHICLES ON THE MAJOR ROADWAY WITHIN DIMENSION 'd'.
3. SINCE OBSERVATIONS ARE MADE IN BOTH DIRECTIONS ALONG THE LINE OF SIGHT, THE REFERENCE DATUM BETWEEN ROADWAYS IS 3'-6" ABOVE RESPECTIVE PAVEMENTS.

(D) BARRIER SYSTEMS WITHIN INTERSECTION SIGHT CORRIDORS, WHERE PENETRATION INTO THE CLEAR LINE OF SIGHT MIGHT OCCUR, SHALL BE LOCATED TO PROVIDE THE LEAST ADVERSE AFFECT PRACTICAL.

(E) ALL PROPERTY NEEDED TO ACHIEVE SIGHT DISTANCE AT INTERSECTIONS SHOULD BE ACQUIRED AS RIGHT-OF-WAY.

(F) SIGHT DISTANCE VALUES IN THESE STANDARD DRAWINGS ARE APPROXIMATE FOR GENERALLY FLAT AREAS WHERE THE ROADWAY GRADES ARE IN THE APPROXIMATE RANGE OF 0% TO 6%. FOR LOCATIONS WHERE ROADWAYS ARE CURVED OR WITH GRADES GREATER THAN 6%, THE DESIGNER IS DIRECTED TO ENSURE THAT STOPPING SIGHT DISTANCES COMPLY WITH AASHTO "A POLICY FOR GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AS CURRENTLY ADOPTED BY TDOT.

LEGEND

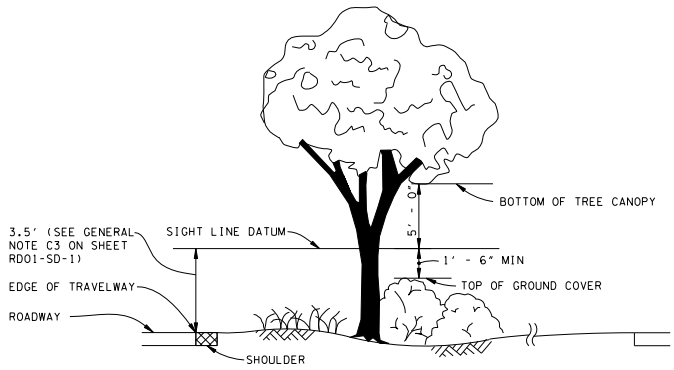
AREAS FREE OF SIGHT OBSTRUCTIONS

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE DESIGN AND GENERAL NOTES

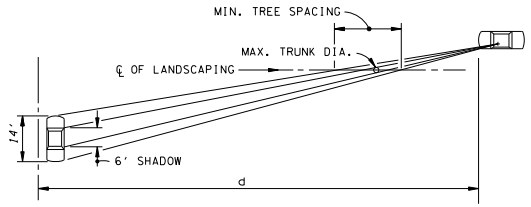
10-1-08 | RD01-SD-1



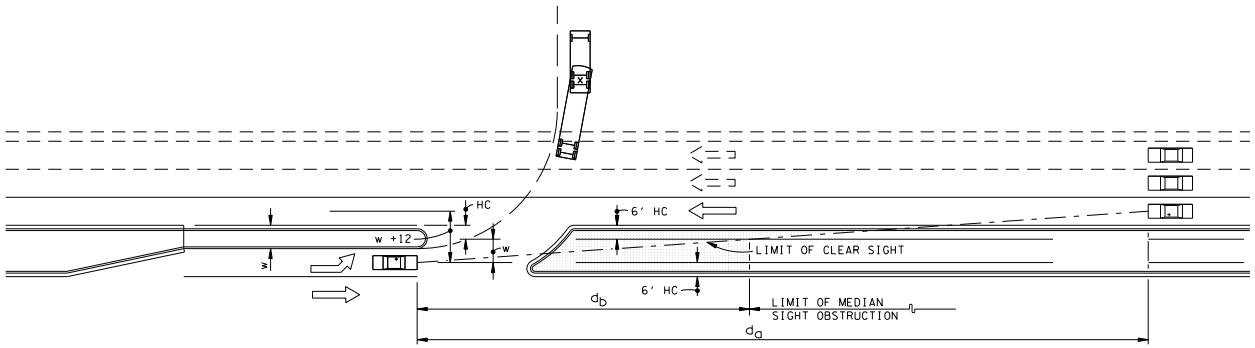
THE INTENT OF THIS STANDARD IS TO PROVIDE A WINDOW WITH VERTICAL LIMITS OF NOT LESS THAN 5' ABOVE AND 1' - 6" BELOW THE SIGHT LINE DATUM, AND HORIZONTAL LIMITS DEFINED BY THE LIMITS OF CLEAR SIGHT.

