Guidelines for
Traffic Control Devices, Street Lights and Street Trees
For
New Developments

Frederick County

May 1, 2008

Developer installed Traffic Control Devices (TCD's) include all signs, signals, lighting, and pavement markings placed on, over, or adjacent to a County roadway by the authority of the Director of DPDR to regulate, warn, and guide vehicular, bicycle and pedestrian activity. The purpose of this policy is to provide guidance for the layout of signs, markings, signals, lighting, street trees, and pavement markings for inclusion in the Final Plan package.

Developers will prepare plans for traffic control devices, street lights, and street trees and submit them for approval once the roadway layout has been approved by DPDR. Developers will be responsible for the costs of signs and streetlights, and a qualified contractor will install them.

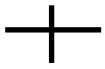
A. General

1. Traffic signs, street lights (SL), and street trees (ST) needs to be shown on a separate plan sheet included in the Improvement Plan (IP) package for most new development projects. This plan will include clear descriptions and locations of all required traffic control devices. Figure 1 provides a list of the standard symbols to be used in the plans. The sheets will also include locations of all driveways, utilities (including storm drains), intersections, edge of pavement, sidewalks, shared use paths, twin meters, required street trees and proposed and existing street lights so that conflicts can be avoided. All private roads should be labeled as such. As a guide to the designer and reviewer, a checklist listing all the elements that may be necessary on the plans is contained in Appendix A.

2. All costs associated with required TCDs for any new development will be paid for or bonded as appropriate under the Public Works Agreement for that project. The developer's Traffic Engineer will prepare a cost estimate once TCD/SL/ST plan is approved.

3. The developer submits TCD/SL/ST sheet(s) to DPDR. For all roadways carrying a classification of collector or higher, all regulatory TCD's such as Speed Limit signs, STOP signs will need regulatory approval, and as such the consulting traffic engineer will need to submit a warrant analysis for regulatory speed limit and stop signs and an accompanying Design Request (DR) if signals are proposed.

Figure 1 – Standard Symbols

Traffic Control Device/Roadway Feature	Designation	Symbol
9" Street Name Sign (2 Blades)	D3-1	
STOP Sign	R1-1	
YIELD Sign	R1-2	
Speed Limit Sign	R2-1	
Crossroad Warning Sign	W2-1	
T Intersection	W2-2	
Street Name Panel (Used with W2-1 or 2)	W16-8	
KEEP RIGHT Sign	R4-7	
DEAD END Sign (For SNS Assembly)	W14-1a	
NO OUTLET Sign (For SNS Assembly)	W14-2a	
Other Warning Signs	Wx-y	
DEAD END	W14-1	
NO OUTLET	W14-2	
Street Light		
Street Tree		

Notes:

- Symbols to be ¼" – 3/8" in width
- Symbols to be centered on proposed location

4. All TCDs shall be in conformance with the latest update of the Manual On Uniform Traffic Control Devices (hereafter referred to as "MUTCD") and/or applicable State and County regulations. If there is a discrepancy between requirements, the Department of Public Works Office of Transportation Engineering should be consulted for direction on what standards are to be followed. Developers are especially reminded that a State law requires all TCDs on public and private property to conform to the MUTCD. General provisions are listed in Appendix B and should generally be copied on all IP's.

B. Traffic Signs - All traffic signs in the right-of-way shall have retro-reflective sheeting and tamper resistant fasteners, and be installed in accordance with the MUTCD & SHA standards. Square tubing is acceptable in lieu of a 4"x 4" pressure treated wood post, provided that the square tube sign assembly includes a larger dimension 3 ft long section 30" in the ground. "U" channel posts are not acceptable in the County r/w. Plans must note that Sign Identity stickers must be pasted on the back of all signs identifying ownership, installer and installation date (See Appendix C).

1. The signing plan should be designed to provide the motorist with clear and concise regulatory, warning, and guidance information regarding the roadways within or adjacent to the development.

2. Traffic signs should be located as close to property lines between lots as possible in all new developments. Care should be taken to avoid placing signs at mid-lot locations.

3. Generally, only one traffic sign will be placed on a square post. The major exception to this is the acceptable practice of placing STREET NAME sign(s) and a STOP sign on the same square post. At times, a NO OUTLET sign may also be added to this square post as part of the street name assembly.

4. The Traffic Engineer in DPDR may be consulted prior to TCD plan submittal to determine if additional signs are required due to unusual circumstances. Examples of this included the presence of schools, playgrounds, or sharp curves along a roadway. During the TCD plan review, it may be determined that additional signs will be required.

5. Refer to Figure 1 for a list of standard sign symbols that are to be used when developing TCD plans. All signs should be sized appropriately as a function of use with rounded corners. The bottom of a single sign shall be 7' from ground (6' for multiple signs).

6. All traffic signs should be placed to provide adequate sight distances. Care should be taken to not obstruct the visibility of any traffic sign with street trees. Figure 2 illustrates the minimum clearances between street trees and signs/street lights. Figure 2 should also be included on the street tree/street light/TCD plan.

7. STREET NAME SIGNS (SNS)

a. The standard designation for a STREET NAME sign is SNS. The SNS assembly shall have a sign blade for each intersecting street for both the major street and minor street(s), so that there will be two (2) or more SNS blades for each SNA assembly

b. All SNS blades will be double-sided and nine inches in height with six inch lettering. (White on Green for public roads & Black on White for private roads) The SNS should display hundred blocks.

c. One SNS installation will generally be required at new intersections. Two SNS installations will be required at each intersection along roadways that have medians or at those intersections where the street name changes from one side of the road to the other.

d. If only one SNS is used at an intersection, it should be installed on the higher volume cross-street leg.

e. Refer to Figure 3 for additional information regarding SNS installations at the intersection of two County roadways.

f. Refer to Figure 4 for additional information regarding SNS installations at the intersection of a County roadway and a State highway.

8. STOP Signs

a. The standard designation for a STOP sign is R1-1.

b. In general, the minor roadway(s) will be provided with a STOP sign at all County intersections. Refer to Figure 3 for additional information.

c. When two residential roadways meet in a four-legged fashion, the road that intersects or is nearest to a collector or arterial roadway will typically be considered the major movement and the traffic on the other road will be required to stop. At a tee-intersection, the traffic on the base of the tee would generally be required to stop.

d. The State Highway Administration is responsible for the installation and maintenance of STOP signs at the intersection of County roadways with State highways. The cost of a State maintained STOP sign will be included in the State's access permit, not the County's Public Works Agreement. Refer to Figure 4 for additional information.

