CHAPTER 2 - SIGNING

2.1 Signing Overview

Purpose

One cannot over ~~emphasized~~emphasize the importance of good signing since national studies indicate that deficient signing is the number one complaint of 60 percent of drivers and is the third leading cause of crashes. In addition, sign improvements have one of the highest benefit-to-cost ratio of all safety improvements.

The purpose of this chapter is to consolidate policies for the application, installation and maintenance of traffic signs either by reference or by inclusion herein.

Classification of Signs

As noted in Section 2A.03~~5~~ of the *MUTCD*, there are only three classifications of signs:

A. Regulatory signs give notice of traffic laws or ~~restrictions~~regulations.

B. Warning signs give notice of a situation that might not be readily apparent.

C. Guide signs show route designations, destinations, directions, distances, services, points of interest and other geographical, recreational, or cultural information.

Design of Signs

The primary purpose of the *MUTCD* is to improve safety and reduce driver frustration by promoting uniformity in the design and application of traffic control devices. FHWA is also working internationally to share and borrow ideas so that uniformity is much broader than just in the United States.

Uniform designs and applications of traffic signs help everyone, because as drivers we can see and understand the sign messages, and the systematic advance placement of warning signs provide sufficient notice for us to take appropriate actions.

To that end, the *MUTCD* establishes the basic framework for the design and application of signs, and the *Standard Highway Signs and Markings* book provides detailed drawings of the standard signs and alphabets.

The *MUTCD* also states in Section 2A.0~~4~~6:

> "Unless otherwise provided in this Manual for a specific sign or as provided in Paragraph 19 of this Section, telephone numbers, Internet addresses, e-mail addresses, domain names, uniform resource locators (URL), metadata tags ("hash-tags"), and scanning graphics (see Paragraph 17 of this Section) for the purpose of obtaining information (other than those for maintenance or inventory purposes per the provisions of Paragraphs 21 through 23 of this Section) shall not be displayed on any sign, plaque, sign panel, or changeable message sign."
>
> ~~"Except as provided in Paragraph 16 and except for the Carpool Information (D12-2) sign (see Section 2I.11), Internet addresses and e-mail addresses, including domain names and uniform resource locators (URL), shall not be displayed on any sign, supplemental plaque, sign panel (including logo sign panels on Specific Service signs), or changeable message sign."~~

Sign Nomenclature

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The *MUTCD* assigns a unique nomenclature to all common types of traffic signs. PennDOT uses the nomenclature in the *MUTCD*, but like other states, PennDOT also has some additional traffic signs that they have approved for unique applications, and for which they have assigned their own nomenclature. The first letter in sign nomenclature conforms to the following:

- Regulatory signs – R.
- Warning signs – W, except school signs start with the letter S.
- Guide signs – a variety of letters, but most commonly D, G, I, or M.

Sign names used in this manual may look awkward because some are in all capital letters while others are in title case. This mix of styles is common because the *MUTCD* and most other sign manuals generally use the following practice:

1. Uppercase legends (capitals) for sign names when the sign name and the sign legend message are the same (e.g., STOP, YIELD, and DO NOT ENTER signs).
2. Title case for symbol signs and whenever the sign name and sign message are not the same (e.g., Speed Limit, Turn, and Intersection signs).

What is Retroreflectivity?

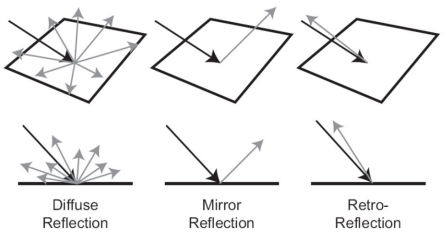
The *MUTCD* requires traffic signs to be either retroreflective or illuminated to show the same shape and color both day and night. Since it is more cost effective to make signs retroreflective than it is to illuminate them, PennDOT requires retroreflective sheeting material on all signs.

Most objects reflect light. The most common type of reflection is "diffuse reflection" where light scatters after striking rough surfaces such as trees, clothing and carpet. Only a very small amount of the diffused light reflects back toward the light source.

Another type of reflection is "mirror reflection" that occurs when light strikes smooth or glossy surfaces, and the light reflects off the surface at an equal but opposite angle. Mirror reflection frequently occurs at night on wet roads when the headlights of approaching vehicles create extensive glare. Sign faces also produce some mirror reflection due to their glossy surfaces, and for this reason; it is a good practice to rotate signs away from the driver.

In contrast, "retroreflection" (see ~~Exhibit 2-1~~Exhibit 2-1) is the unique ability of a surface to reflect light back toward the light source, and "retroreflectivity" is the measurable property of a material to redirect light back to its source.

Exhibit 2-1 Types of Retroreflection



Retroreflective Sheeting Materials

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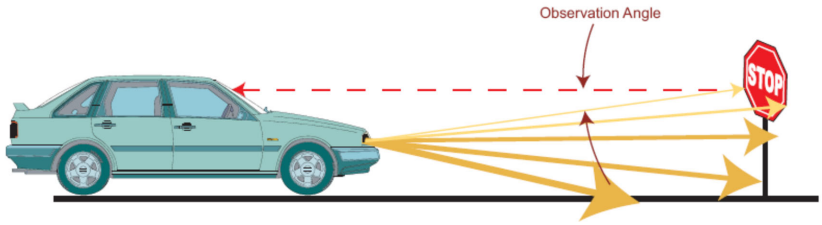
To make signs retroreflective, sign manufacturers apply retroreflective sheeting, which contains either microscopic glass beads or cube corner reflectors, to the face of each sign. If the sheeting manufacturers could make all glass beads and cube corner reflectors perfectly shaped, all reflected light would return directly to the light source (headlights). Although retroreflective sheeting does not have perfectly shaped lenses, drivers do see more reflected light the closer their eyes are to the headlights. As illustrated in ~~Exhibit 2-2~~Exhibit 2-2, the angle formed between the headlights, the sign and the driver's eyes is the observation angle, and the smaller the angle the higher the retroreflectivity.

Exhibit 2-2 Graphic Illustration of the Observation Angle



Retroreflective materials are also more efficient when the light source is approximately perpendicular to the sign face; therefore, it is important to have signs oriented to face approaching traffic.

The ability to see traffic signs at night is a function of the following:

- Driver's night vision.
- Intensity and light distribution of the headlights.
- Distance, mounting height, and orientation of the sign in relation to the vehicle's headlights.
- Location of driver's eyes with respect to the headlights.
- Type, color and age of the retroreflective material.

Why is Retroreflectivity Important?

The nighttime visibility of signs and pavement markings is essential for highway safety. National studies show that 50 percent or more of all fatal crashes occur at night despite lower travel volumes. In fact, the average fatality rate (fatalities per 100 million vehicle-miles of travel) is about three times higher during the night than during the day.

Some of the factors that contribute to higher nighttime crash rates include:

- After age 20, the human eye needs about twice as much light approximately every 12 years in order to read. For example, compared to a 20-year old driver, a 32-year old driver needs twice as much light, a 44-year old driver needs four times as much light, a 56-year old driver needs eight times as much light, and a 68-year old driver needs 16 times as much light.
- The number of visual clues that delineate the roadway alignment are reduced at night.
- Glare from opposing traffic further reduces the number of visual clues.
- Rain, snow, fog, dew and frost reduce visibility distances.
- There are more intoxicated and sleepy drivers.

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Some traffic signs may look almost new during the day but are completely ineffective at night. This nighttime visibility problem is usually a function of the type and age of the retroreflective material.

Initially, only one type of retroreflective sheeting material was available, but as technology developed, brighter and more durable materials became available. Exhibit 2-3~~Exhibit 2-3~~ shows eight types of retroreflective materials currently manufactured for permanent-type signs, and new more-efficient types are rapidly evolving. Please note that Types V and VI sheeting are not included because they are not for permanent signs (Type V sheeting is for delineation and Type VI sheeting is for temporary roll-up signs).

Exhibit 2-3 Retroreflective Materials for Permanent Signs

Type Retroreflective Material	Common Name	Life Expectancy (years)	General Comments
~~I~~	~~Engineering Grade~~	~~7~~	**These two types of materials are no longer approved for use**
~~II~~	~~Super-Engineering Grade~~	~~7-10~~	
III	High-Intensity Grade	10+	Encapsulated lens or microprismatic materials
IV	High-Performance Grade	10+	Microprismatic materials
VII, VIII, IX, X & XI	Super-High Intensity or Very High Intensity Grades	12+	Microprismatic materials

When is Sign Lighting Required?

In 1993, PennDOT started using Type III or higher type retroreflective sheeting for all new traffic signs. Because the Department has elected to use higher types of retroreflective sheeting materials, the need for sign lighting should be minimal. In general, consider sign lighting only for overhead freeway signs as discussed in the section Overhead Signs~~Overhead Signs~~.

Minimum Retroreflectivity

In 1993, Congress directed the U.S. Secretary of Transportation to include minimum retroreflectivity values for traffic signs in the *MUTCD*. Following extensive research and public input, FHWA adopted minimum retroreflectivity values for most traffic signs on December 21, 2007, and incorporated them into the *MUTCD* (Revision 2 of the 2003 Edition). Specifically, Section 2A-09 and Table 2A-1 of the *MUTCD* contain the new criteria. Table 2A-1 is included herein as Exhibit 2-4~~Exhibit 2-4~~.

The Department discontinued using Type I (Engineering Grade) and Type II (Super Engineering Grade) materials in 1993, but most local authorities continued using these materials. However, in 2004, the Department canceled the approvals of all Type I and Type II materials because: (1) the Department was aware of the on-going research; and (2) the fact that the higher grade materials were more cost effective than the cheaper materials. **Therefore, no new signs are to be installed using Type I or Type II materials on any public highway within the Commonwealth.**

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The Department has elected to use the Expected Sign Life Method to maintain the minimum level of retroreflectivity of our traffic signs. Traffic signs fabricated from Type III or higher permanent retroreflective sheeting material can be expected to give a minimum of 18 years of satisfactory performance.

Exhibit 2-4 Minimum Maintained Retroreflectivity Levels

Sign Color	Beaded Sheeting Type (ASTM D4956) I	II	III	Prismatic Sheeting	Additional Criteria
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥ 7	W ≥ 120; G ≥ 15			Post-mounted
White on Blue	W*; B ≥ 3	W*; B ≥ 5	W*; B ≥ 12	W ≥ 250; B ≥ 12	Overhead
	W*; B ≥ 3	W ≥ 120; B ≥ 7			Post-mounted
White on Brown	W*; Br ≥ 1	W*; Br ≥ 5	W*; Br ≥ 10	W ≥ 350; Br ≥ 10	Overhead
	W*; Br ≥ 1	W ≥ 150; Br ≥ 5			Post-mounted
Black on Yellow or Black on Orange	Y*; O*	Y ≥ 50; O ≥ 50			[2]
	Y*; O*	Y ≥ 75; O ≥ 75			[3]
White on Red	W ≥ 35; R ≥ 7				[4]
Black on White	W ≥ 50				–

[1] The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m² measured at an observation angle of 0.2° and an entrance angle of -4.0°.
[2] For word legend and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs
[3] For word legend and fine symbol signs measuring less than 48 inches
[4] Minimum sign contrast ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)
* This sheeting type shall not be used for this color for this application

Bold Symbol Signs

- W1-1,2 – Turn and Curve
- W1-3,4 – Reverse Turn and Curve
- W1-5 – Winding Road
- W1-6,7 – Large Arrow
- W1-8 – Chevron
- W1-10 – Intersection in Curve
- W1-11 – Hairpin Curve
- W1-15 – 270 Degree Loop
- W2-1 – Cross Road
- W2-2,3 – Side Road
- W2-4,5 – T and Y Intersection
- W2-6 – Circular Intersection
- W2-7,8 – Double Side Roads
- W3-1 – Stop Ahead
- W3-2 – Yield Ahead
- W3-3 – Signal Ahead
- W4-1 – Merge
- W4-2 – Lane Ends
- W4-3 – Added Lane
- W4-5 – Entering Roadway Merge
- W4-6 – Entering Roadway Added Lane
- W6-1,2 – Divided Highway Begins and Ends
- W6-3 – Two-Way Traffic
- W10-1,2,3,4,11,12 – Grade Crossing Advance Warning
- W11-2 – Pedestrian Crossing
- W11-3,4,16-22 – Large Animals
- W11-5 – Farm Equipment
- W11-6 – Snowmobile Crossing
- W11-7 – Equestrian Crossing
- W11-8 – Fire Station
- W11-10 – Truck Crossing
- W12-1 – Double Arrow
- W16-5P,6P,7P – Pointing Arrow Plaques
- W20-7 – Flagger
- W21-1 – Worker

Fine Symbol Signs (symbol signs not listed as bold symbol signs)

Special Cases

- W3-1 – Stop Ahead: Red retroreflectivity ≥ 7
- W3-2 – Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35
- W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7
- W3-5 – Speed Reduction: White retroreflectivity ≥ 50
- For non-diamond shaped signs, such as W14-3 (No Passing Zone), W4-4P (Cross Traffic Does Not Stop), or W13-1P,2,3,6,7 (Speed Advisory Signs), use the largest sign dimension to determine the proper minimum retroreflectivity level.

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Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥ 7	W ≥ 120; G ≥ 15			Post-mounted
Black on Yellow or Black on Orange	Y*; O*	Y ≥ 50; O ≥ 50			[2]
	Y*; O*	Y ≥ 75; O ≥ 75			[3]
White on Red	W ≥ 35; R ≥ 7				[4]
Black on White	W ≥ 50				–

[1] The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m² measured at an observation angle of 0.2° and an entrance angle of -4.0°.
[2] For text and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs
[3] For text and fine symbol signs measuring less than 48 inches
[4] Minimum sign contrast ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)
* This sheeting type shall not be used for this color for this application.

Bold Symbol Signs

• W1-1,2 – Turn and Curve • W1-3,4 – Reverse Turn and Curve • W1-5 – Winding Road • W1-6,7 – Large Arrow • W1-8 – Chevron • W1-10 – Intersection in Curve • W1-11 – Hairpin Curve • W1-15 – 270 Degree Loop • W2-1 – Cross Road • W2-2,3 – Side Road • W2-4,5 – T and Y Intersection • W2-6 – Circular Intersection • W2-7,8 – Double Side Roads	• W3-1 – Stop Ahead • W3-2 – Yield Ahead • W3-3 – Signal Ahead • W4-1 – Merge • W4-2 – Lane Ends • W4-3 – Added Lane • W4-5 – Entering Roadway Merge • W4-6 – Entering Roadway Added Lane • W6-1,2 – Divided Highway Begins and Ends • W6-3 – Two-Way Traffic • W10-1,2,3,4,11,12 – Grade Crossing Advance Warning	• W11-2 – Pedestrian Crossing • W11-3,4,16-22 – Large Animals • W11-5 – Farm Equipment • W11-6 – Snowmobile Crossing • W11-7 – Equestrian Crossing • W11-8 – Fire Station • W11-10 – Truck Crossing • W12-1 – Double Arrow • W16-5P,6P,7P – Pointing Arrow Plaques • W20-7 – Flagger • W21-1 – Worker

Fine Symbol Signs (symbol signs not listed as bold symbol signs)

Special Cases

- W3-1 – Stop Ahead: Red retroreflectivity ≥ 7
- W3-2 – Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35
- W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7
- W3-5 – Speed Reduction: White retroreflectivity ≥ 50
- For non-diamond shaped signs, such as W14-3 (No Passing Zone), W4-4P (Cross Traffic Does Not Stop), or W13-1P,2,3,6,7 (Speed Advisory Plaques), use the largest sign dimension to determine the proper minimum retroreflectivity level.