VERTICAL LIMITS OF CLEAR SIGHT DISTANCE

(SEE GENERAL NOTE C1 ON SHEET RD01-SD-1)



HORIZONTAL LIMITS OF CLEAR SIGHT DISTANCE



CHANNELIZED DIRECTIONAL MEDIAN OPENINGS

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

DESIGN NOTES

THE CORRIDOR DEFINED BY THE LIMITS OF CLEAR SIGHT IS A RESTRICTED PLANTING AREA. DRIVERS OF VEHICLES ON THE INTERSECTING ROADWAY AND VEHICLES ON THE MAJOR ROADWAY SHOULD BE ABLE TO SEE EACH OTHER CLEARLY THROUGHOUT THE LIMITS OF 'd' AND 'd_a'. IF IN THE ENGINEERS JUDGEMENT, LANDSCAPING INTERFERES WITH THE LINE OF SIGHT CORRIDOR PRESCRIBED BY THESE STANDARDS THE ENGINEER MAY REARRANGE, RELOCATE OR ELIMINATE PLANTINGS. PLANTS WITHIN THE RESTRICTED AREAS ARE LIMITED TO SELECTIONS AS FOLLOWS:

GROUND COVER & TRUNKED PLANTS (SEPARATE OR COMBINED):

GROUND COVERS - PLANT SELECTION OF LOW GROWING VEGETATION WHICH AT MATURITY DOES NOT ATTAIN A HEIGHT GREATER THAN 18" BELOW THE SIGHT LINE DATUM. FOR GROUND COVER IN COMBINATION WITH TREES. THE FOLLOWING HEIGHTS BELOW THE SIGHT LINE DATUM WILL APPLY: 24" FOR TREES < 11" DIA.

TRUNKED PLANTS - PLANT SELECTION OF A MATURE TRUNK DIAMETER 4" OR LESS MEASURED AT 6" ABOVE THE GROUND. CANOPY OR HIGH BORNE FOLIAGE SHALL NEVER BE LOWER THAN 5' ABOVE THE SIGHT LINE DATUM. THESE SELECTIONS SHALL BE SPACED NO CLOSER THAN 20'.

TREES:

TREES CAN BE USED WITH LAWN; PAVERS; PAVEMENT; GRAVEL, BARK OR WOOD CHIP BEDS; GROUND COVERS OR OTHER DEPARTMENT APPROVED MATERIAL. THE CLEAR SIGHT WINDOW MUST BE IN CONFORMANCE WITH THE 'WINDOW DETAIL' MODIFIED TO ATTAIN THE HEIGHT REQUIREMENTS LISTED IN 'GROUND COVERS' ABOVE. TREE SIZE AND SPACING SHALL CONFORM TO THE FOLLOWING TABULAR VALUES:

DESIGN SPEED (MPH)		30	35	40	45	50	55	60
MINIMUM SPACING (C. TO C. OF TRUCK)	4<Ø<11	22	27	33	40	45	52	60
	12<Ø<18	91	108	126	146	165	173	193

Ø = DIAMETER WITHIN LIMITS OF SIGHT WINDOW (INCHES)

SIZES AND SPACINGS ARE BASED ON THE FOLLOWING CONDITIONS:

(A) A SINGLE LINE OF TREES IN THE MEDIAN PARALLEL TO BUT NOT NECESSARILY COLINEAR WITH THE CENTERLINE,

(B) A STRAIGHT APPROACHING MAINLINE, WITHIN SKEW LIMITS AS DESCRIBED IN GENERAL NOTE B.

(C) TREES ≤ 11" IN DIAMETER CASTING A VERTICAL 6' WIDE SHADOW BAND ON A VEHICLE ENTERING AT STOP BAR LOCATION WHEN VIEWED BY MAINLINE DRIVER BEGINNING AT DISTANCE 'd'; SEE SHADOW DIAGRAM.

(D) TREES WITH DIAMETERS ≤ 11" INTERMIXED WITH TREES WITH DIAMETERS 11" ≤ 18" ARE TO BE SPACED BASED ON TREES WITH DIAMETERS > 11" ≤ 18".

FOR ANY OTHER CONDITIONS THE TREE SIZES, SPACINGS AND LOCATIONS SHALL BE DETAILED IN THE PLANS; SEE DESIGN NOTE NO. 8.

CHANNELIZED DIRECTIONAL MEDIAN OPENINGS

d_a (FEET)

Design Speed MPH	1 LANE CROSSED			2 LANE CROSSED			3 LANE CROSSED		
	P	SU	COMB.	P	SU	COMB.	P	SU	COMB.
30	245	285	330	265	320	360	285	350	390
35	285	335	385	310	370	420	335	405	460
40	325	380	440	355	425	480	380	465	525
45	365	430	495	395	475	540	430	520	590

THE d_a VALUES IN THE TABLE WERE ESTABLISHED BY THE METHOD REFERENCED IN DESIGN NOTE 12, AND ARE APPLICABLE TO URBAN, PREDOMINANTLY CURBED ROADWAYS WITH DESIGN SPEEDS OF 45 MPH OR LESS. FOR HORIZONTAL CLEARANCE (HC) OF SIX FEET (6'), THE VALUES FOR d_b MAY BE DETERMINED BY THE EQUATION $d_b = d_a (w/(w+12))$. FOR ROADWAYS WITH NONRESTRICTED CONDITIONS, d_a AND d_b SHOULD BE BASED ON THE GEOMETRY FOR THE LEFT TURN STORAGE AND ON CLEAR ZONE WIDTHS.