Figure 2 – Street Tree Placement General Guidelines

Street trees which are placed behind sidewalk on closed section roads or at least 8 feet from the edge of paving on open roads usually do not obstruct sight distance and are generally not subject to these restrictions. However, a case-by-case review may be necessary depending on the species of tree used.

In order to assure adequate visibility of signs and vehicles and to prevent the blocking of streetlights, street trees should not be placed:

- Within 3x feet of the face of a STOP or YIELD sign, where x = posted speed;
- Within 2x feet of the face of any other street sign, where x = posted speed;
- Within 25 feet of a street light, or
- Within 100 feet of the intersection to the left or within 75 feet of the intersections to the right along a cross street at an intersection controlled by a STOP or YIELD sign.

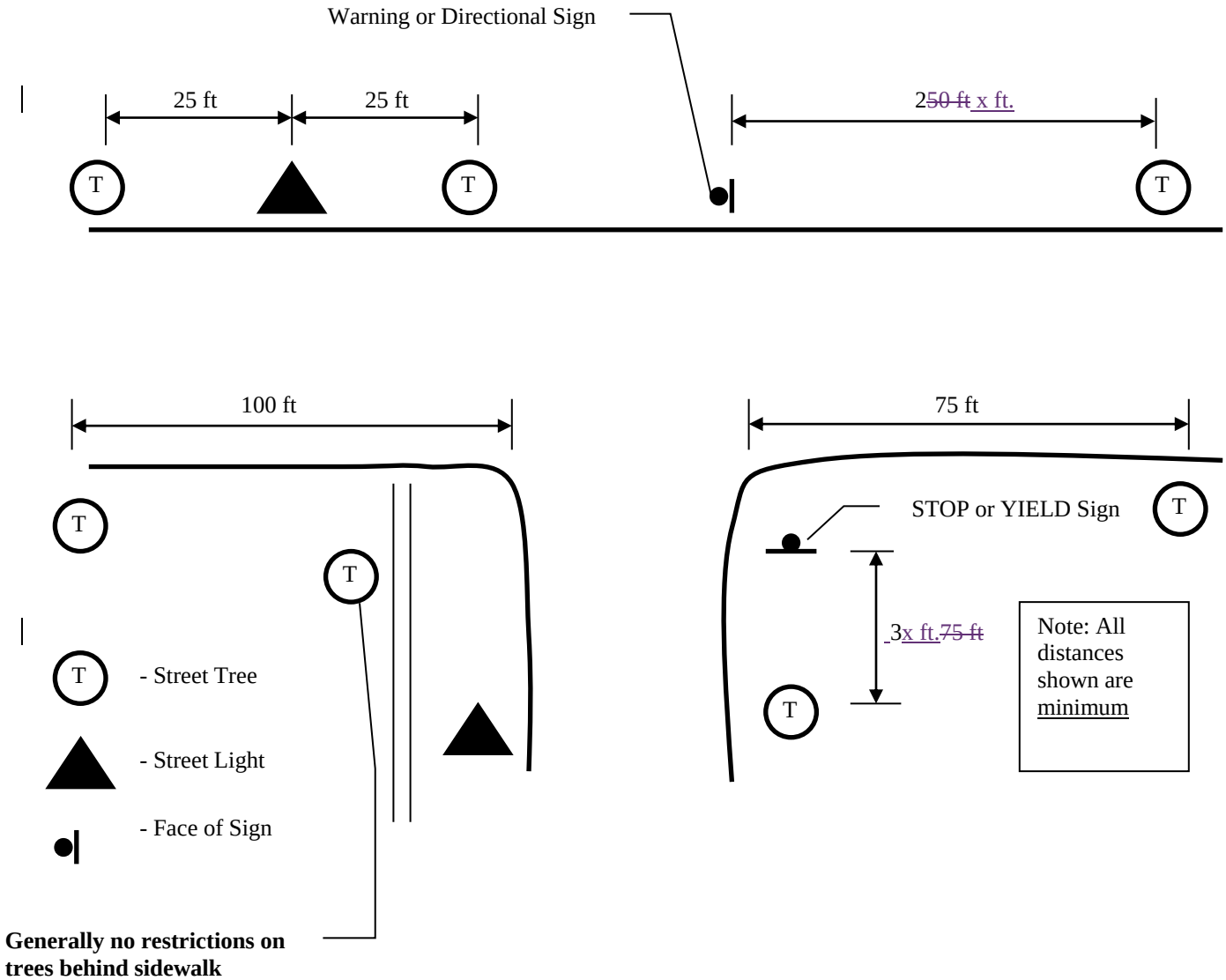


Figure 3 – Signing for County/County Intersections

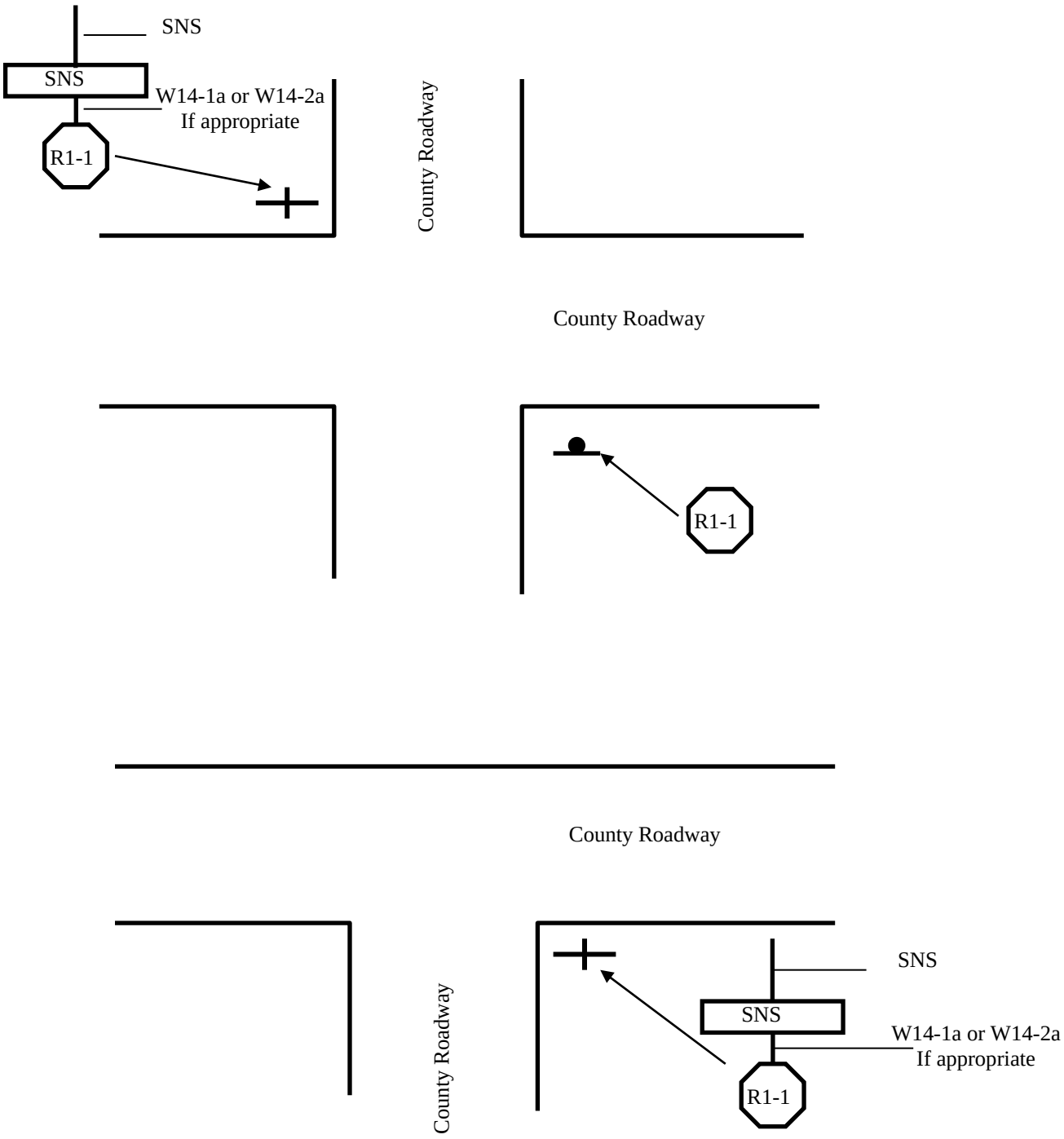
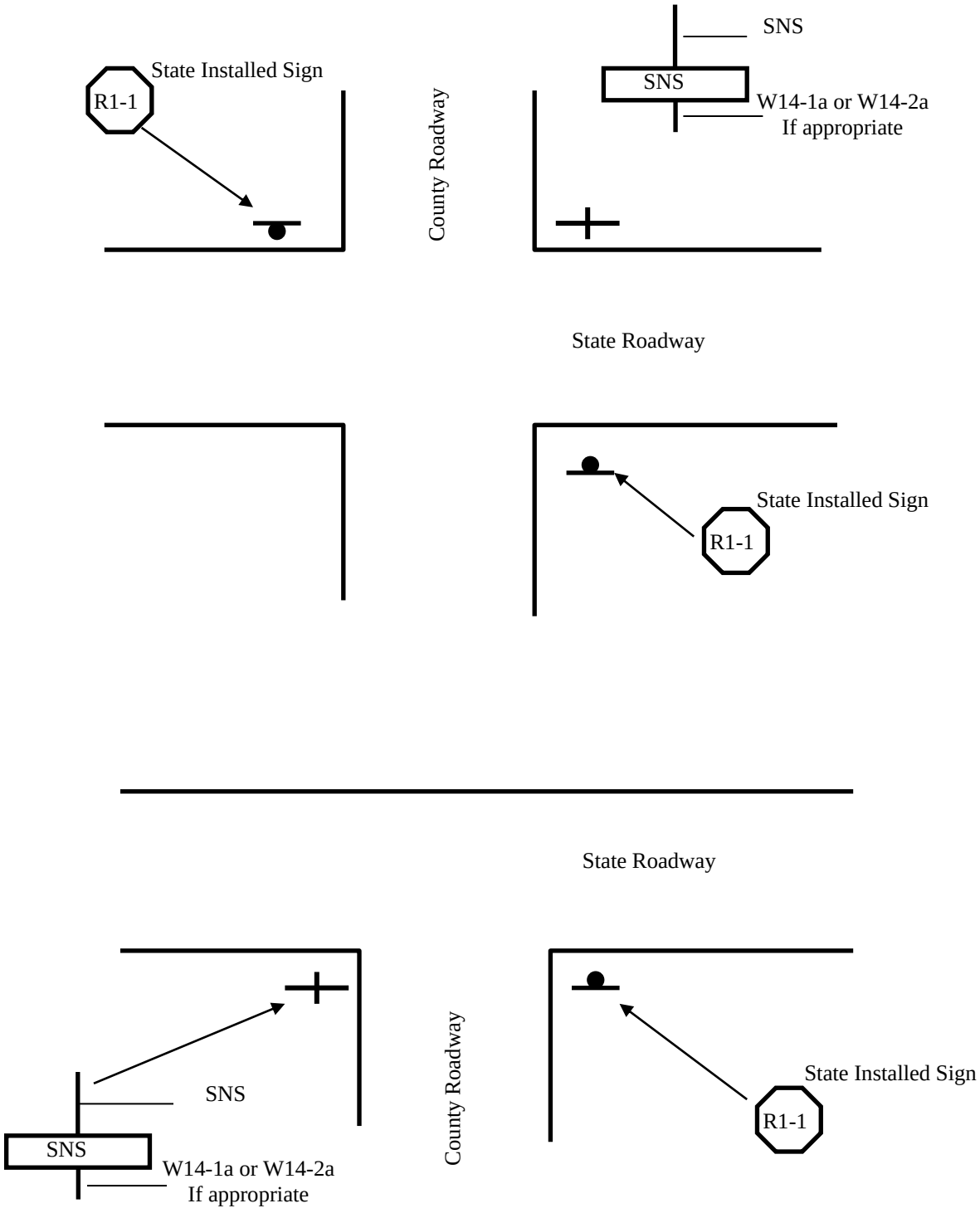


Figure 4 – Signing for State/County Intersections



9. SCHOOL Area Signs

   a. School area signs including school crossing signs and variably timed school zone speed limit signs shall be installed in designated school zones based on standards set forth in the MDMUTCD section 7

   b. School zones shall be identified for developer by DPDR based on Board of Education designated walking areas (within ¾ mile of elementary school and within 1.5 miles of middle and high schools).