NOTE: Type I and II materials both have a uniform appearance similar to metallic paint, whereas all Type III, IV, VII, VIII, IX and X materials have a pattern of hexagons, diamonds or circular shapes measuring about one-eighth inch across. Therefore, it is easy to recognize the inferior Type I and Type II materials. FHWA's Retroreflective Sheeting Identification Guide – 2014~~1~~(available at https://highways.dot.gov/safety/other/visibility/2014-traffic-sign-retroreflective-sheeting-identification-guide ~~http://safety.fhwa.dot.gov/roadway_dept/night_visib/sign_visib/sheetguide/~~ is a handy tool to help determine the grade and manufacturer of most sheeting materials.

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Enhanced Conspicuity for Signs

There are situations where engineering judgment determines the need for increased conspicuity of regulatory, warning or guide signs. This can be accomplished through increasing the size of the sign,

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doubling-up by placing a second identical sign on the left side of the highway or adding a conspicuity device to the sign. The most frequent conspicuity device is an 18" square panel made with fluorescent orange material and turned 45 degrees for mounting above the sign. The Conspicuity Plaque (W16-102P) may be ordered using material ~~#327903~~#327903.

Recouping Costs Incurred from Crashes

Sign maintenance is frequently required because of highway crashes. Therefore, if the responsibility party is identified, record the vehicle information and provide it to the Damage Recovery Unit in the Bureau of ~~Operations~~ Maintenance so that the Department can receive reimbursement from the individual or their insurance carrier, in accordance with Publication 23, Chapter 14.

If a logo sign is damaged, the Department should contact the Pennsylvania Tourism Signing Trust.

Laws, Regulations, and Other Publications

~~Adopt-A-Highway Operational~~Roadside Beautification Manual (Publication 808). A PennDOT ~~manual~~ manual defining the procedures and types of signs available for the Adopt-A-Highway Program.

Maintenance Manual (Publication 23). A manual prescribing the planning, scheduling, equipment, materials, and labor required to accomplish the Department's highway maintenance program.

Manual on Uniform Traffic Control Devices (*MUTCD*). A manual adopted by the Federal Highway Administration, and which establishes national guidelines for traffic-control devices, including signs. Specifically, Part 2 addresses traffic signs, and is available at http://mutcd.fhwa.dot.gov/index.htm.

Handbook of Approved Signs~~Official Traffic Signs~~ (Publication 236). A compilation of official traffic signs approved either by regulation or by signature of the Secretary or designee. The standards include the justification for the signs and the design details necessary to fabricate the signs.

A Policy on Geometric Design of Highways and Streets. The universal standard for geometric design of highways and streets, as published by the American Association of State Transportation Officials (AASHTO). This manual is also commonly called the "Green Book."

Qualified Products List for Construction – Bulletin 15 (Publication 35). A listing of approved materials and manufacturers, including sign materials and sign manufacturers. Sign Foreman's Manual (Publication 108). The Sign Foreman's Manual depicts the various responsibilities of the sign foreman.

*Construction Specifications (*Publication *408*). Specifications referenced for all Department construction projects, which includes requirements for the installation of signs and sign accessories.

Standard Highway Signs and Markings (SHS) book. FHWA's compilation of sign designs approved for national use, which is also the basis for designing the signs in Publication 236. In addition to sign designs, the book includes recreational or cultural interest symbols.

Traffic Control – Pavement Marking and Signing Standards (Publication 111). Standard drawings specifying the types, dimensions, locations and lighting of signs on expressways and freeways, and the legend spacing and sign supports for signs on all highways. Also includes details for pavement markings, snowplowable raised pavement markers, delineation, and Type III barricades.

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2.2 Official Signs and Approved Sign Manufacturers

Official Signs

The following signs are "official signs" and may be installed in highway rights-of-way within the Commonwealth:

- Signs included in the *Handbook of Approved Signs* (Publication 236).
- Signs included in the *Traffic Control Signing Standards* (Publication 111).

Signs that were approved at the time of their manufacture but are no longer listed in the above referenced publications may continue to be used until they fulfill their useful life unless directed otherwise.

Approved Sign Manufacturers

a) Types of Manufacturers. The following sign manufacturers are approved to make official traffic signs:

- PennDOT's Sign Shop, located at 21st and Herr Streets, Harrisburg.
- Department of Conservation of Natural Resources (DCNR) Sign Shop.
- Department-approved commercial sign manufacturers listed in Publication 35 or other lists made available from the Department.

Department-approved municipal sign manufacturers. A list is available from the Department.

b) Sign Identification. The manufacturer may apply their name or logo on the face of the sign. Manufacturers other than the Department's Sign Shop shall identify their Department approval number and may include their name on the front or back of each sign manufactured for use along a public highway within the Commonwealth in accordance with the following:

Sign identifications on the front of the sign shall be confined to either a 1-inch diameter circle on the lower edge of the sign on or near the sign border, or within a 0.5-inch by 2-inch rectangle on or near the border on the lower half of the sign. The identification may be screened on the sign or durably affixed by a transparent sticker.

Sign identification on the back of the sign shall be on the lower half of the sign, positioned at a location that will not be covered by a sign post.

2.3 Approval and Erection Responsibilities

Signing Responsibilities

Effective sign maintenance is important from a customer satisfaction perspective, and from a safety aspect in reducing crashes. Therefore, careful management of sign maintenance at all levels throughout the Department is essential.

Various ~~Altogether many~~ organizations within the Department are involved in signing and each has their necessary function and area of responsibility. The flow ~~line~~ of information ~~and direction~~ starts with Department regulations and policies and ends with the ~~actual~~ installation and maintenance of the signs.

The various organizations and their relationships are identified in this section. Please note that the duties and responsibilities of the Engineering District and County Maintenance District personnel are general guidelines that vary from district to district and county to county.

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a) Traffic Engineering ~~Division (TED)~~and Permits Section

- Central Office. ~~TED's s~~Staff in the Signing and Pavement Markings Unit in the Traffic Engineering and Permits Section ~~Central Office~~ is responsible for the following: establish signing policies and guidelines; develop standards, specifications, and regulations related to signing; develop annual contracts for the purchase of miscellaneous signs, sign accessories and work zone traffic-control devices for use by the county, maintenance districts, and raw materials for use by the Sign Shop Distribution Center; assist in development and implementation of sign-related safety programs; monitor the statewide use and inventory of signs and sign accessories; ~~perform quality assurance reviews of sign installations~~managing the Plant Maintenance (PM) – Signs Program; and rendering technical assistance to the districts and counties for the program areas identified above.~~oversee the sign inventory component of our SAP Plant Maintenance system.~~
- Sign Shop Distribution Center. The Sign Shop Distribution Center (Sign Shop) manufactures signs, and stocks select signs and sign accessories for distribution to the county maintenance districts. The Sign Shop's general goal is to have all signs which are manufactured or stockpiled at the Sign Shop and all sign accessories available for pickup by the counties within two (2) weeks after receipt of the orders. On request, the Sign Shop will fill any priority order as soon as their schedule permits.

b) Engineering District.

- District Bridge Unit. Reviews and inspects ~~Captures~~ signs associated with bridges and coordinates with the District Traffic Unit when changes are necessary. This is to include noting when changes are needed for the ~~Plant Maintenance~~ PM sign inventor~~yy database~~.
- District Traffic Unit. The District Traffic Unit determines what signs and delineation devices should be in place along all State highways within the Engineering District including performing all engineering studies required to identify new or revised signing needs. They also use PM to edit the sign inventory including data entry for signs installed as part of highway occupancy permits and construction projects and create sign notifications (SI) for the installation, relocation and removal of existing signs. The Traffic Unit prepares any SignCAD drawings required or these SI notifications and may create PMS1 (Sign) work orders for the counties. The District Traffic Unit will refer concerns from the public to the District Customer Care Center Administrator related to signing or enter them directly when required. They also provide technical assistance and guidance to County Maintenance Districts for all matters related to signing and offer assistance and training in the use of PM. related to signing and ensure that signs in the Engineering District are reviewed annually.~~The District Traffic Unit determines what signs and delineation devices should be in place along all State highways within the Engineering District. They also prepare a notification of changes, e.g., install of new signs or the relocation or removal of existing signs, via SAP Plant Maintenance. The Traffic Unit may design custom-made signs for inclusion with SAP Plant Maintenance sign orders and take retroreflective readings of select signs for recording in SAP Plant Maintenance. The District Traffic Unit prepares maintenance customer service records related to signing and when required, assigns priorities or due dates for signing work. They provide technical assistance and guidance to the Maintenance Districts in matters related to signing. Ensure that 20 percent of all signs in the Engineering District are reviewed annually.~~

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It is the responsibility of the District Traffic Unit to ensure Department compliance with the Expected Sign Life Method. ~~(more information can be found at the FHWA website, (http://safety.fhwa.dot.gov/roadway_dept/night_visib/retrotoolkit/index.htm).~~ In this method, individual signs are replaced before they reach the end of their expected service life. The expected service life is based on the time required for the retroreflective material to degrade to the minimum retroreflectivity levels.

The listing of signs needing replaced will be provided to the County Maintenance D~~d~~istricts.

- ~~District Plant Maintenance Coordinator. The District Plant Maintenance Coordinator trains and directs county personnel to use the computer for inventory control and sign orders; provides guidance for establishing reorder points and reorder quantities; validates and upgrades county input data to insure accurate records; and supervises the scheduling and reporting of periodic physical inventory checks.~~
  - ~~District Maintenance Unit. The District Maintenance Unit prepares contracts and lease arrangements for equipment not owned by the Department. Some of this equipment, such as cranes, bucket trucks and auger trucks, may be useful for signing projects.~~
  - District Fiscal Office Staff (Administration)/District Plant Maintenance Coordinator Staff (Maintenance). The District Fiscal Office staff or District Plant Maintenance Coordinator/staff trains county personnel on Inventory Management within the SAP System; updates sign master data as it relates to procurement, provides guidance for establishing reorder points and reorder quantities; and may schedule additional physical inventory spot checks.
  - District Permit Unit. Ensure that the District Traffic Unit is aware of all signs required as part of any permit.
  - District Construction Unit. Provide as-built drawings of signs for construction projects and perform oversight and inspection of signs installed as part of construction projects.
  - District Pony Truck Driver. Transport signing materials from the Sign Shop to the County.
  -

c) County Maintenance District Responsibilities.

- Assistant Highway Maintenance Manager (AHMM) – Signs. The Assistant Highway Maintenance Manager (AHMM)-Signs responsibilities include:
  - Determine yearly budget for sign program.
  - Prepare yearly plan of Sign Foreman's work.
  - Maintain the sign inventory in PM.
  - Creation of PMS1 work orders.
  - Planning Sign Foreman's work (Dispatch and weekly plan).
  - Printing of work orders for use by Sign Foreman.
  - Ensure timely and satisfactorily completion of work orders (Technically Completed (TECO)).

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- Liaison between Central Office, district and county for PM.
- Review and approve sign crew payroll.
- Prepare maintenance customer service records for the routine maintenance of existing signs.
- Inspect work performed by the sign crew.

- Assistant Highway Maintenance Manager (AHMM) – All. The Assistant Highway Maintenance Manager (AHMM)-All responsibilities include:
  - Identify traffic-control devices that are damaged or in need of repair.
  - Conduct M681 road reviews of all signs on their roadways.
  - Provide direction to the sign foreman and other maintenance foremen for handling minor items on signing such as replacement of missing bolts on signs.
  - Manages the Agility Program
- Roadway Program Coordinator (RPC). The Roadway Program Coordinator (RPC) responsibilities include:
  - Back-up for AHMM.
  - Runs Custom Sourcing Routine (CSR) for approval of Purchase Requisitions (PREQs).
  - Oversees all activities associated with purchasing.
  - Develops and manages the county's budget.

~~- Administrative Staff.~~

~~o Identify traffic-control devices that are damaged or in need of repair.~~

~~o Conduct routine reviews of signs.~~

~~o Prepare maintenance customer service records for the routine maintenance of existing signs.~~

~~o Establish a work schedule for the sign foreman and create SAP Plant Maintenance work orders.~~

~~o Ensure that the issued work orders are completed in a timely and satisfactory fashion.~~

~~o Transport signing materials from the Sign Shop to the County.~~

~~o Provide direction to the sign foreman and other maintenance foremen for handling minor items on signing such as replacement of missing bolts on signs.~~

~~o Inspect work performed by the sign crew.~~

- Storekeeper/Roadway Programs Technician (RPT). The Storekeeper/RPT responsibilities include:~~.~~
  - Maintain storage location "0001" with signs and sign accessories for the routine maintenance and replacement of signs.
  - Place sign accessory material orders via SAP Plant Maintenance.
  - Create Manual Orders when circumstances dictate the need.
  - Perform Goods Receipt (GR) within 48 hours of materials being received.

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- Receive into inventory signs and accessories.
- Recommend inventory adjustments.
- Review Planned Orders generated through Material Requirements Planning (MRP) and p~~P~~erform MRP runs to ensure adequate supply of on-hand sign inventories.
- Assist in Physical Inventories.

- Sign Foreman. The Sign Foreman's responsibilities include:
  - Complete PMS1 Work Orders including removing, relocation, installing and repairing traffic control devices.
  - Maintain existing signs and delineation devices in a systematic manner, including trimming trees and bushes to provide visibility to the traffic-control devices.
  - Inform the Storekeeper/RPT or other responsible persons of existing and anticipated material needs.
  - Work with Storekeeper/RPT in maintaining signs, delineation devices, post and hardware inventories.
  - Supervise sign crew members.
  - Follow all specifications and standards for proper sign installation including placing installation dates on the backs of all signs.
  - Complete Daily Payroll to include Stocked Materials.
  - Ensure SI notifications are created to capture spot field work performed.
  - Complete customer care concerns.
  - Conduct field views for damaged or missing signs and communicate sign repair/replacement needs.
  - Maintain the sign inventory in PM.

b) District or County Maintenance Units. The District or County Maintenance Units prepare contracts and lease arrangements for equipment not owned by the Department. Some of this equipment, such as cranes, bucket trucks and auger trucks, may be useful for signing projects. They also prepare contracts for the installation of large guide signs.