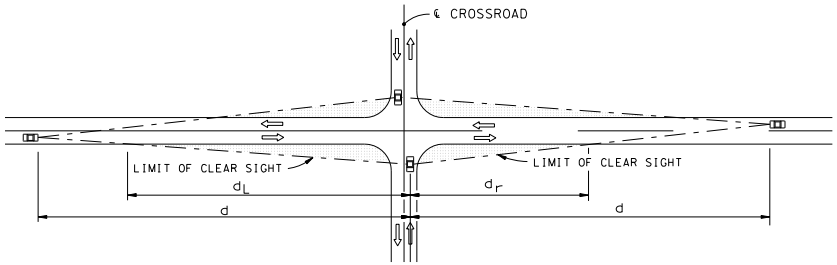
P = PASSENGER VEHICLE
SU = SINGLE UNIT TRUCK
COMB. = COMBINATION
d = CLEAR LINE SIGHT DISTANCE
d_a= CLEAR LINE SIGHT DISTANCE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE LANDSCAPE AND OBSTRUCTION

NOT TO SCALE

10-01-08 RD01-SD-2



2 LANE UNDIVIDED ROADWAY - SYMETRICAL

Design Speed	d	d_L	d_r
15	165	120	75
20	220	160	100
25	275	195	125
30	335	240	150
35	390	275	175
40	445	315	200
45	500	350	225
50	555	390	250
55	610	430	275
60	665	470	300
65	720	510	325
70	775	550	350

PASSENGER VEHICLE

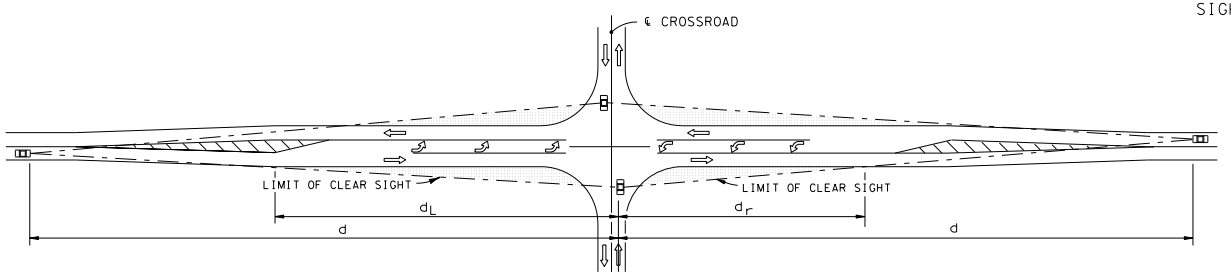
Design Speed	d	d_L	d_r
15	210	150	95
20	280	200	125
25	350	250	160
30	420	295	190
35	490	345	220
40	560	395	250
45	630	445	280
50	700	495	310
55	770	545	345
60	840	595	375
65	910	645	405
70	980	695	440

SU VEHICLE

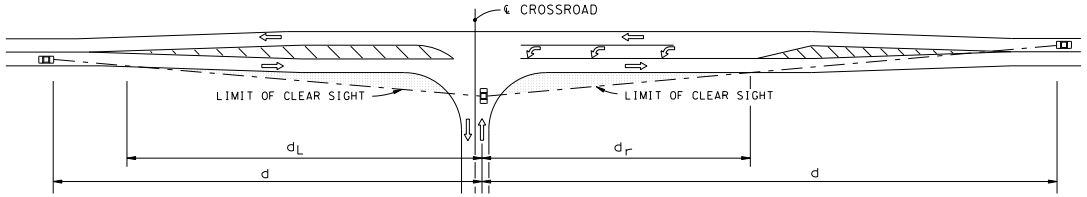
Design Speed	d	d_L	d_r
15	255	180	115
20	340	240	155
25	425	300	190
30	510	360	225
35	595	420	265
40	680	480	305
45	765	540	340
50	845	600	375
55	930	660	415
60	1015	720	450
65	1100	780	490
70	1185	840	530

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)
2 LANE UNDIVIDED



FLARED FOR OPPOSING LEFT TURN CENTERED ON ALIGNMENT - 2 LANE 2 WAY



FLARED FOR SINGLE SIDE LEFT TURN CENTERED ON ALIGNMENT - 2 LANE 2 WAY

Design Speed	d	d_L	d_r
15	180	100	70
20	235	130	90
25	295	165	115
30	355	195	135
35	415	225	155
40	475	260	180
45	530	290	200
50	590	325	220
55	650	355	245
60	710	390	265
65	765	420	290
70	825	455	315

PASSENGER VEHICLE

Design Speed	d	d_L	d_r
15	225	125	85
20	300	165	115
25	375	205	145
30	450	250	170
35	525	290	200
40	600	330	225
45	675	370	255
50	750	410	285
55	825	450	310
60	900	490	340
65	975	530	370
70	1050	575	400

SU VEHICLE

Design Speed	d	d_L	d_r
15	270	150	105
20	360	200	140
25	450	250	170
30	540	295	205
35	630	345	240
40	720	395	270
45	810	445	305
50	900	495	340
55	990	540	375
60	1080	590	405
65	1170	640	440
70	1255	690	475

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)
2 LANE 2 WAY - FLARED FOR LEFT TURNS

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

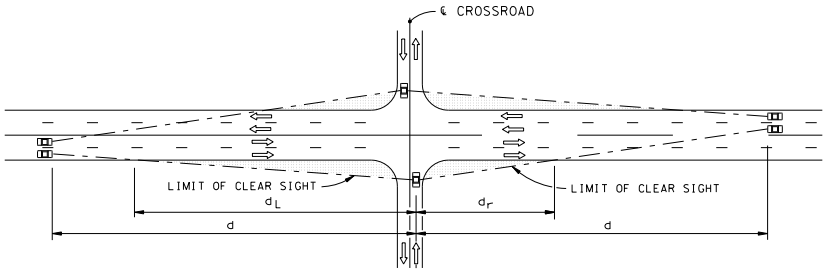
NOTE: SEE RD01-SD-1 FOR INTERSECTING ROADWAY ORIGIN OF CLEAR SIGHT AND QUADRANT CORNER CLIPS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE 2-LANE ROADWAYS