10. DEAD END signs are appropriate for roads that end without intersecting another road.

   a. The standard designation for a street name sign assembly DEAD END sign is W14-1a.

   b. The standard designation for a diamond shaped DEAD END sign is W14-1.

   c. It is anticipated that the STREET NAME sign type DEAD END sign (W14-1p) will be used much more frequently than the diamond shaped DEAD END sign (W14-1). It shall be mounted between the STOP sign and the bottom STREET NAME sign. The diamond shaped variety should only be used when the majority of the approach traffic is directly oncoming. A dead end sign should be required if the end of the roadway cannot be seen from the cross street.

11. NO OUTLET signs are required for roads that serve as the only access to a community.

   a. The standard designation for a STREET NAME sign assembly NO OUTLET sign is W14-2a.

   b. The standard designation for a diamond shaped NO OUTLET sign is W14-2.

   c. It is anticipated that the STREET NAME sign type NO OUTLET sign (W14-2a) will be used much more frequently than the diamond shaped NO OUTLET sign (W14-2). It shall be mounted between the STOP sign and the bottom STREET NAME sign. The diamond shaped variety should only be used when the majority of the approach traffic is directly oncoming. No signs will be installed at the interior intersections of a closed area.

12. KEEP RIGHT Signs

a. The standard designation for a KEEP RIGHT sign is R4-7.

b. KEEP RIGHT signs will be required at both ends of the median for monumental type entrances.

c. For those roadways with continuous medians that have breaks for driveways and roadway intersections, KEEP RIGHT signs will generally only be required at the beginning and end of the median.

13. SPEED LIMIT Signs

a. The standard designation for a SPEED LIMIT sign is R2-1(XX), where XX is the numeric value of the assigned speed limit.

b. A SPEED LIMIT sign will be installed along the inbound lane of all new residential roads, which are at least 500 feet in length. The inbound sign shall be placed within 200 feet of the beginning of the roadway and then beyond major intersections and/or at other locations where it is necessary to remind motorists of the posted speed limit. If the roadway is longer than 1000 feet, an outbound SPEED LIMIT sign will be installed approximately 500 feet from the far end of the roadway and then beyond major intersections and/or at other locations where it is necessary to remind motorists of the posted speed limit.

e. Collector and arterial roadways will have an inbound SPEED LIMIT sign placed within 500 feet of the beginning of the roadway as well as an outbound SPEED LIMIT sign placed within 500 feet of the far end of the roadway. Additional SPEED LIMIT signs will then be placed in pairs at one-half mile intervals or after intersecting side roads at close to the same intervals.

f. The Site Plans/Improvement Plans will generally show the location of the SPEED LIMIT signs. For road classification of collector status or higher, speed limits will be recommended by the consulting Traffic Engineer as a result of a traffic engineering analysis and submitted in the form of a Design Request or DR. In residential areas, the following guidelines will be used for setting speed limits:

- Local and collector roadways 25-35 miles per hour.

- Local and collector roadways with a median 30-40 miles per hour.

14. INTERSECTION WARNING Signs

a. INTERSECTION WARNING signs shall be placed on arterial roadways in advance of intersecting roadways, which are not controlled by a signal.

b. The INTERSECTION WARNING signs will include supplementary STREET NAME panels.

c. The standard designation for a four-legged INTERSECTION WARNING sign is W2-1.

d. The standard designation for a three-legged INTERSECTION WARNING sign is W2-2 or W2.11 depending on the geometry.

e. The standard designation for a STREET NAME panel is D3-2 (black letters on a yellow background).

C. Street Lighting Design

The Site Plans/Improvement Plans will show the locations of streetlights, if provided. The energy and maintenance costs are not the responsibility of the County but rather are arranged in an agreement between the HOA and utility company.

Street Name Signs and other traffic signs should be placed on street light poles whenever permissible and/or feasible to minimize unnecessary sign posts and to avoid having a visual *sign forest* effect. The developer/HOA covenants and restrictions and other appropriate documents are to be developed so as to authorize DPW to be able to place and maintain traffic signs on street light poles within or adjacent to the public right-of-way, and to hold harmless DPW for any damage to street light poles from traffic sign installation such as parking, speed limit, street name signs and other regulatory and warning signs.

D. Street Trees

Street Trees should provide the minimum clearances from signs and street lights as noted below and as shown on Figure 2. In order to assure adequate visibility of signs and vehicles, and to prevent the blocking of streetlights, street trees should not be placed in such a manor as to block traffic control device visibility and driver sight distance.

Further restrictions may be applied on a case-by-case basis as necessary, especially in the vicinity of curves and when placed in medians, when intersection sight distance may be affected.

Care should be taken to avoid placing street trees directly under overhead utility lines, especially high voltage electric lines.

E. Signal Design

Refer to the Maryland SHA policies for signal design standards and plan requirements.

Begin by preparing a Design Request (DR) for County approval. The County would then forward the DR to the SHA for review (this is for all signals, whether or not a State road is involved). When the County & SHA have approved the DR, the engineer may proceed with the traffic signal design drawings. The drawings would be submitted to the County and entered into the Hansen system. The County would then forward the drawings to the SHA for approval. Once approved, the traffic signal drawings would become part of the IP drawings.

Countdown pedestrian signal heads shall be used at all locations that include warranted pedestrian signals as part of their recommended design.

F. Pavement Marking Design

1. The pavement-marking plan is to be included in the public roads plans submitted to DPDR

2. The pavement-marking plan should be designed to provide the motorist, cyclists, and pedestrians with clear driving guidance along County roadways.

3. The developer will be responsible for all pavement striping necessary for both roadway-widening improvements as well as newly constructed subdivision roadways. The following are the most common types of roadway improvements:

    a. Collector and arterial roadway widening improvements. The pavement marking improvements will generally consist of the reconfiguration of the centerline, lane line, and edge line markings so that motorists can utilize the full pavement width.

    b. Intersection improvements (new construction or widening). The pavement marking improvements will generally consist of striping bypass or turning lanes around or into the minor legs of the intersection, or the reconfiguration of the lane assignments of the major legs of the intersection. Pavement markings may also be required in the form of crosswalks, lane assignment arrows, stop bars, bike lanes and bicycle intersection markings.

    c. Residential roadway construction. Except for crosswalks and stop lines, pavement markings are usually not required for these roadways.