- ~~Complete sign work orders issued by the Assistance County Maintenance Manager.~~
- ~~Maintain existing signs and delineation devices in a systematic manner, including trimming trees and bushes to provide visibility to the traffic-control devices.~~
- ~~Inform the storekeeper or other responsible persons of existing and anticipated material needs.~~
- ~~Complete M-206 Customer Service Record Forms.~~
- Therefore, Sign maintenance responsibilities are as follows:

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1. County personnel (ACMM and Sign Foreman) are now responsible for identifying worn-out and vandalized signs. The District Traffic Unit will assist to ensure ~~20 percent of~~ signs are reviewed annually. The County should conduct a systematic review with other work functions.

   ~~The District Traffic Unit is responsible for performing all engineering studies required to identify new or revised signing needs.~~

2. Ordering signs used on a routine basis is performed by the County, so that the County inventory can be controlled. ~~The District Traffic Unit will be involved in CAD drawing development for sign fabrication and special signs.~~

3. If a District/County is in need of a sign(s) on a priority basis, the county can call the Sign Shop manager (717-346-9910) and arrange to have the signs made quickly. Districts and counties should use this service on rare occasions when unexpected and unanticipated events occur.

4. A sign inventory record system of field placements is a useful tool in evaluating and managing signs. The inventory record is necessary so that the Sign Foremen and ACMM can readily detect missing signs and serves as an important management tool for the overall sign program. Therefore, it is essential to maintain the inventory in SAP Plant Maintenance following the detailed process developed in the Plant Maintenance role procedures. This is essential for the Sign Life Maintenance program.

5. Customer surveys indicate that visible and retroreflective highway signage is an important service. County managers are strongly encouraged to dedicate sign crews to sign upgrades and minimize the time the sign crew is used for other work functions, including placement of work zone control.

6. The on-hand sign inventories in the counties are to be kept to a minimum. Use signs in inventory before ordering equivalent new signs from the Sign Shop. Each county should generally have no more than a 4- to 6-week inventory of signs for replacement due to knockdowns (e.g., STOP, Curve, Speed Limit, etc. signs). A listing of recommended on-hand sign inventories is shown in Exhibit 2-32~~Exhibit 2-35~~.

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Signs Erected by Others

Title 67 Pa. Code Chapter 212a identifies the signs that local authorities or others may install on State highways and on local highway approaches to State highways with and without Department approval. However, the Department may enter into an agreement with municipalities to alter their responsibilities.

Signs installed by others that require Department approval will be inventoried in SAP Plant Maintenance.

Issuance of Sign Work Orders

Sign work orders are the responsibility of the County Maintenance District.

2.4 Regulatory Signs

Requirement for Engineering and Traffic Study

The decision to use an approved traffic control device that imposes restrictions that are not normal rules of the road should be based on an engineering and traffic study. Applicable studies are included in 67 Pa. Code Chapter 212a.

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Establishment of Priorities

Signs should be used only where warranted by facts and field studies. Signs are essential where special regulations apply at specific places or at specific times only, or where hazards are not self-evident.

Regulatory signs are not necessary to confirm rules of the road.

STOP Sign Installations

Give the installation of STOP (R1-1) signs the highest priority of all signs. When downed R1-1 signs are reported, sign crews should respond as soon as possible since the downed or missing stop sign represents a high risk for crashes. Due to this liability, when replacing a downed or missing R1-1 sign, sign crews should ensure that motorists are aware of the situation at the uncontrolled intersection by providing flagging, a temporary STOP sign on a stand, or some other appropriate traffic control measure.

If a new STOP sign is installed, a red flasher should be placed on the installation for a minimum of 30 days.

Signing Responsibilities at Intersections with Local Roads

67 Pa. Code §212a (relating to official traffic control devices) was adopted in the Pennsylvania Bulletin. Specifically, §212.5(d) (relating to traffic-control devices on local highway approaches to intersections with State highways) establishes sign installation and maintenance responsibilities at intersections between State highways and local roadways.

The Department Responsibilities

When a Department employee discovers a damaged or missing STOP (R1-1) or YIELD (R1-2) sign on a local roadway approach to a ~~State~~State highway, the employee should notify the responsible municipality. If the municipality cannot respond in a timely fashion, the county should replace the sign with a temporary or permanent installation to ensure that safety is not compromised. The county is to notify the local authorities of the action taken.

County Maintenance offices should document all communication and work associated with the replacement of the damaged or missing sign on the local road approach.

Local Authorities Responsibilities

For Local Authority Responsibilities refer to 67 Pa. Code §212a.

Posting Regulatory Speed Limits

Posting of Speed Limits at Intersections

Use the following guidelines if a problem exists in the enforcement of a speed limit that ends at an intersection:

1. Ending a speed limit on the stem of a T-intersection. Since ~~§3362(b)~~§3362(b) of the Vehicle Code (relating to posting of speed limit) requires that official traffic-control devices be posted at the beginning and end of each speed zone, it is necessary to install signs indicating the end of a speed limit on the stem of a T-intersection in one of two ways:
    - The preferred method is to install a Speed Limit (R2-1) sign indicating the appropriate speed limit on the other two legs within a reasonable distance beyond the intersection, e.g., within 200 feet of the intersection.

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- A less desirable method is to install an END (R3-9DP) sign over a Speed Limit (R2-1) sign in advance of the T-intersection. However, this method may be necessary if there is no speed limit on the other roadway and it has not been determined through test runs that it is safe for travel at 55 mph.

2. Ending the speed limit at a four-way intersection. If a posted speed limit does not exist along the highway beyond the intersection and it has not been determined through test runs that the following section of highway is safe for travel at 55 mph, Districts may end the speed limit by installing an END (R3-9DP) sign above a Speed Limit (R2-1) sign in advance of the intersection.
3. If the highway beyond the intersection and the intersecting highway have posted speed limits or are safe for travel at 55 mph, Speed Limit (R2-1) signs indicating the speed limit along the three other legs of the intersection may be installed within a reasonable distance from the intersection, e.g., within 200 feet of the intersection.
4. Speed limit for turning vehicles at intersections. Neither the Vehicle Code nor regulations require that drivers turning from one highway onto another highway be advised of the speed limit along the highway they are entering. Therefore, it is possible that a turning driver could travel up to one-half mile before knowing what the speed limit is along the highway they have entered.
5. Normally, this is not a problem if the speed limit along the entered highway is higher that the speed limit along the highway the driver is leaving. However, this can create a possible "speed entrapment" condition if a lower speed limit exists along the second highway. In view of this, Districts should consider the installation of Speed Limit (R2-1) signs within a reasonable distance from intersections if the following conditions exist:

    - The speed limit along the second highway is lower than the speed limit along the first highway.
    - The normal one-half mile spacing of speed limit signs has not provided a sign within a reasonable distance from the intersection, e.g., within 500 to 1,000 feet of the intersection.
    - There is a high number of turning, non-local vehicles.

Posting of Regulatory Speed Limits and Advisory Speeds

When the speed on an Advisory Speed (W13-1P) plaque is lower than a posted regulatory speed limit, give priority to the installation of the warning signs with advisory speeds. For example:

1. Do not install a R2-1 sign within the area covered by the W13-1P plaque, or within a distance in feet in advance of the warning sign equal to 10 times the regulatory speed limit in miles per hour (e.g., 550 feet for a 55-mph speed limit).
2. An R2-1 sign may be installed immediately following the section of roadway covered by the warning signs (e.g., within 200 feet after the end of a curve).

Since this posting of signs may result in distances between R2-1 signs that are greater than one-half mile apart, it may be possible to install a supplemental R2-1 sign at an intermediate location. In any event, it is more in the interest of motorists' safety to tell drivers the safe speed than to possibly confuse them by installing conflicting regulatory and advisory signs.

Posting of Regulatory Speed Limits and School Speed Limits

Whenever possible, do not install conflicting Speed Limit (R2-1) signs within a 15-mph school zone speed limit, or within a distance of 10 times the speed limit, in feet, of the beginning of the school speed limit.

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PASS WITH CARE Signs

PASS WITH CARE (R4-2) signs must be installed at the end of no-passing zones to comply with the requirement to post the end of each no passing zone.

ONE-WAY Sign Installations

Property owners are initially responsible for installing and maintaining ONE-WAY (R6-1, R6-2) signs to notify motorists that they are exiting a non-residential driveway onto a one-way highway. This responsibility (in the case of driveways) is uniform for new and long existing one-way highways and driveways as well as for permitted and non-permitted driveways. If a problem is identified, the owner should be contacted and the responsibility documented through a Highway Occupancy Permit or Supplemental Permit, recorded in the County Office of the Recorder of Deeds.

The Office of Chief Counsel advises that despite the permittee's responsibility in the first instance to install the sign, the Department may still have the ultimate responsibility, in the face of possible tort liability, to assure the safety of the traveling public if the permittee fails to erect a sign following a Department directive.

For example, if the absence of a ONE-WAY sign at a business driveway is a "dangerous condition," then the Department would be obligated to take corrective action. If the property owner does not take any action following a proper notification on our part, the District should install the sign and bill the permittee to recover its costs.

Weight Limits

Advance Signs

§4902(e) of the Vehicle Code (relating to erection of signs) requires the erection of restriction signs within 25 feet of each end of a bridge or portion of highway with a weight restriction. Moreover, when the restriction does not begin or end at an intersection with an unrestricted highway, signs are also required at the intersection nearest each end of the restricted bridge or portion of highway to avoid entrapment.

If multi-restrictions exist along a highway between intersections with unrestricted highways (e.g., various bridge weight limits), it is necessary to install advance signing for each restriction unless the first restriction is the most limiting. This signing is required regardless of whether the unrestricted intersecting highway is a State highway or a local roadway or whether the roadway would afford the driver the best alternate route around the restriction. If the closest unrestricted intersecting highway will not provide a suitable alternate route around the restriction, consider an installation of additional advance informational signs at the last intersecting highway that will provide a suitable alternate route.

Prompt Posting of Bridge Weight Limits

When approved, it is extremely important to promptly post all bridge weight limits. To expedite the posting, each county should maintain an inventory of the commonly used R12-1, W16-103P, and R12-5A signs (see the section County Sign Inventory~~County Sign Inventory~~).

In lieu of stocking only completely finished signs, the county may elect to stock some partially finished signs (i.e., without the numerals), and to stock some cutout pressure-sensitive numerals. The numerals should consist of 5" E-Series digits for the standard size R12-1 and R12-1-1 signs and 3" E-Series digits for the standard size R12-5A signs.

On request, the Sign Shop will supply packs of five numerals of the same type as a single commodity. Since cutout pressure-sensitive legend has a tendency to dry out; therefore, counties should stock no more than a

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normal 12-month supply. Store legend upside down to help prevent ~~curling, and~~curling and use the oldest legend first.

Counties should apply pressure-sensitive legend at the location illustrated in the official sign standard, using the procedure outlined in **Exhibit 2-5**~~**Exhibit 2-5**~~.

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~~**Signing on Lower Volume Roads**~~

~~Part 5 of the *MUTCD* is entitled, "Traffic Control Devices for Low-Volume Roads." However, in accordance with Paragraph B in Section 5A.01 of the *MUTCD*, the definition of "low-volume road" excludes all state highways.~~

~~Although Part 5 of the *MUTCD* is not applicable to this manual, it is still permissible to modify signing practices on lower-volume State highways. For example, since these roads typically have mostly local traffic, directional and guide signs are generally not required.~~

~~Moreover, because of the lower traffic volumes, there are typically fewer crashes on these roads even though the vertical and horizontal alignment may be worse than the higher-volume roads. Therefore, use engineering judgment to determine the recommended number and types of regulatory and warning signs. Alternate methods to provide adequate signing are as follows:~~

1. ~~No posted regulatory speed limit, but all significant curves and turns identified by warning signs with advisory speeds plaques when appropriate.~~
2. ~~A reduced regulatory speed limit with fewer curve and turn signs.~~
3. ~~No posted regulatory speed limit, but WINDING ROAD NEXT (___) MILES (W1-5-1) sign or NARROW ROAD NEXT (___) MILES (W5-1-1) sign with advisory speed plaques as appropriate after all intersections.~~

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Exhibit 2-5 "Field" Application of Pressure-Sensitive Legend

1. Store legend at room temperature.
2. Apply legend at the storeroom since it is difficult to apply during hot, cold or humid conditions.
3. Wash hands and the sign face with clean soapy water and thoroughly dry to insure good adhesion of the legend.
4. Use a ~~china~~ grease pencil, soft lead pencil or non-permanent felt-tip pen to draw horizontal lines on the sign face to delineate the top and the bottom of the legend in accordance with the dimensions on the approved sign standard. These lines will also be valuable to help align the legend. (Vertical lines may also be valuable in orienting some legend.)
5. Without removing the backing paper, position the characters at their relative locations. Space between characters should generally be about 125 percent of the stroke width (the width of the lines in the legend) – a slightly smaller space should be used before and after a "4" or a "7". Characters which have a curve at the top should extend slightly above the top transverse line and characters which have a curve at the bottom should extend slightly below the lower transverse line.
6. Pull the backing paper off part of the character and align that part before removing the balance of the paper. It is best to start with the bottom of characters with straight bottoms (e.g., 2's, A's, L's, etc.), and the top of characters with straight tops (e.g., 5's, 7's, F's, etc.). After the first part of the character is in place, remove the balance of the paper and allow the character to flow into place without stretching the characters.
7. Use your fingernails or a special plastic blade as a squeegee to apply pressure to the characters to affix them to the sign. The legend will normally be removable for a short time by using a blade or knife to lift a corner, but if removed, apply new legend instead of trying to reapply the same legend.
8. Use a damp cloth to remove felt-tip or grease~~china~~ pencil markings. Do not erase lead pencil markings.
9. Take pride in your work – the Department's image is judged by it!

2.5 Warning Signs

General

Guidelines for installing warning signs are included in Sections 2C of the *MUTCD*.

Consider the installation of oversize warning signs if one or more of the following exists:

a) The condition is properly signed and/or delineated, but crashes or incidents related to the condition addressed by the warning sign continue to occur.

b) Inadequate contrast exists between the sign and the environment when a standard size sign is used.

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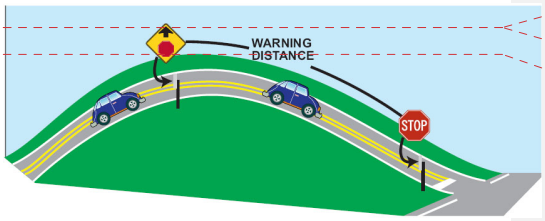
c) The location is on a high-speed (45 mph or higher) highway with four or more lanes.