NOT TO SCALE

10-01-08 RD01-SD-3



4 LANE UNDIVIDED - SYMETRICAL

Design Speed	d	d_L	d_r
30	355	250	115
35	415	295	135
40	475	335	155
45	530	375	175
50	590	415	195
55	650	460	210
60	705	500	230
65	765	540	250
70	825	585	270

PASSENGER VEHICLE

Design Speed	d	d_L	d_r
30	450	320	150
35	525	370	170
40	600	425	195
45	675	475	220
50	750	530	245
55	825	585	270
60	900	635	295
65	975	690	320
70	1050	745	345

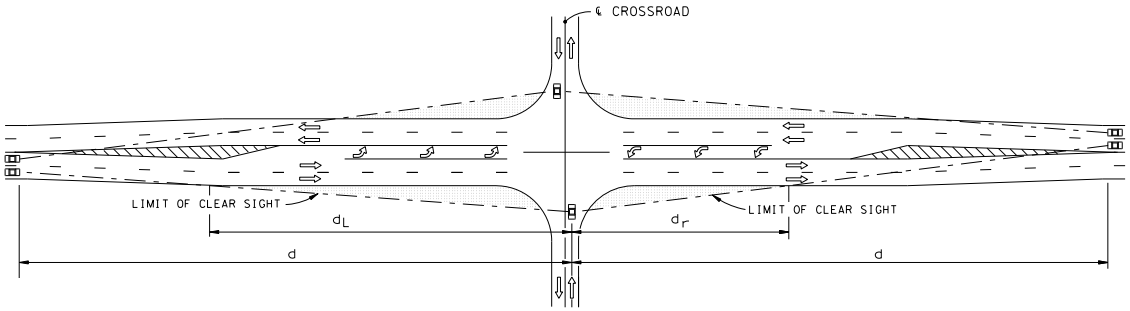
SU VEHICLE

Design Speed	d	d_L	d_r
30	540	380	175
35	630	445	205
40	720	510	235
45	810	570	265
50	900	635	295
55	990	700	320
60	1080	765	350
65	1170	825	380
70	1260	890	410

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)

4 LANE UNDIVIDED



4 LANE UNDIVIDED FLARED - SYMMETRICAL

Design Speed	d	d_L	d_r
30	375	205	120
35	440	240	145
40	500	275	165
45	565	310	185
50	625	340	205
55	690	375	225
60	750	410	245
65	815	445	265
70	880	480	285

PASSENGER VEHICLE

Design Speed	d	d_L	d_r
30	480	220	155
35	560	255	180
40	640	290	210
45	720	330	235
50	800	365	260
55	880	400	285
60	960	440	310
65	1040	480	340
70	1120	520	365

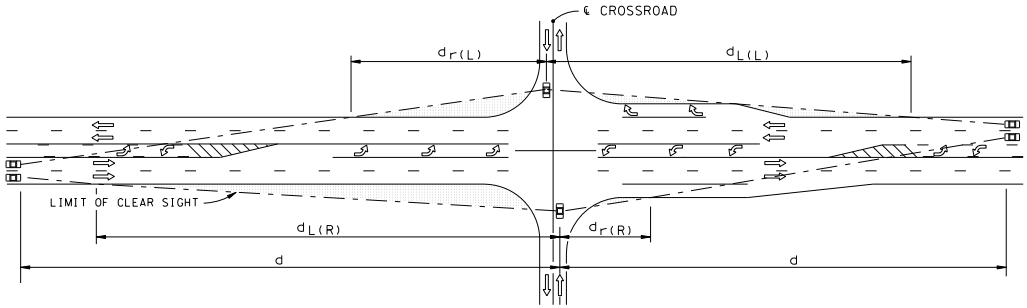
SU VEHICLE

Design Speed	d	d_L	d_r
30	570	310	185
35	665	365	215
40	760	415	250
45	855	470	280
50	950	520	310
55	1045	570	340
60	1140	625	370
65	1235	675	400
70	1330	730	430

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)

4 LANE UNDIVIDED FLARED - SYMMETRICAL



5 LANE FLARED WITH RIGHT TURNS

Design Speed	d	$d_{L(R)}$	$d_{r(R)}$	$d_{L(L)}$	$d_{r(L)}$
30	375	265	95	170	120
35	440	310	115	195	145
40	500	355	130	225	165
45	565	400	145	250	185
50	625	440	160	280	205
55	690	490	172	310	225
60	750	530	195	335	245
65	815	575	210	365	265
70	880	625	230	385	285

PASSENGER VEHICLE

Design Speed	d	$d_{L(R)}$	$d_{r(R)}$	$d_{L(L)}$	$d_{r(L)}$
30	480	340	125	215	155
35	560	395	145	250	180
40	640	450	165	285	210
45	720	510	185	320	235
50	800	565	205	360	260
55	880	620	225	395	285
60	960	680	245	430	310
65	1040	735	265	465	340
70	1120	795	285	500	365