4. It is recommended that the developer review the MUTCD for further information regarding pavement markings:

        F.3 Pavement Markings

F.3.2 Arrow Placement in Turn Lanes, Lane Drops, and Two-Way Left Turn Lanes

F.3.3 Auxiliary Lane Lines

F.3.4 Stop Line Placement

F.3.8 Crosswalk Markings

F.9.C.1 On-street Bicycle Facility Markings

5. The minimum transition rate of centerline and edge line striping is as per the following table as per MUTCD:

SPEED LIMIT (MPH)	TAPER RATIO (FT TO FT)
30	15 : 1
35	21 : 1
40	25 : 1
45	45 : 1
50	50 : 1

6. The minimum lane width for pavement striping purposes is ten feet.

7. Twenty-five feet of storage space is required per vehicle for the design of turning lanes.

8. Traffic count data may be required at intersections where it is not clear whether a bypass lane arrangement or an exclusive left turn lane would be more appropriate. In general, the SHA Access Permits Manuel should be utilized to determine warranted treatments.

9. Any existing pavement markings that conflict with required new markings must be removed. Either asphalt or slurry seal overlay, or grinding is appropriate, as determined by DPDR. Painting the existing striping with black paint is not acceptable. The costs associated for this work must be bonded under the subdivision's Public Works Agreement. The lines that are to be removed must be shown on the plans.

10. All pavement-marking plans must include a note requiring the Contractor to notify the Office of Highway Operations (301-600-1555) and arrange a field review before installing any pavement markings.

G. Traffic Calming Device Signing and Pavement Marking

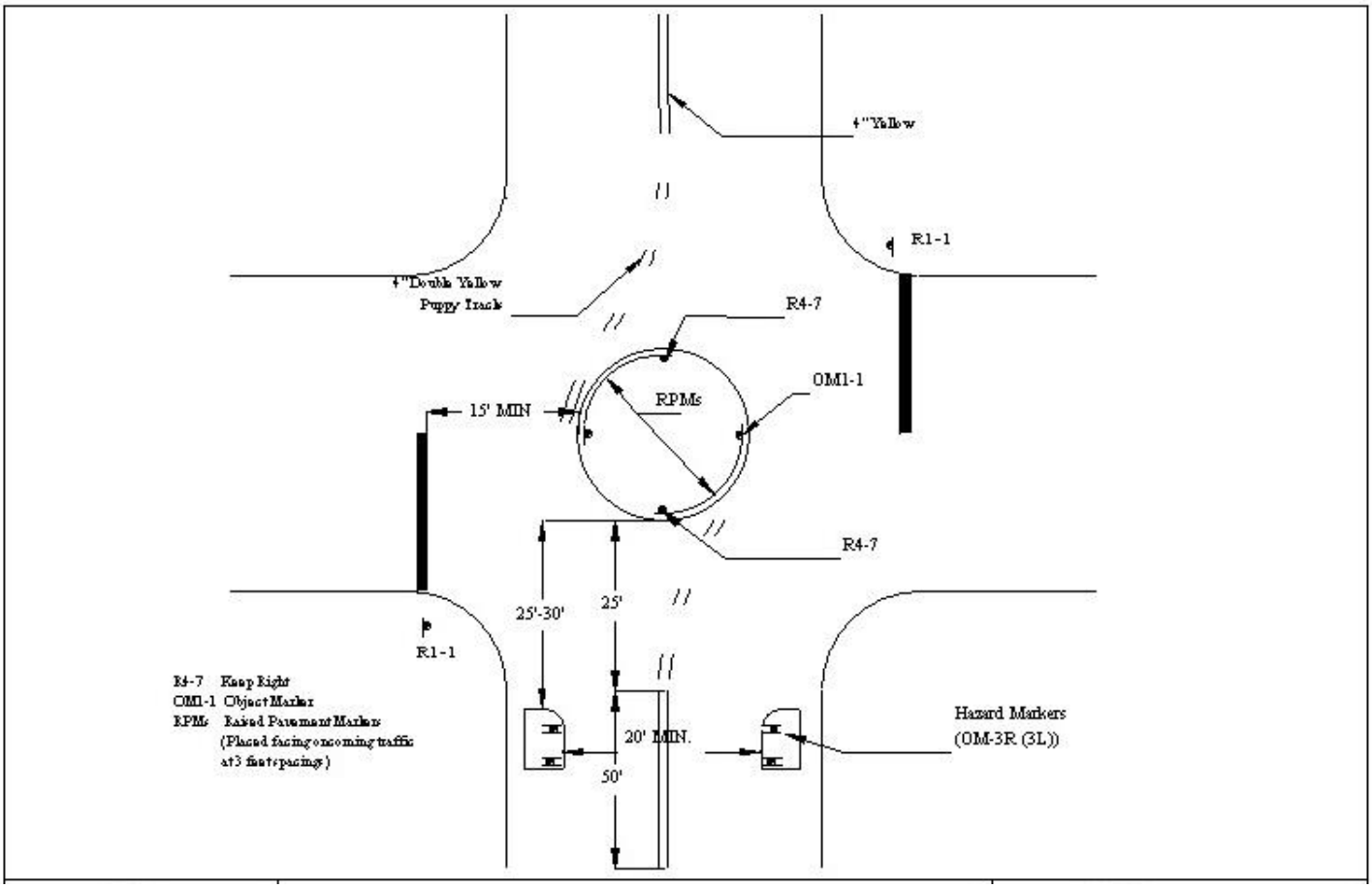
Roadways should be designed (in alignment, grade and section) to discourage speeds in excess of the posted speed limit. All way stop control should not be considered as a speed calming measure. Speed humps should generally not be installed on new residential roadways. The design and layout of other speed control devices (such as islands, circles, chokers, edge lines, etc.) should be reviewed with DPDR to assure appropriate designs for school buses, emergency vehicles, snowplows, and trash trucks. Plans for traffic calming devices will be included in the public roads plans. (See Traffic Engineering Policy E-4.) Signing and striping residential streets for islands, circles, and chokers should be as shown on Figure 6. The signing and striping roadways of collector status or higher for single lane roundabouts should be as shown on Figure 6B.