Advance Placement of Warning Signs

Since the primary purpose of warning signs is to gain attention of the unfamiliar motorist, the placement of warning signs is important. The placement must allow these drivers sufficient time to see the warning sign, understand the intent, identify the potential hazard, decide what action must be taken, and then to perform any necessary maneuver.

Table 2C-34 in the *MUTCD* (see ~~Exhibit 2-6~~Exhibit 2-6) provides the recommended advance sign placement distances. However, it is important to note that Condition A is only for those situations where motorists may have to change lanes in heavy traffic. Examples of applicable signs include:



- Merge (W4-1).
- ~~Pavement Width Transition~~Lane Ends (W4-2L, W4-2R).
- Entering Roadway Merge (W5-5).
- RIGHT LANE ENDS (W9-1R).

Condition B is for all other advance placement distances. ~~and these values are typically much smaller than the values historically used by traffic engineers. The reason for the change is that FHWA has reconciled their advance distances to match the stopping sight distances in Table 3-1 of AASHTO's A Policy on Geometric Design of Highways and Streets, using a 2.5-second reaction time and a deceleration rate of 10 feet/second2. Moreover,~~ Engineering Districts should keep in mind that these are minimum distances, and they may want to use larger values for the following reasons:

- The advance distances assume that drivers will always use their brakes to decelerate to a posted advisory speed, thereby wasting energy.
- The lower advance posting distances may violate drivers' expectations, especially if at the same time more realistic advisory speeds are used as suggested in the section **Advisory Speed Signs**~~Advisory Speed Signs~~.

Also, Districts should base the minimum advance distance on the "0 mph" advisory speed for the Stop Ahead, Yield Ahead, Signal Ahead, Advance Railroad Crossing, and Intersection Warning signs because a driver may wish to turn at an intersection or may need to stop due to other turning traffic.

A few warning signs are not placed in advance of the situation, but instead rely on the visibility of the sign from a distance. Examples include:

- Chevron Alignment (W1-8) sign.
- NO PASSING ZONE (W14-3) pennant.
- Pedestrian Crossing (W11-2) and School Advance Warning (S1-1) signs, when physically placed at the crosswalks with a Diagonal Downward Pointing Arrow (W16-7p) sign.
- Double Arrow (W12-1) sign, i.e., as used on the approach end of an island where traffic can pass on both sides.

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Exhibit 2-6 Guidelines for Advance Placement of Warning Signs

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Posted or 85th-Percentile Speed	Advance Placement Distance[1]									
	Condition A: Speed reduction and lane changing in heavy traffic[2]	Condition B: Deceleration to the listed advisory speed (mph) for the condition								
		0[3]	10[4]	20[4]	30[4]	40[4]	50[4]	60[4]	70[4]	80[4]
20 mph	225 ft	115 ft	N/A[5]	–	–	–	–	–	–	–
25 mph	325 ft	155 ft	N/A[5]	N/A[5]	–	–	–	–	–	–
30 mph	460 ft	200 ft	N/A[5]	N/A[5]	–	–	–	–	–	–
35 mph	565 ft	250 ft	N/A[5]	N/A[5]	N/A[5]	–	–	–	–	–
40 mph	670 ft	305 ft	100 ft[6]	100 ft[6]	N/A[5]	–	–	–	–	–
45 mph	775 ft	360 ft	125 ft	100 ft[6]	100 ft[6]	N/A[5]	–	–	–	–
50 mph	885 ft	425 ft	200 ft	175 ft	125 ft	100 ft[6]	–	–	–	–
55 mph	990 ft	495 ft	275 ft	225 ft	200 ft	125 ft	N/A5	–	–	–
60 mph	1,100 ft	570 ft	350 ft	325 ft	275 ft	200 ft	100 ft[6]	–	–	–
65 mph	1,200 ft	645 ft	450 ft	400 ft	350 ft	275 ft	200 ft	100 ft[6]	–	–
70 mph	1,250 ft	730 ft	525 ft	500 ft	450 ft	375 ft	275 ft	150 ft	–	–
75 mph	1,350 ft	820 ft	625 ft	600 ft	550 ft	475 ft	375 ft	250 ft	100 ft[6]	–
80 mph	1,475 ft	910 ft	725 ft	700 ft	625 ft	550 ft	450 ft	350 ft	200 ft	–
85 mph	1,600 ft	1,010 ft	825 ft	800 ft	750 ft	675 ft	575 ft	450 ft	300 ft	150 ft

[1] The distances are adjusted for a sign legibility distance of 180 feet for Condition A. The distances for Condition B (with the exception of the potential stop condition) have been adjusted for a sign legibility distance of 250 feet, which is appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.

[2] Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PRT of 14.0 to 14.5 seconds for vehicle maneuvers (2018 AASHTO Policy, Table 3-3, Decision Sight Distance, Avoidance Maneuver E) and adjusted for a legibility distance of 180 feet for the appropriate sign.

[3] Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2018 AASHTO Policy, Table 3-1, Stopping Sight Distance, providing a PRT of 2.5 seconds, a deceleration rate of 11.2 feet/second^2.

[4] Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second^2, and adjusted for a sign legibility distance of 250 feet.

[5] No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing. An alignment warning sign may be placed anywhere from the point of curvature up to 100 feet in advance of the curve. However, the alignment warning sign should be installed in advance of the curve and at least 100 feet from any other signs.

[6] The minimum advance placement distance is listed as 100 feet to provide adequate spacing between signs.

Note: Warning signs that advise road users about conditions that are not related to a specific location, such as Deer Crossing or SOFT SHOULDER, can be installed in an appropriate location, based on engineering judgment.

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Posted or 85th-Percentile Speed	Advance Placement Distance[1]								
	Condition A: Speed reduction and lane changing in heavy traffic[2]	Condition B: Deceleration to the listed advisory speed (mph) for the condition							
		0[3]	10[4]	20[4]	30[4]	40[4]	50[4]	60[4]	70[4]
20 mph	225 ft	100 ft[6]	N/A[5]	—	—	—	—	—	—
25 mph	325 ft	100 ft[6]	N/A[5]	N/A[5]	—	—	—	—	—
30 mph	460 ft	100 ft[6]	N/A[5]	N/A[5]	—	—	—	—	—
35 mph	565 ft	100 ft[6]	N/A[5]	N/A[5]	N/A[5]	—	—	—	—
40 mph	670 ft	125 ft	100 ft[6]	100 ft[6]	N/A[5]	—	—	—	—
45 mph	775 ft	175 ft	125 ft	100 ft[6]	100 ft[6]	N/A[5]	—	—	—
50 mph	885 ft	250 ft	200 ft	175 ft	125 ft	100 ft[6]	—	—	—
55 mph	990 ft	325 ft	275 ft	225 ft	200 ft	125 ft	N/A[5]	—	—
60 mph	1,100 ft	400 ft	350 ft	325 ft	275 ft	200 ft	100 ft[6]	—	—
65 mph	1,200 ft	475 ft	450 ft	400 ft	350 ft	275 ft	200 ft	100 ft[6]	—
70 mph	1,250 ft	550 ft	525 ft	500 ft	450 ft	375 ft	275 ft	150 ft	—
75 mph	1,350 ft	650 ft	625 ft	600 ft	550 ft	475 ft	375 ft	250 ft	100 ft[6]

[1] The distances are adjusted for a sign legibility distance of 180 feet for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 feet, which is appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.

[2] Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PRT of 14.0 to 14.5 seconds for vehicle maneuvers (2005 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 180 feet for the appropriate sign.

[3] Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2005 AASHTO Policy, Exhibit 3-1, Stopping Sight Distance, providing a PRT of 2.5 seconds, a deceleration rate of 11.2 feet/second^2, minus the sign legibility distance of 180 feet.

[4] Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second^2, minus the sign legibility distance of 250 feet.

[5] No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing. An alignment warning sign may be placed anywhere from the point of curvature up to 100 feet in advance of the curve. However, the alignment warning sign should be installed in advance of the curve and at least 100 feet from any other signs.

[6] The minimum advance placement distance is listed as 100 feet to provide adequate spacing between signs.

Signing Curves and Turns

Curve and Turn Signs

The legal speed limit of the highway should be used when evaluating the need for advance Turn (W1-1) or Curve (W1-2) signs. All curves and turns with a recommended safe speed less than the legal speed for the highway should normally be signed with an appropriate curve or turn sign. An exception to the installation of a curve or turn sign may be a ramp to or from a freeway or expressway where an advisory exit speed or ramp speed sign ~~exists~~exists, and flexible delineator posts or Chevron Alignment (W1-8) signs exist.

Curve or turn signs should normally be installed a minimum distance in advance of the curve or turn equal to the appropriate values in Condition B in Exhibit 2-6~~Exhibit 2-6~~. To use this table, you need to know the legal or 85th percentile speed, plus the recommended advisory speed around the curve or turn.

Advisory Speed Signs

An Advisory Speed (W13-1P) plaque shall be installed below a Curve or Turn sign if the recommended safe speed for the curve or turn is less than the legal speed for the highway.

The safe speed on curves may be determined by making several trial runs through the curve in a car equipped with a ball-bank indicator in accordance with the following guidelines:

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a) Mount the ball-bank indicator transversely in the car at an orientation to give a "zero reading" when the car is level.

b) For the first trial run, drive the car in the center of the lane at a speed that is a multiple of 5 mph that provides a maximum ball-bank indicator reading less than the appropriate value in Exhibit 2-7~~Exhibit 2-7~~.

c) If necessary, make succeeding observations at higher 5 mph increments until the reading on the ball-bank indicator equals or exceeds the appropriate value in Exhibit 2-7~~Exhibit 2-7~~. The safe speed on the curve is the highest speed that does not exceed the appropriate value in Exhibit 2-7~~Exhibit 2-7~~ while consistently driving in the center of the travel lane.

d) On two-way roadways, conduct test runs in each direction of travel since the safe speed may be different for the different directions of travel.

e) When the advisory speed is less than the posted speed. If the difference between the advisory and the posted speed limit is 15 mph or greater, then a large single arrow W1-6 and/or chevron sign W1-8 must be installed.

Exhibit 2-7 Maximum Ball-Bank Indicator Readings

Speed (mph)	Ball–Bank Indicator (degrees)
20 or less	16
25 and 30	14
35 or more	12

Additional Signing and Delineation at Curves and Turns

In addition to the advance Curve or Turn sign discussed in the Section Curve and Turn Signs~~Curve and Turn Signs~~ and the section Advisory Speed Signs~~Advisory Speed Signs~~, additional signing and/or delineation of curves and turns should be considered if one or more of the following exists:

a) Crash lists indicate that there are “run-off-the road,” “hit-fixed-object,” or other curve-related crashes.

b) There is physical evidence of errant vehicles leaving the road in the form of shoulder rutting, guide rail damage, scars on adjacent trees, or other markings on the shoulder that appear to be made by vehicles.

c) The curve or turn is “hidden” from drivers and the roadway alignment is not evident such as a combination horizontal and an over-vertical curve, an overhead utility line that diverges from the highway, or other features that could mislead drivers.

d) Day or night test drives of the highway indicate that additional signing and/or delineation is required to adequately indicate the travel path for drivers.

The additional signing and/or delineation could consist of the Large Single Arrow (W1-6) sign, Chevron Alignment (W1-8) sign, or Flexible Delineator Posts. These devices also provide day and night target value, especially the Large Single Arrow and the Chevron Alignment signs. However, these devices should not generally be installed at a curve or turn unless an advance Curve or Turn sign exists. Exceptions are:

1. On a ramp where an Advisory Exit Speed (W13-2) or Ramp Speed (W13-3) sign exists.

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2. On a ramp, freeway, or expressway where delineators are required in accordance with the Traffic Control - Pavement Markings and Signing Standards TC-8600 and TC-8700 Series (Publication 111) and the *MUTCD*.
3. At locations identified in Paragraph (1) above, but the recommended safe speed for the curve or turn as determined by ball-bank readings is equal to or higher than the legal speed limit for the highway.

If it is determined that the installation of one or more of these devices is desirable, consider the following guidelines:

A. Large Single Arrow (W1-6) Sign. This sign should be considered for use on curves and turns that are relatively short in length. Normally curves and turns up to about 300 or 350 feet in length can be satisfactorily signed with one W1-6 sign in each direction. It is also possible to sign longer curves with a single W1-6 sign, but engineering judgment based on field conditions must be used in making this decision.

B. You may also consider the W1-6 sign for use on compound curves, reverse curves and turns, winding roads, and other locations where a severe change in alignment occurs.

C. Chevron Alignment (W1-8) Sign. Based on the results of a study in Virginia, "Evaluation of Curve Delineation Signs," published in Transportation Research Record 1010, consider this sign for curves or turns that are greater than 7 degrees. In addition, consider the W1-8 sign when:

- Standard delineation is in place, but there is still a high incidence of daytime and/or nighttime "run-off-the-road" crashes.
- Standard delineation does not, or would not, show the roadway alignment; e.g., combination horizontal and over vertical curve.

Do not use the W1-8 sign if a turn has inadequate length for proper spacing of the W1-8 sign.

When used, a minimum of two signs should always be visible. Do not install the first W1-8 sign before the P.C. and the last sign beyond the P.T. When applicable, W1-8 signs may be installed on back-to-back installations as described in the Sign Foreman's Manual (Publication 108).

When W1-8 signs are used, Exhibit 2-8~~Exhibit 2-8~~ shows recommended spacing based on three different methods in accordance with TTI Report FHWA/TX 04/0 4052 1, entitled *Simplifying Delineator and Chevron Applications for Horizontal Curves*.

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Exhibit 2-8 Suggested Spacing for W1-8 Signs

Method 1 Curve Radius (feet)	Method 2 Degree-of-Curve*	Method 3 Curve Advisory Speed (mph)*	Chevron Spacing (feet)
< 200	> 28.6	≤ 15	40
200 - 400	14.3 -28.6	20 - 30	80
401 - 700	8.2 – 14.2	35 - 45	120
701 – 1250	4.6 – 8.1	50 - 60	160
> 1250	< 4.6	> 60	200

* "Degree-of-Curve" (D) is the measurement, in degrees, of the change in alignment over a 100-foot section of roadway. The degree-of-curve can be calculated by the formula D=5729.6/radius.

A. Flexible Delineator Posts. Based on the results of the study in Virginia, these devices should be considered for use on curves that are less than or equal to 7 degrees. They may be considered for use on curves or turns which are greater than 7 degrees, when it has been determined that the W1-8 sign should not be used.

B. Combination of Signs and/or Delineation Devices. A combination of devices discussed above may be used to delineate a curve or turn (or combination of curves or turns), if a field review indicates the need for a combination of devices to adequately advise drivers of the roadway alignment.