SU VEHICLE

Design Speed	d	$d_{L(R)}$	$d_{r(R)}$	$d_{L(L)}$	$d_{r(L)}$
30	570	405	145	255	185
35	665	470	170	295	215
40	760	540	195	340	250
45	855	605	220	380	280
50	950	670	245	425	310
55	1045	740	270	465	340
60	1140	805	295	510	370
65	1235	875	320	550	400
70	1330	940	345	595	430

COMBINATION VEHICLE

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)

5 LANE FLARED WITH RIGHT TURN LANES

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

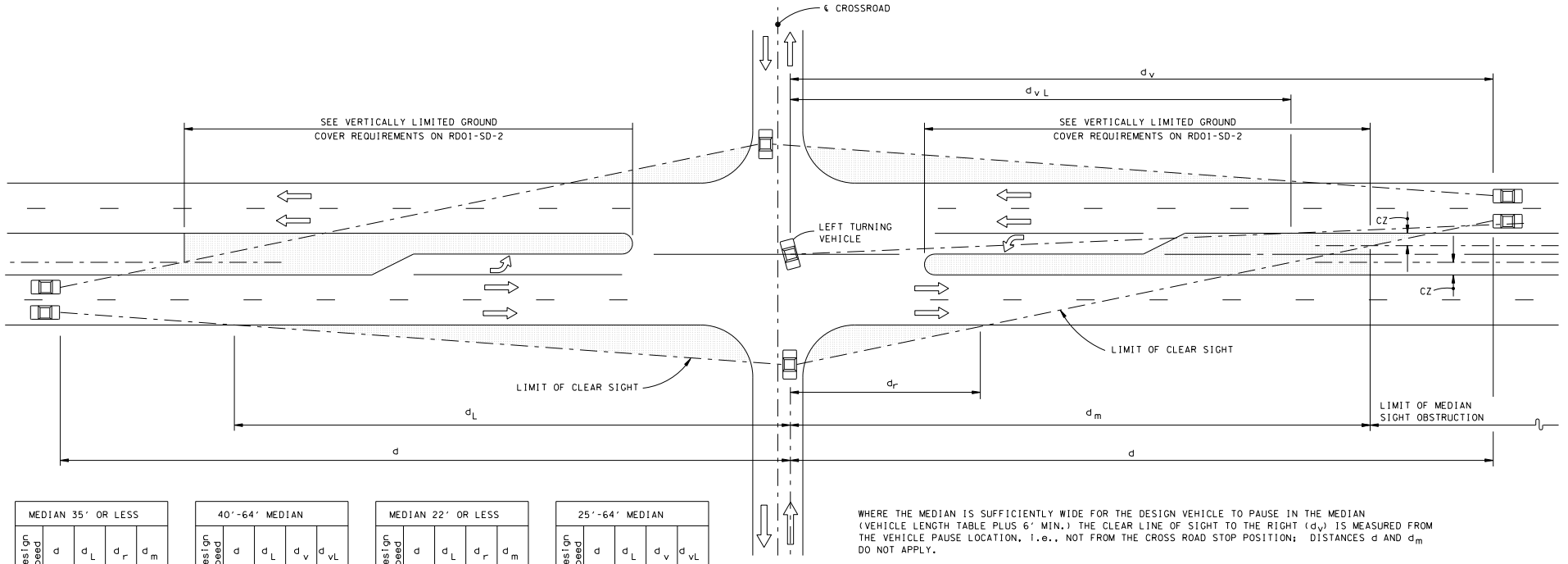
NOTE: SEE RD01-SD-1 FOR INTERSECTING ROADWAY ORIGIN OF CLEAR SIGHT AND QUADRANT CORNER CLIPS.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE 5-LANE AND 4-LANE UNDIVIDED ROADWAYS

10-01-08 RD01-SD-4



PLAN

MEDIAN 35' OR LESS				
Design Speed	d	d_L	d_r	d_m
30	540	380	100	460
35	630	450	110	530
40	720	510	130	610
45	810	570	150	690
50	900	640	160	760
55	990	700	180	840
60	1080	760	200	920
65	1170	830	210	990
70	1260	890	230	1070

40'-64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	370	260	420	300
35	440	310	490	350
40	500	350	560	400
45	560	400	630	450
50	620	440	700	500
55	690	490	770	540
60	750	530	840	590
65	810	570	910	640
70	875	620	980	690

SINGLE-UNIT TRUCK (SU)

MEDIAN 22' OR LESS				
Design Speed	d	d_L	d_r	d_m
30	390	280	90	320
35	460	330	100	380
40	520	370	110	430
45	590	420	130	480
50	650	460	140	530
55	720	510	160	590
60	780	550	170	640
65	850	600	190	700
70	920	650	200	760

25'-64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	290	210	330	230
35	330	230	390	280
40	380	270	440	310
45	430	300	500	350
50	480	340	550	390
55	530	370	610	430
60	570	400	660	470
65	620	440	720	510
70	670	475	770	550

PASSENGER VEHICLE (P)

MEDIAN 30' OR LESS				
Design Speed	d	d_L	d_r	d_m
30	620	440	120	520
35	720	510	140	600
40	820	580	160	690
45	930	660	180	780
50	1030	730	200	860
55	1130	800	220	950
60	1240	880	240	1040
65	1340	950	260	1120
70	1440	1020	280	1200