H. Sight Distance at Intersections

At intersections controlled by STOP or YIELD signs, care must be taken to provide adequate intersection sight distance (ISD) for vehicles exiting the minor road. In addition, vehicles turning left into the minor road must have adequate sight distance and must be visible to other vehicles approaching from the rear (SSD or HSD).

Figure 7 illustrates the minimum acceptable sight distance for vehicles entering local and collector roadways. For higher speed roadways, the latest AASHTO Green Book guidelines should be followed.

Figure 6 – Signing and Markings for Speed Control
(Circles, Islands, and Chokers)



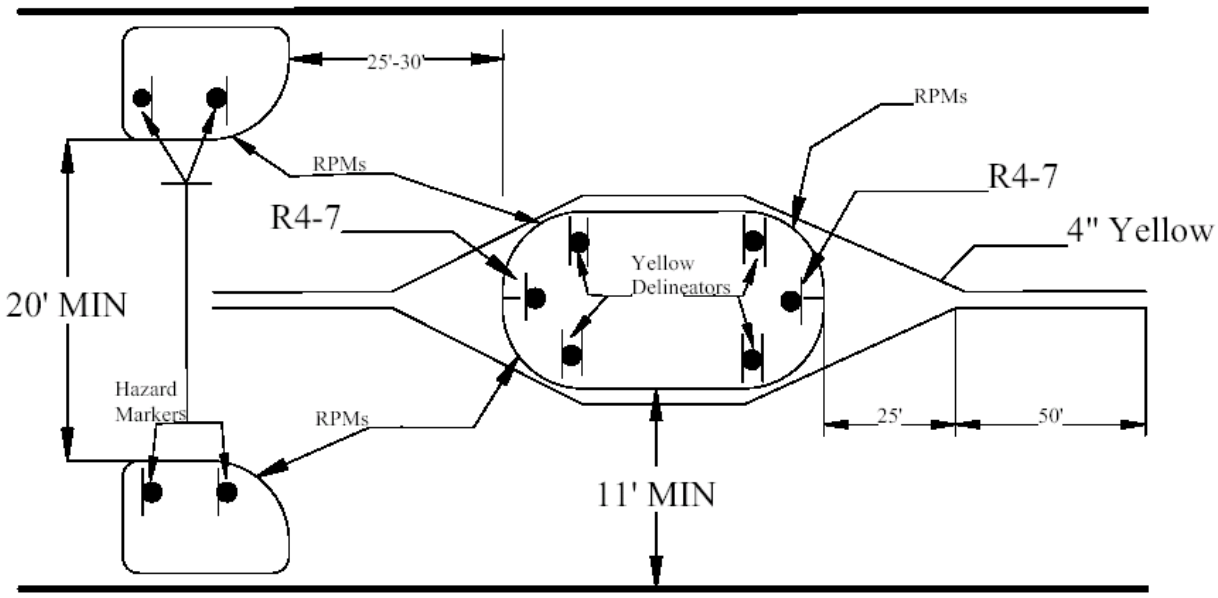


Figure 6B – Signing and Markings for Roundabouts
(Conceptual only, refer to latest version of the MUTCD)