Degree-of-Curve

If you do not know the degree-of-curve or the radius of a curve, you can estimate the degree-of-curve by two methods. First, you can take the total change in direction of the curve and divide by the length of the curve in hundreds of feet to calculate the degree-of-curve. For example, if you have a right angle (90 degree) curve that measures 1,000 feet from the beginning of the curve (P.C.) to the end of the curve (P.T.), the curve would be a 9-degree curve (i.e., 90/10 = 9). A compass that includes degrees and a distance-measuring instrument (DMI) are of value.

Although labor intensive, the second method involves stretching a 62-foot string between two points along the roadway's centerline or an edge ~~line, and~~line and measuring the distance from the center of the string to the line. This distance is the middle ordinate, and when measured in inches, it very closely approximates the "degree-of-curve" for curves with a degree-of-curve up to approximately a 45-degree curve (e.g., a 10-inch middle ordinate equals a 10-degree curve, a 20-inch middle ordinate equals a 20-degree curve, etc.). ~~Exhibit 2-9~~~~Exhibit 2-9~~ illustrates this method.

Other methods are available in other ~~text book~~textbook references if desired.

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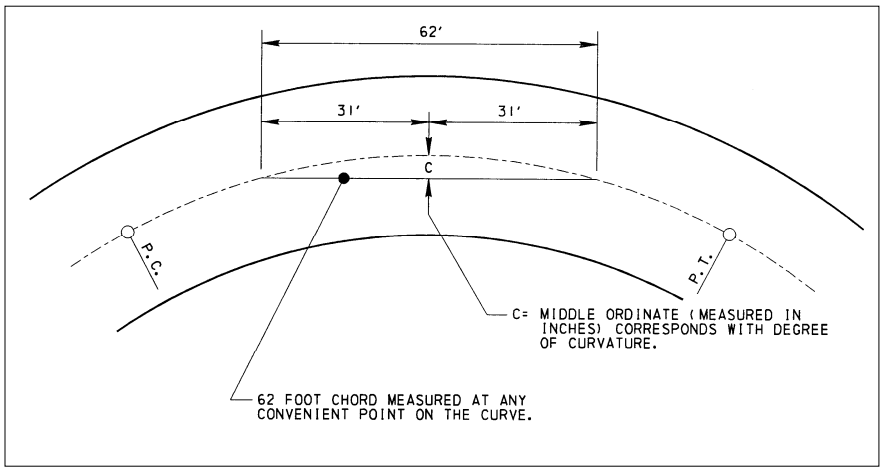
Exhibit 2-9 Estimating the Degree of Curve



Stop Ahead Signs

Stop Ahead (W3-1) signs should be installed in advance of STOP (R1-1) signs when one or more of the following exists:

a) Because of physical conditions, the R1-1 sign is not continuously visible for the required distance specified for the W3-1 sign in Publication 236.

b) Although the R1-1 sign is visible for the minimum distance in Publication 236, one of the following exists:

- A "running-the-stop-sign" crash experience exists.
- The view of the R1-1 sign is occasionally blocked by moving or stopped vehicles.
- The highway has a multi-lane, high-speed (45 mph or higher) approach to the R1-1 sign. (Note, if a divided highway and the median is wide enough, the STOP Sign and/or the Stop Ahead Signs should be installed on both sides of the roadway.)
- There is extensive environmental interference.

When used, install the Stop Ahead (W3-1) sign in advance of the R1-1 sign in accordance with the distance indicated in Condition B in ~~Exhibit 2-6~~Exhibit 2-6.

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~~Share the Road Sign~~

~~The Share-the-Road Sign (W16-101) is available for installation on appropriate State highways throughout the Commonwealth. The purpose of the sign is to promote cooperation, understanding, and mutual safety between motorists and bicyclists on roadways where sharing roadway space is required.~~

~~Requests for the W16-101 sign may come from any legitimate source, including the following internal or external sources:~~

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~~a) Department designers or consultants may independently suggest the installation of the signs as part of the project development process. In addition, Department personnel may suggest locations for the signs as a stand-alone project.~~

~~b) Non-department personnel may suggest locations for installation without solicitation from the Department. These suggestions may be included as part of a larger project or as a stand-alone project. Forums for this input may be District Bicycle/Pedestrian Advisory Committees, MPO/LDD Bicycle/Pedestrian Advisory Committees, or other sources. However, it is important to note that the Department will not provide signs to local municipalities for installation on local roads.~~

~~All requests for W16-101 signs on State highways should go to the District Bicycle/Pedestrian Coordinator for review. The criteria for road selection should include roads that possess any or all of the following:~~

- ~~Highways promoted as a cycling route by a local or state agency, or that demonstrate a need based on the traveling patterns of local cyclists or a car-bike crash history.~~
- ~~Prior to bottlenecks such as narrow bridges or underpasses, and short stretches of roads that lack paved shoulders.~~
- ~~On sections of highway that have numerous commercial driveways, such as in a cluster of suburban strip malls.~~
- ~~Sections of highway where lanes are greater than 14 feet wide and motorists may be tempted to travel two abreast and crowd cyclists off the road.~~
- ~~On narrow highways where cyclists can only proceed safely if, they use the full lane width.~~

~~If the Bicycle/Pedestrian Coordinator determines that a request is justified, counties may order W16-101 signs from the Sign Shop. If installed by the Department, the Department is responsible for maintenance of the signs.~~

Advance Street Name Signs

On multilane roads and roads with a speed limit greater than 35 mph, Districts are encouraged to use either the Single-Line Advance Street Name (W16-8P) or Double-Line Advance Street Name (W16-8AP) sign, with appropriate arrows, as necessary, below any of the following advance warning signs:

- Any W1-series sign with a side road.
- Cross Road (W2-1) sign.
- Offset Side Road (W2-7L, W2-7R) sign.
- Side Road (W2-2) sign.
- Double Side Road (W2-2D).
- 45º Side Road (W2-3L, W2-3R) sign.
- Curve – Side Road (W2-3-1L, W2-3-1R) sign.
- "T" Symbol (W2-4) sign.
- "Y" Symbol (W2-5) sign.
- "Y" Symbol Secondary (W2-5-1L, W2-5-1R) sign.
- Stop Ahead (W3-1) sign.
- Signal Ahead (W3-3) sign.

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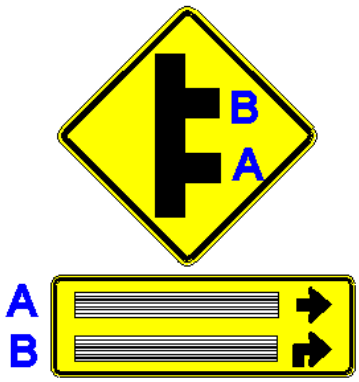
Note: The decision to erect the above-listed warning signs should be based on their justification in Publication 236, and not solely to facilitate the installation of Advance Street Name Signs. As an alternate, you may install the Single-Line Advance Street Name (D3-2) sign or the Double-Line Advance Street Name (D3-3) sign in lieu of the W16-8P or W16-8AP sign.

If a Double-Line Advance Street Name (W16-8AP) sign is installed below a Double Side Road (W2-8) sign, the order of destinations on the W16-8AP sign should correspond to the warning sign graphic as illustrated in ~~Exhibit 2-10~~Exhibit 2-10. Further, the advance turn style arrow must be used for the second street encountered.

Exhibit 2-10 Order of Destinations for Double Side Road Sign



2.6 Guide Signs and Route Markers

General

Guide signs are necessary to inform motorists of intersecting routes; to direct them to cities, towns, villages, or other important destinations; to identify nearby rivers, streams, parks, forests, and historical sites; and generally to give such information as will help them along their way in the most simple, direct manner possible.

Numbered traffic routes and directional signs facilitate travel by enabling motorists to reach their intended destination when using an accurate transportation map. Proper directional signing consists of Route Markers and Route Marker auxiliaries; Destination signs; Distance signs; and, where necessary, Advance Street Name signs.

Install Route Markers and Route Marker auxiliaries in sign assemblies to identify the numbered traffic route and provide additional guidance (such as general direction of the route and other information required to follow a designated numbered traffic route). Destination and Distance signs provide directions and distances to communities and points of interest that may be reached by following certain roads. Advance Street Name signs provide advance notice of the names of intersecting major streets and highways.

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Definitions

The following words and terms, when used in this policy shall have the following meanings, unless the context clearly indicates otherwise:

Advance Route Turn Assembly – An assembly consisting of a Cardinal Direction Marker and other Route Marker auxiliaries if needed, a Route Marker, and an Advance Turn Arrow.

Advance Street Name Sign – A sign used in advance of an intersection that displays the street or road names for the next cross or side ~~road, and~~road and may contain directional arrows as appropriate. The sign may be either:

- White legend on a green background and installed either separately or as a part of other destination signs (D1 Series) sign.
- Black legend on a yellow background (W16-8P or W16-8AP sign) installed below an intersection-related warning signs as discussed in the Section Advance Street Name Signs~~Advance Street Name Signs~~.

Advance Turn Arrow – A marker which displays a right or left arrow, the shaft of which is bent at a right angle or at a 45-degree angle. It is to be mounted below the Route Marker in Advance Route Turn Assemblies.

BUSINESS Marker – An M4-3P marker used to designate an alternate route that branches from a regular numbered route, passes through a business area, and rejoins the regularly numbered route beyond that area. If a Cardinal Direction Marker is used, it shall be mounted above the Business Marker.

BY-PASS Marker – An M4-2P marker used to designate a route that branches from the regular numbered route, bypasses a part of a city or congested area, and then rejoins the regular numbered route.

Cardinal Direction Marker – A marker with the legend EAST, WEST, NORTH, or SOUTH mounted above a route marker to indicate the general direction of the entire route.

Confirming or Reassurance Assembly – An assembly consisting of a Cardinal Direction Marker and a Route Marker which is placed along a numbered traffic route to reassure motorists that they are on their desired route.

Control city – These are major communities on or along a numbered traffic route that are familiar to a majority of drivers from either Pennsylvania or other states. These destinations must be shown on the Department's Official Transportation Map and should have a population of at least 10,000 or be a county seat. The control city may be in an adjacent State if there are no communities along the route in Pennsylvania that meet these minimum criteria. Control cities for Interstate highways are listed in Exhibit 2-19~~Exhibit 2-21~~.

Destination Sign – A sign with the names of communities, points of interest, or street or road names with appropriate distances and directional arrows, if required. Destination signs are D1-Series signs, typically D1-1 through D1-3 signs. If distances are included, they should be to the central business district, or if none, to the center of the community.

DETOUR Marker – An M4-8P marker used to designate a temporary route that branches from a regular numbered route, bypasses a section of a route that is closed or blocked by construction or traffic emergency, and rejoins the regular numbered route beyond that section. When used, the Detour Marker will always be mounted at the top of the assembly.

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Directional Arrow – A marker which displays a single-headed arrow pointing in the general direction (left, right, straight, 45 degrees left or right) that a route may be followed. The Directional Arrow should always be below the route marker in directional assemblies.

Directional Assembly – An assembly consisting of a Cardinal Direction Marker and other Route Marker auxiliaries if needed, a Route Marker, and a Directional Arrow.

Distance Sign – A sign carrying the names of not more than three communities or points of interest, and the distance (to the nearest mile) to those places. Distance signs are D2-Series signs, typically D2-1 through D2-3 signs.

END Marker – An M4-6P marker used to indicate that the numbered traffic route is ending. The marker should be mounted either directly above the Route Marker, or above a marker for an alternate route that is part of the designation of the route being terminated.

Junction Assembly – An assembly consisting of a Junction Marker and a Route Marker.

Junction Marker -- An M2-1P or M2-1P-1 marker with the abbreviated legend JCT mounted at the top of an assembly.

Minor terminal – Communities or nationally known points of interest, except control cities, that are served by the numbered traffic route. Minor terminals can be used to guide motorists and/or to provide supplemental information relative to the position of motorists along their intended travel route. These destinations must be shown on the Department's Official Transportation Map, and may include county seats and communities where there are junctions of major traffic routes.

Numbered traffic route – A highway that has been assigned an Interstate, United States, or Pennsylvania route number to aid motorists in their travels. Any changes to Interstate or United States numbered traffic routes require approval of the American Association of State Transportation Officials (AASHTO).

Route Marker – Markers used to identify and mark a numbered traffic route.

Route Marker Assembly – An assembly which consists of a Route Marker and Route Marker Auxiliaries which further identify the route and indicate direction. Assemblies for two or more routes, or for different directions on the same route, are normally mounted in groups on a common support.

Route Marker Auxiliaries – Supplemental signs used with Route Markers to provide additional information about the numbered traffic route. Route Marker Auxiliaries shall match the color combination of the respective marker which they supplement. Route Marker Auxiliaries include, but are not limited to, Junction Markers, Cardinal Direction Markers, BY-PASS Markers, BUSINESS Markers, TRUCK Markers, TO markers, END Markers, DETOUR Markers, Advance Turn Arrows, and Directional Arrows.

Special Road Facility Symbol – A route marker designating the Pennsylvania Turnpike, or any other Department-approved symbol marker designating routes.

TO Marker – An M4-5P, ~~or~~ M4-5P-1 or M4-5P-2 marker used to provide directional guidance to a particular road facility from other highways in the vicinity. When used, it is mounted at the top of an assembly.

Trailblazer Assembly – An assembly consisting of a TO Marker, a Cardinal Direction Marker if needed, a Route Marker or special road facility symbol, and a single-headed directional arrow pointed along the route leading to the road. This assembly provides directional guidance to a particular road from other highways in the vicinity.

TRUCK Marker – An M4-4P marker used to designate an alternate route for trucks that branches from a regular numbered route, bypasses an area which is congested or where height or weight limitations have been established, and rejoins the regularly numbered route beyond that area.

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Clearview Font

The *MUTCD* defers to the *Standard Highway Signs and Markings* (SHS) book for the design of letters, numerals, route shields, and spacing. However, Appendix A in the *MUTCD* allows for Series E(modified)-Alternate (Clearview font) to be used in place of Series E(modified) for the names of places, streets, and highways on freeway and expressway guide signs. ~~on September 2, 2004, FHWA issued interim approval for the optional use of the Clearview font for positive legends (i.e., white legend) on all guide signs. Research shows that the Clearview font generally improves the maximum nighttime sign legibility distance by approximately 12 percent for the same size sign. (See the interim approval at http://mutcd.fhwa.dot.gov/pdfs/ia_clearview_font.pdf.)~~

~~In accordance with the interim approval, FHWA will grant statewide interim approval to use the Clearview font for white legend on any guide sign to any highway agency that submits an appropriate written request. The Department obtained FHWA approval to use the Clearview font for not only the Department, but also for all local authorities within the Commonwealth.~~

~~Exhibit 2-11~~Exhibit 2-11 shows the transition from Series E-Modified ~~Highway Gothic fonts, as mentioned in the *MUTCD*, to Clear~~to Clearview font~~s~~.