35'-50' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	670	470	100	580
35	780	550	120	680
40	890	630	140	780
45	1000	710	150	870
50	1110	790	170	970
55	1220	860	190	1070
60	1330	940	200	1160
65	1440	1020	220	1260
70	1550	1100	240	1360

64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	460	330	510	360
35	540	380	590	420
40	620	440	680	480
45	690	490	760	540
50	770	540	850	600
55	850	600	930	660
60	920	650	1020	720
65	1000	710	1100	780
70	1080	770	1180	840

INTERMIDIATE SEMI-TRAILERS (WB-40 & WB-50)

VEHICLE TYPE	VEHICLE LENGTH (FT.)
PASSENGER (P)	19
SINGLE UNIT (SU)	30
LARGE SCHOOL BUS	40
WB-40	45.5
WB-50	55

VEHICLE LENGTH TABLE

SIGHT DISTANCES (d) & (d_v) AND RELATED DISTANCES (d_L, d_r, d_m & d_{vL}) (FEET)

4 LANE DIVIDED HIGHWAYS

WHERE THE MEDIAN IS SUFFICIENTLY WIDE FOR THE DESIGN VEHICLE TO PAUSE IN THE MEDIAN (VEHICLE LENGTH TABLE PLUS 6' MIN.) THE CLEAR LINE OF SIGHT TO THE RIGHT (d_v) IS MEASURED FROM THE VEHICLE PAUSE LOCATION, I.e., NOT FROM THE CROSS ROAD STOP POSITION; DISTANCES d AND d_m DO NOT APPLY.

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

CZ CLEAR ZONE WIDTH FOR NONRESTRICTED CONDITIONS (6' MIN. FOR RESTRICTED CONDITIONS)

GENERAL NOTES FOR 4-LANE DIVIDED ROADWAY

1. SEE RDO1-SD-1 FOR ORIGIN OF CLEAR SIGHT LINE ON THE ROAD.
2. VALUES SHOWN IN THE TABLES ARE THE GOVERNING (CONTROLLING) SIGHT DISTANCES CALCULATED BASED ON 'AASHTO CASE B - INTERSECTION WITH STOP CONTROL ON THE MINOR ROAD.'
3. DEFINITIONS:

   d_{vL} THE CLEAR LINE OF SIGHT TO THE RIGHT IS THE DISTANCE MEASURED FOR THE VEHICLE PAUSE LOCATION TO THE EDGE OF THE INSIDE TRAVEL LANE

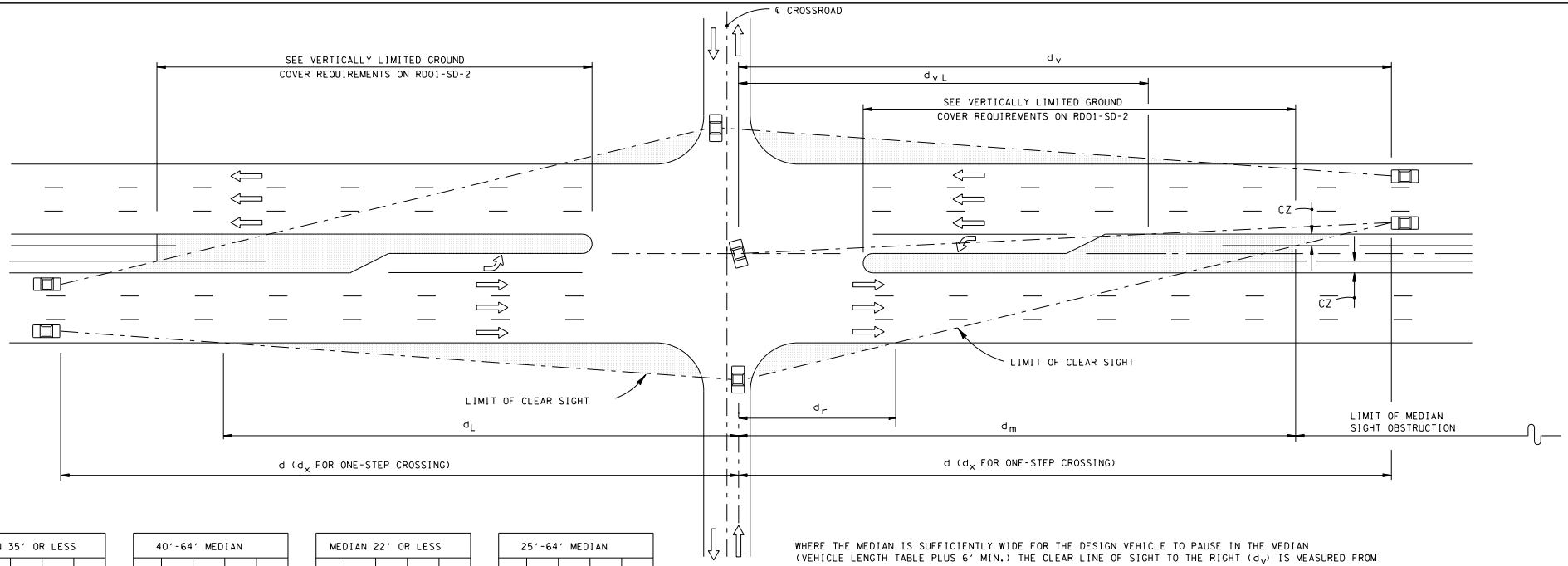
   CZ CLEAR ZONE

   d_m DISTANCE MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO A POINT ON THE MEDIAN CLEAR ZONE LIMIT OR HORIZONTAL CLEARANCE LIMIT FOR THE FAR SIDE ROADWAY OF THE MAJOR ROADWAY
4. SEE SHEET RDO1-SD-2 FOR MEDIAN LANDSCAPE REQUIREMENTS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE 4-LANE DIVIDED HIGHWAYS