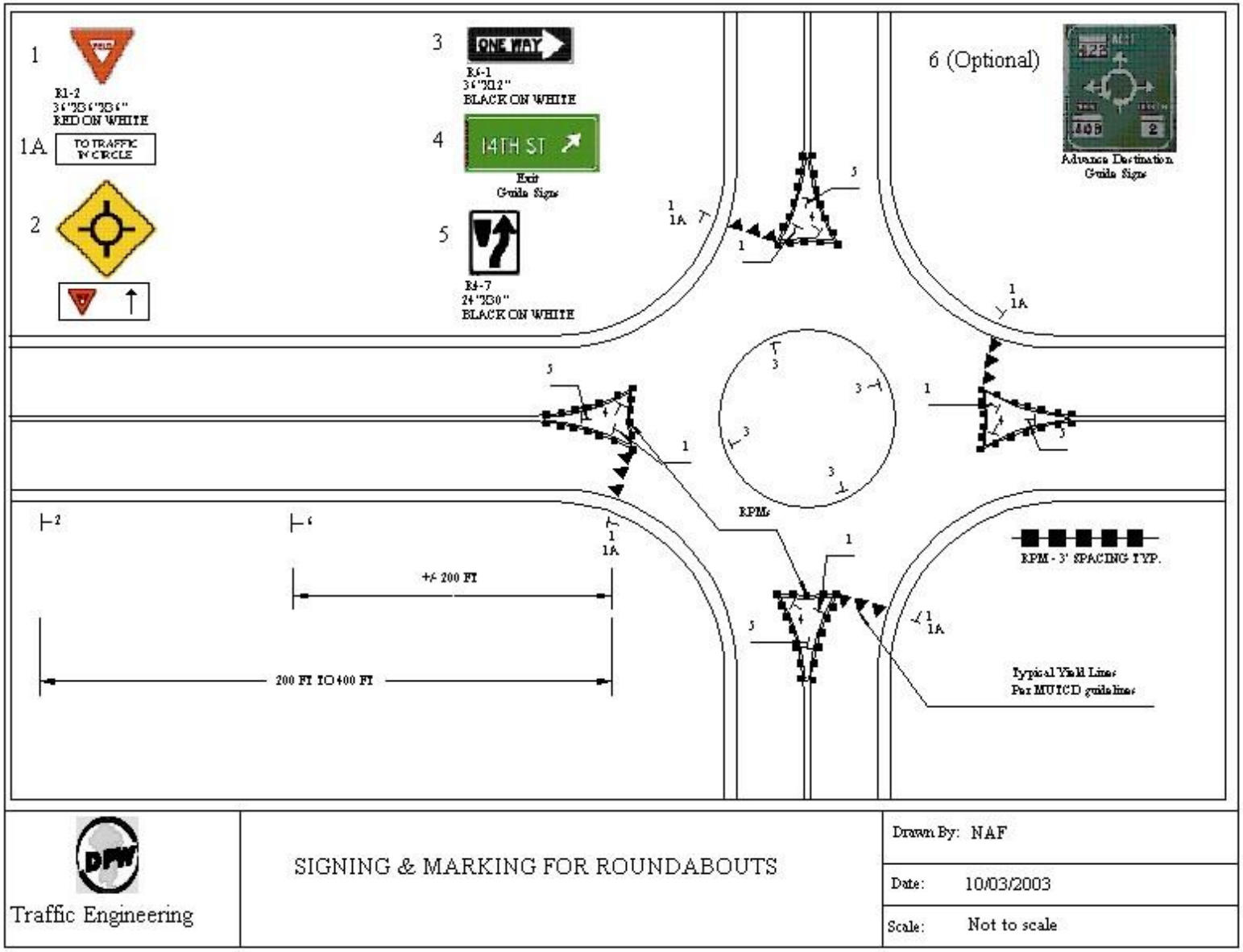
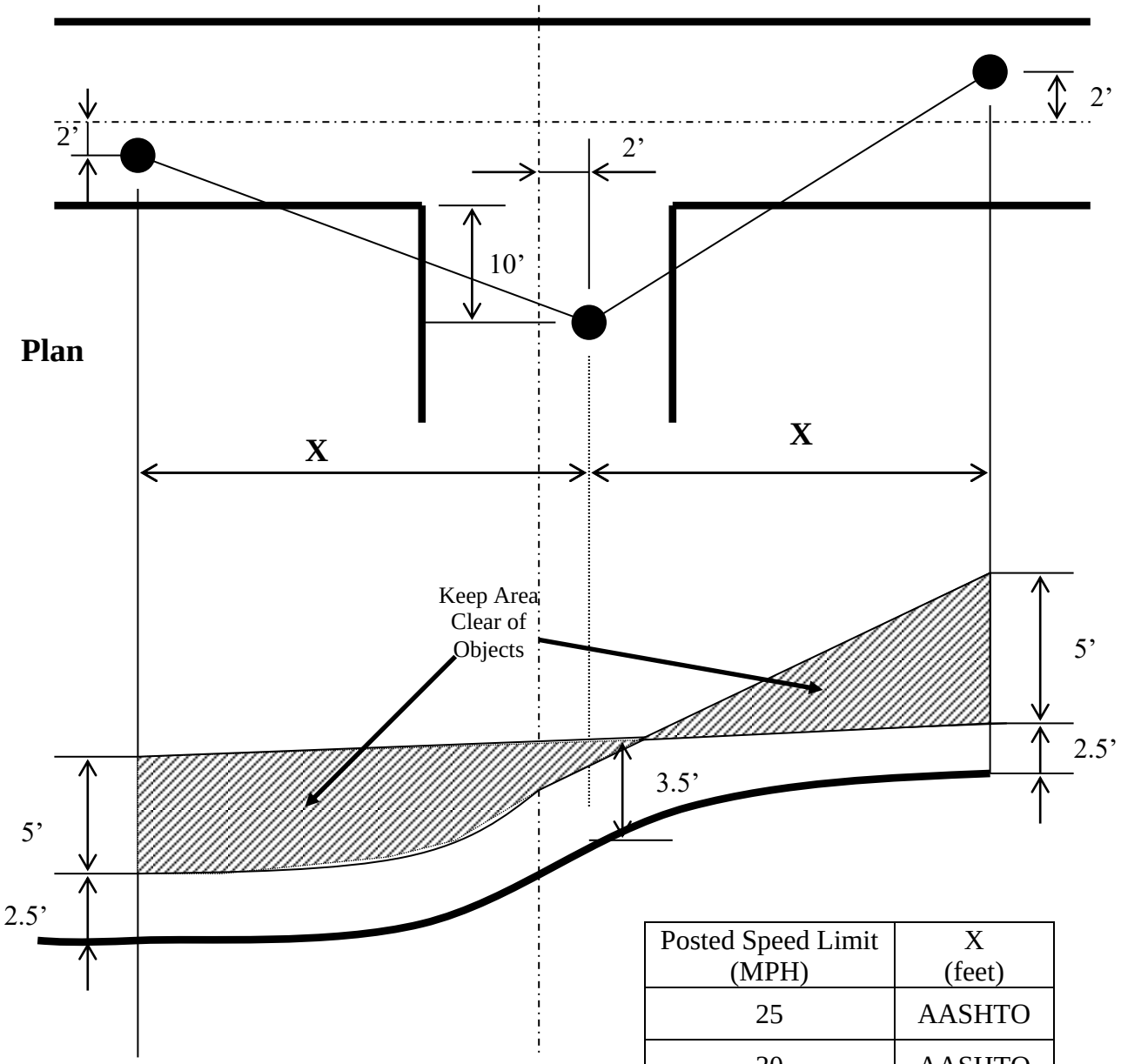


Figure 7 – Sight Distance Requirements for Local and Collector Roads (See AASHTO for intersections with Arterial or higher roadways)



Posted Speed Limit (MPH)	X (feet)
25	AASHTO
30	AASHTO
35	AASHTO

The sight triangle must be free of obstructions in both the horizontal and vertical planes as defined above.

APPENDIX A

Traffic Checklist Guide

Sight Plans

a. Vertical & Horizontal Sight Distance verification (incl. Inside of curves
b. Provide left turn lane and/or acceleration, deceleration & by-pass lanes)

Traffic Control Plans

a. Show any typical Detail plate numbers
b. Type of traffic control required as per MUTCD
c. Phases of construction shown and listed
d. Closures only permitted 9am-3pm (unless permitted otherwise by DPW Dir.
e. Are VMS signs needed for lane closures?
f. Coordination with adjacent construction

Signing, Marking, Street light and Landscaping Plans

a. Show critical roadway base information shown including sidewalk & shoulder
b. Show field survey information of existing signs & pavement markings 500 ft beyond limits of project.
c. Show existing & proposed signs & post types.
d. Show replacement of faded signs and/or nonstandard posts.
e. Note indicating "Highway signs shall consist of 0.80 gauge aluminum blanks, 3M or equivalent retro-reflective background sheeting and 3M or equivalent electrocut sheeting in accordance with the MUTCD
f. Note indicating "Permitee will contact DCMI inspector 48 hours prior to installing permanent signs on existing roadways
g. All dimensions & minimum sign heights shown on plan
h. Show all dimensions including taper ratio and length for transition pavement markings
j. Show pavement markings referenced to nearest intersection rather that Station Numbers
k. If the roadway is a designated bikeway in the Frederick County Bikeways and Trails Plan or within 3/4 mile of elementary schools or within 1.5 miles of middle or high schools, appropriate bicycle lane marking/sign locations and bicycle specific intersection marking and sign locations shall be identified as part of the submitted signing and marking plan.