Exhibit 2-11 Transitioning to the Clearview Font

SHS Standard Alphabet	Clearview "W" Series	Typical Abbreviation
~~Series B~~	~~Clearview 1-W~~	~~CV 1W~~
~~Series C~~	~~Clearview 2-W~~	~~CV 2W~~
~~Series D~~	~~Clearview 3-W~~	~~CV 3W~~
~~Series E~~	~~Clearview 4-W~~	~~CV 4W~~
Series E- Modified	Clearview 5-W & 5-W-R*	CV 5W & 5WR
~~Series F~~	~~Clearview 6-W~~	~~CV 6W~~

* Clearview 5-W-R has slightly tighter letter space than 5-W. The Department is using Clearview 5-W-R instead of 5-W for signs on existing supports that will not accommodate 5-W.

~~Studies indicate that upper/lower-case Clearview 3-W font has a legibility distance of about 29 percent greater than all capital letters using the Highway Gothic Series D font with the same size footprint. The *MUTCD* requires upper/lower-case legend for place names.~~

~~When designing signs with a Clearview font, it is important to note that the height of the lower-case legend is approximately 82 percent of the height of the upper-case legend. Consequently, you should ignore all references in the *MUTCD* indicating that lower-case letters are to be 75 percent of the height of the upper-case legend, or that the height of the upper-case letters are to be approximately 1.33 times the loop height of lower-case letters. Also, lower-case letters with top extenders, e.g., b, d, f, h, etc., extend about 8 percent above the top of the upper-case letters.~~

The spacing for the Clearview font is different from Highway ~~Gothic, but~~Gothic but calculated in the same manner as the current spacing charts included in Section 9 of FHWA's *Standard Highway Signs and Markings* book. Specifically, calculate the spacing by using a combination of a "right side bearing"

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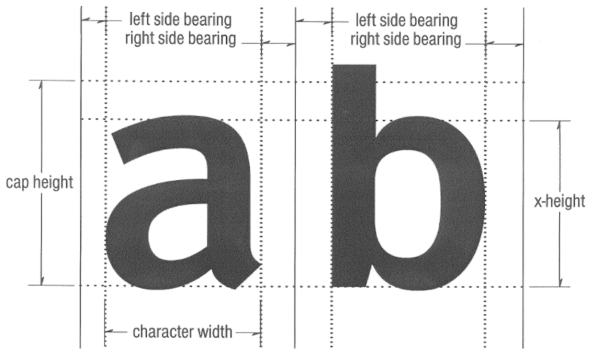
associated with the first of two letters and a "left side bearing" associated with the second letter as illustrated in ~~Exhibit 2-12~~Exhibit 2-12.

Exhibit 2-12 Inter-letter Spacing of Clearview Font



~~The normal letter and numerical height for guide signs on two-way, two-lane conventional roadways is 6CV 3W, and on four-lane undivided conventional roadways should be 8CV 3W, both of which previously were "D" series.~~

The Clearview font is a TrueType font and is compatible with PCs, sign design software, and sign makers.

Numbered Traffic Routes

Types of Traffic Routes

The main purpose of numbered traffic routes is to identify the best travel path between population centers and to indicate these "best paths" on the Official Transportation Map. There are three categories of numbered traffic routes: Interstate (I), United States (US), and Pennsylvania (PA).

All numbered traffic routes are established, eliminated, extended or relocated by the Secretary of Transportation or their designated representative. However, the American Association of State Highway and Transportation Officials (AASHTO) must also approve the establishment, elimination, or relocation of all Interstate and US numbered traffic routes.

Types of Auxiliary Classification

In addition to the regular numbered traffic route, the Department may assign the following additional auxiliary classifications to segments of US and PA traffic routes:

1. Business Routes. A business route is a route principally within the corporate limits of a larger municipality, usually traversing the central business district, which provides the traveling public an opportunity to travel through the business part of a municipality while the regular route does not pass through the congested part of the municipality. Business routes are often established on the old alignment of the regular route when the regular route is relocated around the municipality. The Business Route connects with the regular numbered route at the opposite sides of the municipality.
2. Truck Routes. A truck route is sometimes desirable to divert through truck traffic around the business or congested areas of larger municipalities when the regular route goes through such

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areas. Such truck routes not only help to facilitate the flow of passenger vehicles through the congested areas, but also help to reduce air and noise pollution, and assist truck drivers since they can frequently minimize their delays. In addition, truck routes may sometime be required to avoid locations that have insufficient vertical or horizontal clearances for trucks, or bridges or highways with weight restrictions.

3. By-Pass Routes. A by-pass traffic route classification is sometimes assigned to a new roadway that bypasses a congested urban area. However, this classification generally confuses the through drivers since they are forced to make a decision between the regular numbered route and the by-pass. Moreover, most unfamiliar drivers are reluctant to leave a regular numbered route to follow a by-pass route. For these reasons, it is generally better to relocate the regular numbered traffic route to the new alignment and, if necessary, assign a business designation or a new traffic route number to the old alignment. The by-pass route connects with the regular numbered route at the opposite sides of the community.
4. Alternate Routes. Alternate traffic routes provide a route that parallels the regular route and sometimes offers advantages as a scenic view. However, because the unfamiliar drivers do not know whether the regular numbered routes or the alternate route is the best route, avoid using this designation whenever possible.

Establishment, Elimination, or Revision of Any Numbered Traffic Route

Public Relations

Review proposed traffic route changes with county planning agencies, municipal officials and the local chambers of commerce, particularly in urban areas and other locations where businesses use the numbered traffic route in their advertising or as an address. This will not only facilitate good public relations but will provide advance information to businesses so that they can plan and implement any required changes in their advertising and/or address.

General Guidelines

To be of maximum benefit to the public, all numbered traffic routes must either be continuous across the ~~Commonwealth, or~~Commonwealth or must end at another numbered traffic routes. All numbered traffic routes should also be continuous, that is, they should not stop and restart at a subsequent location.

Engineering Districts should work with adjoining states to attempt to extend Pennsylvania's numbered traffic routes into their state and vice versa, and to keep the same number whenever possible.

District Requests

In order to facilitate the approval of a traffic route change (establishment, elimination, or revision), the Engineering District must submit the following to the Central Office:

1. A request similar to the example in the Chapter 2 Appendix~~Chapter 2 Appendix~~. This request would include a brief justification and a tentative date for the implementation of the proposed change.

   This request should also provide a route description for those portions of highway where a proposed elimination or relocation would occur:

   - Provide the route description from south to north, or west to east for two and three-lane two-way conventional roads. For one-way roadways and all roadways with four or more

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lanes, provide the description in both directions of travel. Use the format shown in the Chapter 2 Appendix~~Chapter 2 Appendix~~ to request a change.

- Use the currently assigned SRs and segments. If the SR numbers and/or segments are to be changed, coordinate all efforts through the District RMS Coordinator and the Roadway Management Division of the Bureau of Operations (BOO).

2. One copy of a reproducible map or sketch indicating the proposed establishment and/or elimination. As an alternate to the reproducible map or sketch, provide a minimum of nine color-coded copies of a map. It is desirable to have all control points (transition points from one SR to another - or other official identification data if not an SR, beginning and end points, etc.) identified by SR Number, segment and offset (or other identification data if not a State Route).
3. A listing of all physical limitations of the proposed establishment or relocation, similar to the example in the Chapter 2 Appendix~~Chapter 2 Appendix~~.
4. The local authority must complete three original agreements (see the Chapter 2 Appendix~~Chapter 2 Appendix~~) between the local authority and the Department for the establishment of all proposed traffic routes over a local road. A copy of a resolution designating signature authority (see the Chapter 2 Appendix~~Chapter 2 Appendix~~) must also be attached to each agreement.

Requests to Change US and Interstate Routes

In addition to the items listed above, approvals for the establishment, elimination or revision of Interstate, US, and US Bicycle numbered traffic routes comes under the jurisdiction of AASHTO's "Special Committee on U.S. Route Numbering." Although all changes technically come under their control, the Department is only seeking their approval when the change involves any of the following:

1. Another state.
2. The relocation of the junction with another Interstate or US numbered route.
3. The beginning or ending location of the route.
4. The length of the route changes by more than 0.5 mile.

If any of the above applies, the Engineering District needs to provide an electronic copy of the AASHTO application for their "Special Committee on U.S. Route Numbering" to the Central Office

The homepage for AASHTO's "Special Committee on U.S. Route Numbering" is at Special Committee on U.S. Route Numbering - Home ~~http://cms.transportation.org/?siteid=68&pageid=1538~~. ~~This site includes the committee's *"United States Numbered Highways"* book, which in turn includes their established policies and a route-by-route description of all US numbered traffic routes.~~ This homepage ~~also~~ includes a link for the ~~application~~application to make changes in an Interstate Route, US Route, or US Bike Route.

Route Marker Assemblies

General

Erect Route Marker Assemblies along numbered traffic routes on all approaches to the intersection of other numbered traffic ~~routes, and~~routes and may be erected on the approaches to numbered routes on unnumbered major State highways.

Where two or more numbered traffic routes follow the same section of highway, the Route Markers for Interstate, U.S., or Pennsylvania routes shall be mounted in that order from the left in horizontal

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arrangements and from the top in vertical arrangements. Moreover, within these three types of routes, Route Markers for lower-numbered routes shall be above or to the left of the higher-numbered routes.

Within groups of assemblies, information for routes intersecting from the left shall be to the left in horizontal arrangements and at the center of vertical arrangements. Similarly, information for routes intersecting from the right shall be at the right or bottom, and for straight-through routes at the center or top.

Junction Assembly

Erect the Junction Assembly along numbered traffic routes in advance of every intersection where another numbered traffic route intersects or joins the route being traveled. The Junction Assembly may also be installed along major unnumbered State highways in advance of their intersection or junction with a numbered traffic route. The route marker shall carry the number of the intersected or joined route. Where two or more routes are to be indicated, one Junction Marker can be used for the assembly and the route markers grouped in a single mounting.

Examples of Junction Assemblies are shown in Figure 2~~.~~D-~~86~~ in the *MUTCD*.

Advance Route Turn Assembly

An Advance Route Turn Assembly shall be installed on numbered traffic routes in advance of an intersection where a turn must be made to remain on the indicated route or to follow an intersecting route. The Advance Route Turn Assembly on numbered traffic route approaches may be omitted when either of the following conditions exists:

a) All traffic on the approach must stop at a stop sign, and the approach is a single lane, without separate turning lanes.

b) There is inadequate longitudinal space or other physical reasons why the assembly cannot be installed.

On multilane highway approaches to an interchange or intersection, an Advance Route Turn Assembly is essential so that drivers may position their vehicles in the correct lane to follow the desired numbered traffic route. An assembly which contains an Advance Turn Arrow should not be placed where there is an intersection (or major driveway which looks like a street or roadway) between the sign assembly and the designated turn. Sufficient distance should be allowed between the assembly and any preceding intersection (or major driveway which looks like a street or roadway) that could be mistaken for the indicated turn. Where two or more routes turn, the signing may be installed as a group on a common support.

Examples of Advance Route Turn Assemblies are shown in Figure 2D-~~86~~ in the *MUTCD*.

Directional Assembly

A Directional Assembly shall be installed on numbered traffic routes at all intersections where a turn must be made to remain on a route, to follow an intersecting route, or to indicate a straight-ahead movement to follow an intersecting route. Uses of Directional Assemblies are:

- Straight-through movements of a numbered traffic route should be indicated by a Directional Assembly with a Route Marker displaying the number of the continuing route, a Cardinal Direction Marker, and a vertical arrow. A Directional Assembly should not be used for a straight-through movement in the absence of other assemblies indicating right or left turns, as the Confirming Marker beyond the intersection normally provides adequate guidance.

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- Turn movements (as indicated by an Advance Route Turn Assembly) shall be marked by a Directional Assembly with a Route Marker displaying the number of the intersected or continuing route, a Cardinal Direction Marker, and a single-headed arrow pointing in the direction of the turn.
- The beginning of a route (as indicated in advance by a Junction Assembly) shall be marked by a Directional Assembly with a Route Marker displaying the number of that route, a Cardinal Direction Marker, and a single-headed arrow pointed in the direction of the turn.
- The end of a route shall be marked by a directional assembly with an END Marker and a Route Marker displaying the number of the route.
- An intersecting route (as indicated in advance by a Junction Assembly) shall be marked by one or two Directional Assemblies (one if one direction or two if two directions), each with a Route Marker displaying the number of the intersected route, a Cardinal Direction Marker, and a single-headed arrow pointed in the direction of movement on that route.

Examples of Directional Assemblies are shown in Figure 2D-~~8~~6 of the *MUTCD*, and recommended locations for directional assemblies are as follows:

a) Directional Assemblies should be located on the near right-hand corner of the intersection.

b) At major intersections and at Y or offset intersections, it is often desirable to install additional assemblies on the far right-hand or left-hand corner to confirm the near-side assemblies.

c) When the near right-hand corner position is not practical for Directional Assemblies, the far right-hand corner is the preferred alternative, with oversize signs if necessary for legibility.

d) If cross traffic interferes with the visibility of a Directional Assembly, place the assembly where it can be read at close range as determined by engineering judgment.

Additional Route and Destination Guidance Signs

Confirmation Assemblies

The Confirmation Assembly shall be installed just beyond intersections of numbered traffic routes and should be installed beyond other major intersecting streets or highways. Care should be taken to erect the Confirmation Assembly where it is highly visible to drivers. Examples of confirmation assemblies are shown in each example in Figure 2D-~~8~~6 of the *MUTCD*.

Trailblazer Assemblies

Trailblazer Assemblies are located at strategic locations to indicate the direction to the nearest or most convenient point of access to a specific numbered traffic route or other special road facility. Trailblazer Assemblies indicate that the road or street where it is posted is not a part of the indicated route, but that the driver is merely being directed progressively to the route.

When a Trailblazer to a highway facility is installed, it is essential that, from that point, additional trailblazers or other appropriate directional signing, consistent with this policy, be provided at other key downstream locations en route to that highway facility.

Trailblazer Assemblies may be erected with other route marker assemblies, or alone, in the immediate vicinity of designated facilities. In addition, Trailblazer Assemblies may be used to guide drivers to a freeway on-ramp from a partial interchange where access to both directions of the freeway is not available.

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Destination Signs

Destination Signs may be installed at, or in advance of, intersections to direct motorists to cities, boroughs, towns, villages, or other important destinations. These signs normally carry the names of two or three major terminal destinations – one straight ahead along the route and one in each direction along the intersecting roadway. The destination that is straight ahead is optional; however, if used, it is the first name on the sign, the destination to the left is second, and the destination to the right is on the bottom. (More than one destination may be shown to the left or right; however, the maximum number of destinations on a sign should not exceed three.)