NOT TO SCALE | 10-01-08 | RDO1-SD-5



PLAN

WHERE THE MEDIAN IS SUFFICIENTLY WIDE FOR THE DESIGN VEHICLE TO PAUSE IN THE MEDIAN (VEHICLE LENGTH TABLE PLUS 6' MIN.) THE CLEAR LINE OF SIGHT TO THE RIGHT (d_v) IS MEASURED FROM THE VEHICLE PAUSE LOCATION, I.e., NOT FROM THE CROSS ROAD STOP POSITION; DISTANCES d AND d_m DO NOT APPLY.

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

CZ CLEAR ZONE WIDTH FOR NONRESTRICTED CONDITIONS (6' MIN. FOR RESTRICTED CONDITIONS)

SINGLE-UNIT TRUCK (SU)

MEDIAN 35' OR LESS				
Design Speed	d	d_L	d_r	d_m
30	590	420	90	510
35	690	490	110	600
40	780	550	120	680
45	880	620	140	760
50	980	690	160	850
55	1080	760	170	940
60	1170	830	190	1020
65	1270	900	200	1100
70	1365	970	215	1185

40'-64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	410	290	420	300
35	470	330	490	350
40	540	380	560	400
45	610	430	630	450
50	680	480	700	500
55	740	520	770	540
60	810	570	840	590
65	880	620	910	640
70	950	670	980	690

PASSENGER VEHICLE (P)

MEDIAN 22' OR LESS				
Design Speed	d	d_L	d_r	d_m
30	410	290	80	350
35	480	340	90	410
40	550	390	100	470
45	620	440	110	530
50	690	490	130	580
55	760	540	140	640
60	830	590	150	700
65	900	640	170	760
70	970	690	185	820

25'-64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	310	220	330	230
35	360	250	390	280
40	410	290	440	310
45	460	330	500	350
50	510	360	550	390
55	570	400	610	430
60	620	440	660	470
65	670	470	720	510
70	720	505	775	550

INTERMIDIATE SEMI-TRAILERS (WB-40 & WB-50)

MEDIAN 30' OR LESS				
Design Speed	d	d_L	d_r	d_m
30	670	470	110	580
35	780	550	130	670
40	890	630	150	770
45	1000	710	170	860
50	1110	790	190	960
55	1220	860	200	1050
60	1330	940	220	1150
65	1440	1020	240	1240
70	1550	1100	260	1335

35'-50' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	720	510	100	640
35	830	590	110	740
40	950	670	130	840
45	1070	760	150	950
50	1190	840	160	1060
55	1310	930	180	1160
60	1430	1010	190	1270
65	1550	1100	210	1380
70	1670	1185	230	1490

64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	490	350	510	360
35	580	410	590	420
40	660	470	680	480
45	740	520	760	540
50	820	580	850	600
55	910	640	930	660
60	990	700	1020	720
65	1070	760	1100	780
70	1150	820	1185	840

VEHICLE LENGTH TABLE

VEHICLE TYPE	VEHICLE LENGTH (FT.)
PASSENGER (P)	19
SINGLE UNIT (SU)	30
LARGE SCHOOL BUS	40
WB-40	45.5
WB-50	55

GENERAL NOTES FOR 6-LANE DIVIDED ROADWAY

1. SEE RD01-SD-1 FOR ORIGIN OF CLEAR SIGHT LINE ON THE MINOR ROAD.
2. VALUES SHOWN IN THE TABLES ARE THE GOVERNING (CONTROLLING) SIGHT DISTANCES CALCULATED BASED ON 'ASSHTO CASE B - INTERSECTION WITH STOP CONTROL ON THE MINOR ROAD.'
3. DEFINITIONS:

   d_{vL} THE CLEAR LINE OF SIGHT TO THE RIGHT IS THE DISTANCE MEASURED FOR THE VEHICLE PAUSE LOCATION TO THE EDGE OF THE INSIDE TRAVEL LANE

   CZ CLEAR ZONE

   d_m DISTANCE MEASURED FROM THE CENTERLINE OF THE ENTRANCE LANE OF THE MINOR ROADWAY TO A POINT ON THE MEDIAN CLEAR ZONE LIMIT OR HORIZONTAL CLEARANCE LIMIT FOR THE FAR SIDE ROADWAY OF THE MAJOR ROADWAY
4. SEE SHEET RD01-SD-2 FOR MEDIAN LANDSCAPE REQUIREMENTS

SIGHT DISTANCES (d), (d_V) & (d_X) AND RELATED DISTANCES (d, d_L, d_r, d_m & d_{vL}) (FEET)