Field Inspection Checklist

a. TCD plan sheet(s) signed by PE w/ traffic experience or PTOE
b. Verification regulatory signs approved by regulatory authority
c. Sign height
d. Retrofeflective sheeting
e. Square tube breakaway posts
f. 3ft delve 30' in ground with utility clearances
g. Rounded corners
h. White on Green Public Street Name Sign (SNS) / Black on White Private SNS
i. Block #s on SNS
j. Tamper resistant fasteners
k. Sticker with County logo, date installed, with name of sign company installing & employee initials

APPENDIX B

FREDERICK COUNTY, MD SIGNAGE & MARKING PLAN

I. GENERAL NOTES FOR SIGNAGE AND PAVEMENT MARKING SPECIFICATIONS

1. All signage and pavement markings shall comply with "Standard Specifications for Construction & Materials", dated January 2001, as published by the Maryland Department (MDOT) of Transportation State Highway Administration (SHA), and latest revisions or additions, including specifications herein, and latest revisions. The specifications shall hereafter be referred to as the specifications. The specifications are accessible on-line at: http://www.sha.state.md.us/businesswithsha/businesswithsha.asp?id=B157

2. All standard details and standard plates referred to shall be those of the State of Maryland, Department of Transportation, State Highway Administration's "Book of Standards for Highway & Incidental Structures" or Frederick County Standard Details and the latest revision thereto. The State of Maryland, Department of Transportation, State Highway Administration "Book of Standards" shall be referred to as the Maryland State Highway Administration's "Book of Standards" or Maryland State Highway Administration standard. Access to the State of Maryland standard details and standard plates etc. can be found on-line at: http://www.sha.state.md.us/businesswithsha/businesswithsha.asp?id=B157

3. References to the State of Maryland, State, S.R.C., State Roads Commission, State Highway Administration, or Commission in these specifications shall be interpreted to mean Frederick County, Maryland.

4. References to officials of Maryland State Government or the Maryland State Highway Administration Book of Standards shall be interpreted to mean the appropriate official in Frederick County Government, unless specified otherwise.

II. CONSTRUCTION & REQUIREMENTS

A. PAVEMENT MARKINGS: 951

1. Markings shall be thermo-plastic except long line markings.
2. Long line markings shall meet State Standards, including reflectorized beads meeting SHA specs
3. School Zone Crosswalks shall either have perpendicular hatching (not diagonal) located away from wheel paths without parallel lines or 2 parallel lines without any interior hatching.
4. Approved traffic paints for use in Maryland from the 1994 NASTO site. These results are approved for both PCC and Bituminous surfaces.

5. SHA Approved Paints are cited with 1994 NASTO Ref. #, Manufacturer Code, Manufacturer Name & color r

B. SIGN POST MATERIAL - 2 INCH SQUARE TUBE STEEL SIGN POST

This work shall consist of furnishing and erecting steel sign posts as specified in the Contract Documents, Manufacturer's Recommendations or as directed by the Engineer. All posts require utility clearances.

1. Galvanized Steel Posts-2 Inch Square, 14 Ga., with bolt holes 1" on center on all 4 sides of post
2. Galvanized Steel Sleeves-2 ¼ " x 36", 214 Ga., 30
3. Bolts, Nuts and Washers-, fasteners, rivets, etc. all to be tamper resistant -909.6
4. Galvanizing for Posts and Sleeves –A123
5. Galvanizing for Hardware-A153 &Galvanizing for Bare Metal-A 780

C. TRAFFIC SIGN REQUIREMENTS

1. 1.3M DG Cubed grade reflectorized sheeting (Diamond grade cubed) & 3M 1177C Electro Cut Film (or equivalent)
2. All signs (except STOP signs) must have rounded corners including SNS.
3. STOP signs minimum size is 30"
4. All signs to be firmly & securely fastened with extruded aluminum 3/8 inch tamper resistant pop rivets & nylon washers.
5. Where feasible, minimize sign posts by placing traffic signs on existing poles including street light poles
6. Place traffic signs for driver visibility, especially STOP signs.
7. Identification Stickers on back side of signs to be non-reflective sign grade sheeting with standard adhesive.
8. All traffic signs specific to school crossing, pedestrian crossing, and shared use path crossing signs shall use the approved fluorescent green background color as opposed to the yellow.
9. Any crosswalks marked with pavement markings shall have appropriate MDMUTCD approved traffic signs installed denoting their locations.

D. STREET NAME SIGNS (SNS) & ROAD NAME LETTERING & SHEETING

1. 3M DG Cubed White backing (Diamond Grade Cubed) & 3M 1177C Electro Cut Film (or equivalent)

2. All SNS signs must have rounded corners.

3. SNS – Use double blades (not extruded blades)

4. Mount SNS with 2 aluminum 3/8 inch tamper resistant pop rivets & nylon washers in center of sign, and spacers in each end.

5. Mount SNS above STOP signs on Street light poles or above STOP signs on sign posts if no street lights present.

Sign color to be latest adopted State Standard. Install SNS for both main street and intersecting street(s)

a. 9" high double aluminum blades (double or 2 SNS blades to be used. Extruded aluminum blades not permitted)
b. 6" road name, 3" road suffix &3" hundred block number with arrow pointing towards increasing block #s.
c. White (reflectorized) lettering on Green (reflectorized) background for public road SNS
d. Black lettering on White (reflectorized) background for private road SNS

APPENDIX C

Sign Identity Sticker

Sign identity sticker for signs installed on proposed Frederick County roads.

- Sticker is to be non-reflector sign grade sheeting with white background & black lettering.
- Name of Sign Installation Co & Initials of Sign Installer to be written with waterproof and weatherproof markers.
- Appropriate Year & Month to be hole punched out when sign is installed.
- Non-reflective sign sheeting material with standard adhesive.
- Dimensions of sticker 4" wide by 3" high Lettering is Ariel # 10 font & WARNING is # 14 font.

PROPERTY OF FREDERICK COUNTY, MD 21702
DEPT. OF HIGHWAYS & TRANSPORTATION

WARNING

Vandalism, Theft or Possession of a Highway Sign is

Punishable by Law & Perpetrators Will be Prosecuted

Fred. Co. ID#_____

Installation Date *(Punch Out year & month)*

08 09 10 11 12 13 14 15 16 17 18 19 20 21 22

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Sign Installation Co._____

Initials of sign installer (in permanent marking)_____