If there is more than one destination shown in any direction, the name of the nearest destination shall appear above that of any further away. In the case of overlapping routes, only one destination in each direction should be shown for each route.

The distance to a destination, in the nearest number of whole miles, may also be shown on the destination sign. Distances should be measured to the center of the destination.

If adequate longitudinal space does not exist for proper spacing of all sign assemblies, the destination sign may be installed on the same posts with the advance route turn or directional assemblies.

Examples of destination signs are shown in Figure 2D-~~8~~6 of the *MUTCD*.

Distance Signs

Distance signs should be installed on all numbered traffic routes leaving a city, borough, or town and beyond intersections of numbered traffic routes in rural areas. These signs normally carry the names of two or three destination points. The top name should be that of the next place along the route having a post office, railroad station, route number or the name of an intersected highway, or other significant geographical identity that is shown on the Department's Official Transportation Map. The lowermost name should be the next control city along the route. If three destinations are shown, the middle line should be a minor terminal prior to the control city. If more than one minor terminal exists prior to the control city, the name on the middle line may be varied on successive distance signs.

The control city should remain the same on all successive signs throughout the length of the route until that destination is reached. An exception to this is when the route divides at some distance ahead to serve two control cities of similar importance. If the two destinations cannot appear on the same sign, the names of the two control cities may be alternated on succeeding signs. On the route continuing into another State, destination(s) in the adjacent State should be shown.

Examples of distance signs are shown in Figure 2D-~~8~~6 of the *MUTCD*.

Advance Street Name Signs

Advance Street Name (D3-2, D3-3) signs are encouraged on numbered traffic routes when the speed limit is greater than 35 mph, and the roadway has two or more through travel lanes in each direction.

If an Intersection Series warning sign, or a Stop Ahead (W3-1) or Signal Ahead (W3-3) sign is used in advance of the intersection, the preferred scenario is to use a Single-Line Advance Street Name (W16-8P) or Double-Line Advance Street Name (W16-8AP) sign below the warning sign as discussed in the Section Advance Street Name Signs~~Advance Street Name Signs~~ instead of installing an independently-mounted D3-series sign.

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Longitudinal Placement

The guidelines shown in ~~Exhibit 2-13~~ should be considered when locating Route Marker Assemblies, Destination Signs, Distance Signs, and Advance Street Name Signs in the field, since the exact longitudinal placement of these signs cannot be firmly established. It is more important that these signs be readable at the right time and place than to be located with absolute uniformity.

Typical installations of numbered traffic route signing are shown in the three drawings in Figure 2D-~~8~~6 of the *MUTCD.*

Route Marker Assemblies, including the Route Marker and all auxiliary signs, are treated as a single sign for vertical clearance purposes.

Exhibit 2-13 Longitudinal Placement

- You may adjust the distances shown below to accommodate actual field conditions and to obtain proper spacing between signs.
- When installing more than one sign or sign assembly, the minimum desirable distance between sign installations should be 200 feet in rural areas and 150 feet in urban areas.
- When the speed limit or prevailing speeds are above 45 mph, greater distances from the intersection and greater spacing between sign installations are desirable.

Sign or Sign Assembly	Urban Area	Rural Area
Junction Assembly	• In block before intersection.	• Not less than 400 feet in advance of intersection.
Advance Route Turn Assembly	• Approximately 300 feet in advance of intersection. • May omit when all traffic on the approach must stop at a stop sign, and the approach is a single lane, without separate turning lanes. • May omit because of inadequate longitudinal space or other physical reasons.	• Not less than 400 feet in advance of intersection. • May omit when all traffic on the approach must stop at a stop sign, and the approach is a single lane, without separate turning lanes. • May omit because of inadequate longitudinal space or other physical reasons.
Destination Sign	• Not less than 150 feet in advance of intersection. • At the intersection on a one-lane approach where all traffic must stop at stop sign. • May combine with advance route turn or directional assemblies if space is limited.	• Not less than 200 feet in advance of intersection. • At the intersection on a one-lane approach where all traffic must stop at stop sign. • May combine with advance route turn or directional assemblies if space is limited.

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Sign or Sign Assembly	Urban Area	Rural Area
Directional Assembly	• Near right-hand corner of intersection. • Alternate location may be far right-hand corner or most suitable location based on engineering judgment.	• Near right-hand corner of intersection. • Alternate location may be far right-hand corner or most suitable location based on engineering judgment.
Confirming Assembly	• Normally no more than 100 feet beyond the far shoulder or curb line of all intersection numbered traffic routes and major intersecting streets or highways. • Beyond the built-up area of any city, borough, or town. • Should be installed at intervals approximately one-half mile apart.	• Normally no more than 300 feet beyond the far shoulder or curb line of all intersection numbered traffic routes and major intersection streets or highways. • Beyond the built-up area of any city, borough, or town. • Should install at intervals approximately 2 miles apart in built-up areas. • May install at intervals of approximately 5 miles in areas with little or no development and only minor intersections.
Distance Sign	• Approximately 500 feet outside the limits of a city, borough, or town, or at the edge of the built-up area if this area extends beyond the corporate limits. • Where overlapping routes separate a short distance from the corporate limits, the distance sign at the corporate limits may be omitted, and instead should be erected approximately 300 feet beyond the separation of the two routes. • May be combined with confirming assembly if space is limited.	• Approximately 300 feet beyond the far shoulder or curb line of all intersecting numbered traffic routes when these numbered routes are more than one mile apart. • May combine with confirming assembly if space is limited.
Intersection-Related Warning Signs (W2 Series, W3-1, & W3-3)	• As specified in Table 2C-~~3~~4 of *MUTCD*. • Erection shall be based on engineering justification, and they shall not be installed solely for the purpose of facilitating advance street name signing. • Normally, do not W2 Series signs when junction or advance route turn assemblies are present.	
Advance Street Name Sign	• When mounted with warning sign, see intersection-related warning sign category above. • When mounted alone, see destination sign category above.	

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2.7 Tourist Oriented Directional Signs (TODS) Policy

Purpose, Authority, and Authorization

Purpose

The purpose of this policy is to establish guidelines for the installation of Tourist Oriented Directional Signs (TODS) within State highway right-of-way to guide travelers to businesses, services, and Participants in which the traveling public would have reasonable interest. These guidelines include the eligibility, location, design, installation, cost, and maintenance of these signs.

Authority

The provisions of this chapter are promulgated under 75 Pa.C.S. §6125(d).

Authorization

Only Department Pennsylvania Tourism Signing Trust (PTST) approved TODS may be installed within the State highway right-of-way. However, the authorization of TODS is not an endorsement of the applicant's facilities.

Definitions

The following words and terms, when used in this policy, have the following meanings, unless the context clearly indicates otherwise:

Administering Agent – Pennsylvania Tourism Signing Trust

Agreement – The document of agreement between the Participants in the Program and the Administering Agent, setting forth the terms and conditions of participation in the Program.

Conventional Road – Any free-access public highway other than a Freeway or Expressway.

Department – The Pennsylvania Department of Transportation.

Expressway – A divided arterial highway for through traffic with partial control of access and with interchanges at junctions with high-volume highways. For purposes of this policy, sections of Expressway with at-grade intersections will be considered as a "Conventional Road," and sections of Expressway with interchanges will be considered as "Freeway."

Freeway – A divided highway with full control of access to which the only means of ingress and egress is by interchange ramps.

General Public – The people of society who are not members of a particular organization or who do not belong to a particular group.

Local Authorities – County, municipal and other local boards or bodies having authority to enact laws relating to traffic. The term also includes airport authorities, except where those authorities are located within counties of the first class or counties of the second class.

Official Traffic Control Devices – Signs, signals, markings, and devices consistent with 75 Pa.C.S. (relating to Vehicle Code) and Department regulations, placed or erected by authority of a public body or official having jurisdiction for the purpose of regulating, warning or guiding traffic.

On-Premise Sign – A sign which is erected upon the same real property that the business, facility or point of interest is located. The signs shall only advertise the business, facility or point of interest located thereon.

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Participant – An eligible business entity that is issued a contract by the Administering Agent for TODS.

PennDOT – Pennsylvania Department of Transportation.

Rural Area – Any geographic area which is not included in an Urban Area on the Department's County Functional Classification Maps.

Rural Conventional Road– Any public Conventional Highway in a Rural Area.

Seasonal Business – Any business which is not operated on a year-round basis.

Secretary – The Secretary of Transportation.

Signing District – A geographical area for which a governmental sponsor has entered into an Agreement with the Department to coordinate, provide, install and maintain all signing authorized by and in conformance with this policy after approval by the Department, without bias to any businesses and at no cost to the Department.

Supplemental Guide Sign - A sign used to provide information regarding destinations and attractions accessible from an interchange other than places displayed on the standard interchange signing.

Tourist Oriented Directional Signs (TODS) – A 72"x24" or 48"x16" directional sign (D7-4) with white legend on blue or brown background that indicates the name of, and gives directional guidance to the Participant's location. These signs are located for individual Participant(s), following PennDOT's TODS Signing Policy, and are not part of a larger signing system.

TODS Assembly – A single TODS installation consisting of sign posts, anchor posts, and a maximum of three individual TODS.

Urban Area – Any geographic area with a population of 5,000 or more inhabitants, with boundaries fixed by State and local officials in cooperation with each other, approved by the Secretary, and designated as an Urban Area on the Department's County Functional Classification Maps.

Urban Conventional Road– Any public conventional highway in an Urban Area.

General Eligibility Requirements

General

The Participant shall be open to all persons regardless of race, color, religion, ancestry, national origin, sex, age or handicap; be maintained in good repair; and comply with all Federal, State and local regulations and statutes for public accommodations concerning health, sanitation and safety. Pursuant to federal regulations promulgated under the authority of The Americans with Disabilities Act, 28 C.F.R. §35.101, et seq., the Participant understands and agrees that no individual with a disability shall, on the basis of the disability, be excluded from the Participant.

Distance to Services

Except as otherwise provided in this policy, on all Conventional Roads, the maximum distance from the intersection for which Participants can be trail blazed and qualify for TODS shall be 5.0 miles.

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Local Ordinance

As a matter of policy in deference to local governments for this program, TODS shall not be installed when prohibited by local ordinance.

Admission Charges

If a general admission is charged, it shall be collected upon entry and any other charges shall be clearly displayed, at the place of entry.

Annual Attendance

There is no minimum annual attendance requirement. No Participant shall be excluded from the TODS Program based on attendance.

Hours of Operation

Participants other than arenas, schools, colleges/universities, campgrounds, cultural centers, fairgrounds, farm markets, religious sites, roadside farm markets, and military bases shall maintain regular hours and schedules and be open to the General Public at least 6 days each week for at least 30 days per calendar year. In addition, farm markets and roadside farm markets shall maintain regular hours and schedules and be open to the General Public at least 2 days each week during the normal business season.

Other Signs

TODS will not be authorized if an illegal advertising sign exists along any State highway for that specific business, or if a legal advertising sign exists on the same highway approach as the request for a TODS. In addition, if the Participant has in place any other Department-approved signing, additional signing or redundant signing will not be authorized on the same highway approach.

Sufficient Space

Space must exist to install signs at all locations along the route to the Participant where a turn is required.

On-Premise Sign

The Participant shall have an On-Premise Sign identifying the name of the facility. If the facility or its on-premise signing is readily visible from the highway, a TODS shall not be placed immediately in advance of the business.

Parking Accommodations

The Participant shall have adequate on-premise or available on-street parking for patrons.

Road System

The location of the Participant shall not require motorists to perform any illegal movements or U-turns, and the roads shall be capable of handling the anticipated traffic volume and types of traffic. Motorists shall be able to readily return to the highway and proceed in the original direction of travel after visiting the Participant. This may result in the Participant being required to install signing to guide the motorist to their original direction of travel.

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Route Continuity

TODS will be installed in advance of all necessary turns subsequent to the initial TODS installation. If a TODS is required on a local roadway between a State highway and the Participant, the Local Authorities must authorize the installation of the TODS on their roadway prior to the installation of TODS on any State highway that would direct motorists to that local roadway. The Pennsylvania Tourism Signing Trust will be responsible for the physical installation of the TODS after authorization by the Local Authorities.

Additional Eligibility Requirements

General

Additional eligibility requirements may apply depending on the type of highway and the type of area where the TODS are to be installed. The requirements are less restrictive for TODS installed along rural Conventional Roads than for TODS installed along Urban Conventional Roads.

Local Approval

TODS may be authorized along any Conventional Road either urban or rural for eligible types of Participants as defined below, which meet the general eligibility requirements, and are approved by the local municipalities within which the TODS are to be located. Local approval is required as a matter of policy in deference to local governments for this program. The approval of the Local Authorities is not required for a TODS installed to direct motorists to Participants operated by State or Federal agencies or TODS which trailblaze a Participant in the Logo program.

Eligible Types of Participants

Any facility meeting the requirements of the definitions listed below

(a) Commercial

Amusement Park: A permanent facility that may include structures and buildings, where there are multiple devices for entertainment, including rides, booths for the conduct of games and buildings for shows.

Brewery : A licensed site which shall be open to the General Public for tours, tasting and sales, a minimum of 1,500 hours per year, on-site brewing and provide an educational format for informing visitors about beer and beer processing.

Caverns and Other Unique Natural Areas: A naturally occurring area or site of interest to the General Public. May include caverns, waterfalls, caves, or special rock formations.

Commerce Park: A group of small business facilities, at least 25 acres in size, recognized and signed as a commerce park by Local Authorities.

Distillery: A licensed site which shall be open to the General Public for tours, tasting and sales, a minimum of 1,500 hours per year, on-site distillation and provide an educational format for informing visitors about liquor and liquor processing.

Drive-In Theatre: An outdoor facility for the public showing of movies projected onto at least one large screen for viewing by patrons from their vehicles. Facility shall operate at least 30 days per year, have a concession area open during show times and provide restrooms with running water and flush toilets.

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Facility Tour: A facility such as a plant, factory or institution which conducts daily or weekly tours for the General Public on a regularly scheduled basis year round.

Gaming Entity: A facility licensed under Act 71-2004, Amending Title 4 (Amusements) Pa C.S. which authorizes certain gaming sites.

Off-Track Betting Facility: A facility which provides off-premise wagering as authorized by Act 1988-127.

Racetracks and Speedways: A permanent facility used for the primary purpose of presenting organized animal or vehicle racing events.

Roadside Farm Market: A stationary retail sales establishment operated by one or more farmers for the purpose of selling farm and food products directly to consumers. Operations by which the consumer harvests their own farm or food products shall be considered roadside farm markets. Roadside farm markets shall be open at least two days per week throughout the harvest season or year. On-premise or legal on-street parking shall be available.