6 LANE DIVIDED HIGHWAY

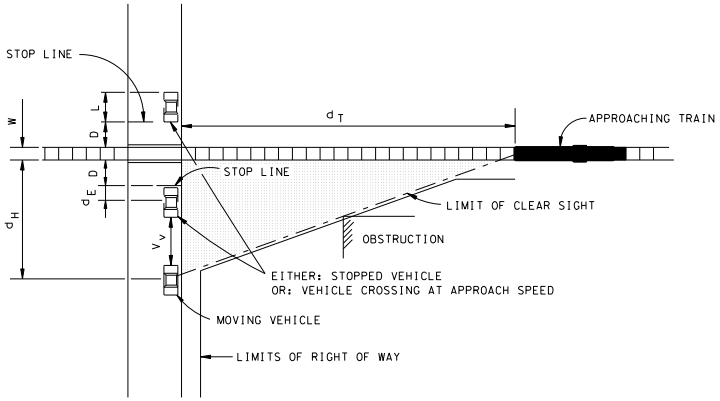
NOT TO SCALE

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

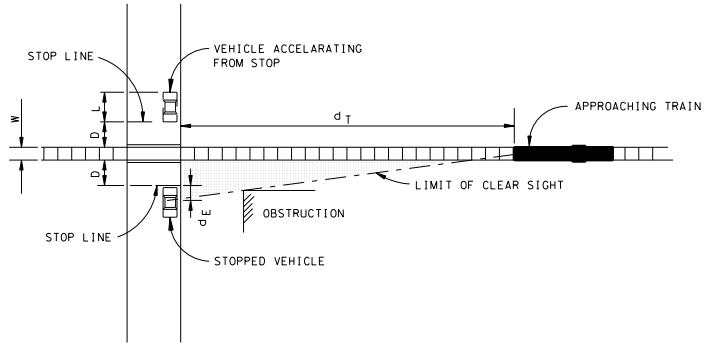
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE 6-LANE DIVIDED HIGHWAYS

10-1-08 | RD01-SD-6



CASE A
APPROACHING VEHICLE TO SAFELY CROSS OR STOP AT RAILROAD CROSSING
(FOR CLARITY RIGHT OF WAY LINES ARE NOT SHOWN FOR THE OTHER QUADRANTS)



CASE B
VEHICLE DEPARTING FROM STOPPED POSITION TO SAFELY CROSS RAILROAD TRACK
(FOR CLARITY RIGHT OF WAY LINES ARE NOT SHOWN FOR THE OTHER QUADRANTS)

LEGEND

AREAS FREE OF SIGHT OBSTRUCTIONS

DESIGN SIGHT DISTANCES FOR COMBINATIONS OF TRAIN AND HIGHWAY VEHICLE SPEEDS

CONDITIONS: SINGLE RR TRACK 90° CROSSING
DESIGN VEHICLE WB-67
FLAT HIGHWAY GRADES
PASSIVE CROSSING

TRAIN SPEED (MPH) TS	CASE B VEHICLE DEPARTURE FROM STOP	CASE A MOVING VEHICLE					
	VEHICLE SPEED (MPH)						
	0	10	20	30	40	50	60
	DISTANCE ALONG RAILROAD FROM CROSSING, d_T (FT)						
10	240	146	106	99	100	105	111
20	480	293	212	198	200	209	222
30	721	439	318	297	300	314	333
40	961	585	424	396	401	419	444
50	1201	732	530	494	501	524	555
60	1441	878	636	593	601	628	666
70	1681	1024	742	692	701	733	777
80	1921	1171	848	791	801	838	888
90	2162	1317	954	890	901	943	999
STOPPING SIGHT DISTANCE ALONG HIGHWAY FROM RR CROSSING, d_H (FT)							
		69	135	220	324	447	589

GENERAL NOTES

1. SIGHT DISTANCES ARE REQUIRED IN ALL QUADRANTS OF THE CROSSING.
2. CORRECTIONS MUST BE FOR CONDITIONS OTHER THAN SHOWN IN THE TABLE, SUCH AS, MULTIPLE RAILS, SKEW, ASCENDING AND DESCENDING GRADES, AND CURVATURE OF HIGHWAYS AND RAILS. FOR CONDITION ADJUSTMENTS AND ADDITIONAL INFORMATION REFER TO RAILROAD-HIGHWAY GRADE CROSSINGS UNDER CHAPTER 9 OF "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", AASHTO 2001.
3. DEFINITIONS

d_H = SIGHT-DISTANCE LEG ALONG HIGHWAY ALLOWS A VEHICLE PROCEEDING TO SPEED V_V TO CROSS TRACKS EVEN THOUGH A TRAIN IS OBSERVED AT A DISTANCE d FROM THE CROSSING OR TO STOP THE VEHICLE WITHOUT ENCROACHMENT OF THE CROSSING AREA (FT)

V_V = SPEED OF THE VEHICLE (MPH)

W = DISTANCE BETWEEN OUTER RAILS (FOR A SINGLE TRACK, THIS VALUE IS 5 FT.)

D = DISTANCE FROM THE STOP LINE OR FRONT OF THE VEHICLE TO THE NEAREST RAIL, WHICH IS ASSUMED TO BE 15 FT.

d_E = DISTANCE FROM THE DRIVER TO THE FRONT OF THE VEHICLE, WHICH IS ASSUMED TO BE 8 FT.

L = LENGHT OF VEHICLE, WHICH IS ASSUMED TO BE 65 FT.

d = SIGHT DISTANCE ALONG RR TRACK

TS = DESIGNER SHOULD OBTAIN THIS INFORMATION FROM THE UTILITIES OFFICE

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INTERSECTION SIGHT DISTANCE FOR PASSIVE RAILROAD HIGHWAY GRADE CROSSINGS

NOT TO SCALE

10-1-08 RD01-SD-7