Specialty Shop District:

Antique/Craft/Flea Market: An establishment or group of establishments comprised of shops/vendors that specialize in the sale of antiques, crafts, or flea market items. A group of 1 to 5 such establishments must have at least 2,400 square feet of cumulative retail space.

Shopping Center: A group of 30 or more retail stores in a traditional shopping center or mall.

Specialty Shops: A group of 5 or more specialty shops/vendors that offer goods or services of unique interest to tourists or whose structures have a prevalent architectural style of interest to tourists and which derives a major portion of its income during normal business season from motorists that do not reside in the immediate area as recommended by the Tourist Promotion Agency. The goods or services shall be readily available to tourists without the need for scheduling appointments or return visits.

Town Shopping Area: An area in a town or village, that includes 5 or more retail shops including at least one specialty shop and includes other public service facilities or destinations such as libraries, museums, courthouses, etc. The area should have prevalent architectural style of interest to tourists, or must be recommended by the local Tourist Promotion Agency as being representative of the tourism theme of the region.

Winery: A licensed site which produces a maximum of 200,000 gallons of wine per year. Sites shall maintain a minimum of 5~~3,0~~00 vines or 5 acres of vineyard in the Commonwealth.; be open to the General Public for tours, tasting, and sales, a minimum of 1,500 hours per year, and provide an educational format for informing visitors about wine and wine ~~tasting~~processing.

Zoos, Zoological Gardens and Animal Parks: A place where animals are kept, often in combination of indoor and outdoor spaces. Must have facilities which are open to the General Public.

(b) Cultural/Institutional

Arena: A stadium, expo center, sports complex, auditorium, convention center, civic center or racetrack, which has a seating capacity of at least 5,000.

Business District: An area within a city or borough which is officially designated as a business district by the local officials.

CareerLink Center: A facility operated under the direction of the Pennsylvania Department of Labor and Industry for providing career services.

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College or University: An institution which is approved by a nationally-recognized accreditation agency and which grants degrees.

Courthouse/Government Buildings: A public building , structure, or complex used by a Federal, County, State or municipal government for the purpose of convening official legal activities, excluding district magistrate offices.

Fairground: A commercially-operated tract of land where fairs or exhibitions are held, and which has permanent buildings included but not limited to livestock exhibition pens, exhibition halls, bandstands, etc.

Library: A repository for literary and artistic materials, such as books, periodicals, newspapers, recordings, films, and electronic media, kept and systemically arranged for use and reference.

Military Base: A facility operated by the State or federal government for training or support of military troops, or for inventorying and warehousing military equipment.

Museum: A facility that cares for and exhibits works of artistic, cultural, or scientific value that are cared for and exhibited to the General Public.

Observatory: A facility designed and equipped for making observations of astronomical, meteorological, or other natural phenomena.

Religious Site: A shrine, grotto or similar type site, which is of a unique religious nature. Facilities whose sole purpose is to host routine worship services are not eligible.

School: Any facility for education wherein a resident of the Commonwealth can legally fulfill compulsory school requirements for any one or more grades, including kindergarten through grade 12.

Theaters and Performing Arts Centers: A facility for the performing arts, exhibits, or concerts, which has a minimum occupancy capacity of 150 people.

(c) Historical/Architectural

Historical Site: A designated National Historic Site or a structure or place of historical, archaeological or architectural significance listed on or eligible for listing on the National Register of Historic Places maintained by the US Department of Interior or otherwise designated by the Pennsylvania Historical and Museum Commission (PHMC), or a County Historical Commission or Agency. The site must be accessible to the General Public and provide a place where visitors can obtain information about the historic site.

Historic Sites may include the following types, provided they meet the above criteria:

- Encampments and Battlefields
- Forts
- Houses
- Commercial Buildings
- Farms, Farmsteads, and Barns
- Religious Sites, Places of Worship, Cemeteries, and Monuments
- Mills and Factories
- Furnaces
- Coal Mines and Coke Ovens

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- Bridges
- Tollhouses
- Canals
- Railroad Stations
- Cemeteries

Historic District: A district or zone listed on or eligible for listing on the National Register of Historic Places maintained by the U.S. Department of Interior or otherwise designated by the Pennsylvania Historical and Museum Commission (PHMC), or a County Historical Commission or Agency. Historic districts shall provide the General Public with a single, central location such as a self-service kiosk or welcome center, where visitors can obtain information concerning the historic district.

Historic Districts may include the following types, provided they meet the above criteria:

- Historic Residential Streets
- Shopping Streets and Districts
- Court Houses and Public Buildings
- Railroad lines
- Canals

(d) Recreational

Boat Launch: A facility open to the General Public for docking or launching boats.

Campground: A facility with continuous operation for at least 6 months per year and a minimum of 20 overnight sites. An attendant shall be available during the hours of operation and restrooms with showers, running water and flush toilets shall be available. Accommodations sold on annual or time-sharing basis or otherwise not available for General Public use will not be counted toward the minimum requirements.

Canoeing and Rafting: Areas open to the General Public with established canoeing and rafting facilities.

Golf course: A facility opens to the General Public and offering at least nine (9) holes of play. Miniature golf courses, driving ranges, chip and putt courses, and indoor golf shall also be eligible.

Hiking and Biking Trails/Routes: Areas designated for recreational hiking, biking, walking, etc. which are publicly accessible, and owned and maintained by either the Local or County government or Pennsylvania Department of Conservation and Natural Resources (DCNR), or non-profit organizations. TODS will only be installed at locations that direct the motorist to an established trail head with parking facilities.

Horseback Riding Areas: Areas designated for horseback /ponyback riding for the General Public.

Hunting and Fishing Areas: Areas so designated and under jurisdiction of the Pennsylvania Game Commission or the Pennsylvania Fish and Boat Commission.

State and National Park, Recreation Area, Forest: An area so designated and under the jurisdiction of DCNR, Pennsylvania Historical and Museum Commission (PHMC), National Park Service, U.S. Department of Interior, County Government, or non-profit organization with facilities open to the General Public.

Ski Area: A downhill skiing area with equipment rentals, or a cross country ski area with equipment rentals and a minimum of 5 miles of marked and groomed trails.

Snowmobile Trails and Winter Sports Areas (excluding Ski Areas): Areas with marked snowmobile trails, ice skating rinks, snowboarding, sleigh rides, and toboggan runs, which are open to the General Public. TODS will only be installed at locations that direct the motorist to an established trail head with parking facilities.

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Sports Facilities: Regional (multi-jurisdictional) facilities such as minor league and little league baseball fields, and school recreational fields.

Water Skiing: Areas designated for water skiing, jet skiing, or motorboats.

(e) Tourist Services

Bed and Breakfasts: A private residence located in a Rural Area that contains ten (10) or fewer bedrooms used for providing overnight accommodations to the General Public, and which breakfast is the only meal served and is included in the charge for the room. Must be rated in accordance with national or state standards for bed and breakfasts; rating may be performed by the local Tourist Promotion Agency.

Country Inn: A facility located in a Rural Area that contains 25 or fewer rooms for providing overnight lodging accommodations to the General Public, and that at a minimum provides full service dining for morning and evening meals. Must be rated in accordance with a national or state standards for country inns; rating may be performed by the local Tourist Promotion Agency.

Historic Hotel: A facility which must be located within a building that is at least 50 years of age. And be listed on or eligible for listing on the National Register of Historic Places, or which is recognized by State, National or a County Historical Society as having historical significance; and currently holds itself out by any means, including advertising, license, registration with any innkeepers' group, convention listing association, travel publication or similar association or with any government agency, as being available to provide overnight lodging or use of facility space for considerations to persons seeking temporary accommodations.

Hospital : An institution providing primary health services and medical or surgical care to persons, primarily inpatients, suffering from illness, disease, injury, deformity and other abnormal physical or mental conditions. The facility must have 24-hour emergency care with a doctor on duty at all times

Resort: A facility with at least 75 rooms and those recreational amenities normally present at a resort, and which is the main focal point of a vacation.

Regional Restaurant: An establishment in a Rural Area where food and drink are prepared, served and consumed on premise and provided by full-table service. The facility must provide a minimum of twenty~~eighty~~ (2~~8~~0) indoor seats. Must be a local operation uniquely associated to the region. Drive -through only establishments and franchised or corporate-owned chain restaurants are excluded from this type of eligible Participant.

Pennsylvania Visitor Information Centers: A facility where the primary purpose of its operation is to provide, information and tourist supportive services. Must be approved by the Department of Community and Economic Development.

(f) Transportation

Airport: A public-use facility licensed by the Department for the landing and takeoff of aircraft, and for receiving and discharging passengers and cargo.

Heritage Roads, Historic Routes, Byways or Trails: a road, trail, or route designated by DCNR, PennDOT, U.S. Department of Interior, or other agency as being part of a national or state recognized historic or heritage park, trail system, or byway.

Railroad Trips: Scenic or historic railroad trips recognized by the local Chamber of Commerce, the regional Tourist Promotion Agency, DCNR, or Pennsylvania Historical and Museum Commission.

Railroad/Bus Stations: A passenger terminal utilized for discharging and picking up passengers and for ticketing.

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Scenic Overlook: An area, usually at the side of the road, where persons can observe a scenic area such as significant geology, unique botanical resources, or expanses of land such as farmlands, woodlands, or across mountaintops or ridges.

Water Tours: A guided tour on a body of water using a passenger carrying vessel with access to a docking facility and adequate legal parking.

Waterfronts: Areas with access to and views of the rivers of the Commonwealth, which are recognized by the County or the State as having significant recreational or cultural value and are open a minimum of 30 days per calendar year.

Location, Spacing, and Design of TODS for Conventional Roads

General

TODS may be installed to direct traffic to each entrance of an eligible Participant beginning at the nearest ~~access point~~intersection from a Conventional Road with an average of at least 2,000 vehicles per day. TODS shall not be authorized to direct motorists onto or off of any Freeway or Expressway. TODS with straight ahead arrows will not be authorized, except where the Department deems necessary to provide positive guidance.

Location

Install TODS in advance of the intersection where a motorist leaves the primary highway system and at all subsequent locations where the motorist is required to turn in order to travel to the Participant. When the Participant, or the Participant's On-Premise Sign, is readily visible from the highway, do not install a TODS immediately in advance of the Participant. All TODS should be on the right-hand side of the highway and where sufficient space is available. Applicants located on a Conventional Road with an average of at least 2,000 vehicles per day are not eligible for TODS.

TODS should be located to take advantage of natural terrain, to minimize the impact on the scenic environment, and to avoid visual conflict with other signs within the highway right-of-way. Department-approved breakaway sign supports shall be used. When an at-grade intersection on a primary highway is replaced with an interchange, the location shall no longer qualify for TODS and any TODS previously erected shall be removed.

TODS shall be located so as not to interfere with, obstruct, or divert driver's attention from any official traffic control device. Official Traffic Control Devices placed at intersection approaches subsequent to the placement of TODS shall have precedence as to location and may require the relocation of TODS. In general, TODS shall be installed at least 200 feet from other official traffic control devices.

TODS shall be positioned in such a manner that does not restrict drivers' vision when entering the highway from side roads or driveways.

TODS shall not be displayed for any business which is readily visible and identifiable within 200 feet along the highway.

Spacing

TODS shall be located not less than 200 feet or more than 1,320 feet in advance of a location where a turn is required from the highway. At intersections where more than one TODS assembly is required, the minimum spacing between such assemblies should be 200 feet. The maximum number of TODS assemblies on any intersection approach shall be two.

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Design of TODS on Conventional Roads

TODS layout shall be in accordance with ~~Exhibit 2-14~~D7-4 Attraction Sign in *Handbook of Approved Signs* (Pub. 236). Each TODS shall have one or two lines of legend which should generally be limited to the name of a single Participant or an abbreviation thereof. The names of multiple participants or businesses will not be included on a single TODS. A maximum of 16 letters and spaces shall be permitted on each line unless specific approval for an increased number of letters and spaces is granted by the Department. Legends shall not include promotional advertising, and no logos shall be permitted except for the symbols in in **Exhibit 2-14**.~~.~~

Generally, a directional arrow shall be required. If the distance to the business is 1/4 mile or greater, the distance in miles should be included below the arrow. The distance may be 1/4, 1/2, 3/4, or the nearest whole mile. When necessary, the sign may have a full-width message without a directional arrow, with a second line message such as "DRIVEWAY ON LEFT," "LEFT 500 FEET," , etc.

The standard TODS size shall be 72″x24″. Where insufficient right-of-way or roadside exists, smaller TODS measuring 48″x16″ may be authorized. All TODS shall be of the same size where multiple TODS are installed on a single sign assembly.

TODS shall have white reflectorized legend and border on a blue reflectorized background. A brown reflectorized background may be authorized for State and National parks, recreational areas and historical sites. All TODS shall be fabricated by a Department-approved sign manufacturer through the Pennsylvania Tourism Signing Trust.~~using a Department-approved retroreflective sheeting.~~

Generic symbols may be used on TODS at the beginning of the legend area. Any generic symbol included in **Exhibit 2-14**~~**Exhibit 2-15**~~, or included as a recreational or cultural interest area symbol in either the FHWA's *Standard Highway Signs and Markings* book or the Manual on Uniform Traffic Control Devices (*MUTCD)* is permitted for use.

Arrangement

TODS will normally be installed as independent sign assemblies. A maximum of six TODS shall be authorized for installation on any approach to an intersection.

When the number of TODS at an intersection approach is three or less, TODS shall be grouped together with signs displaying arrows pointing to the left above those pointing to the right. If any TODS with straight-ahead arrows (as is the case where the road turns and the access is straight-ahead) are authorized, the TODS for the straight-ahead Participant shall be installed above any TODS for Participants to the left or to the right; except that seasonal Participants shall be mounted below all other signs regardless of orientation of directional arrow.

If the number of TODS at an intersection approach is more than three, TODS shall be grouped as two separate TODS assemblies with a maximum of three TODS per assembly. The first TODS assembly should generally be limited to Participants with straight-ahead or left arrows, and the second TODS assembly will generally be limited to Participants with right arrows. Install Seasonal Businesses on the second assembly.

If more than one business exists in a given direction, the TODS for a closer business shall be mounted above the more distant business.

The top of the TODS assembly shall be a minimum of 9 feet above the ground. The bottom sign shall be a minimum of 5 feet above the near edge of roadway and 7 feet above the ground where pedestrian traffic may exist.

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Sign Installation, Cost and Maintenance

Installation

The Pennsylvania Tourism Signing Trust will be responsible for the manufacturing and installation of all TODS (except for driver's license centers ~~Airports~~ and ~~s~~Signing ~~d~~Districts which fall under the purview of the Department) in accordance with PennDOT standards and specifications. At locations where sidewalks exist, the Pennsylvania Tourism Signing Trust will obtain municipal authorization for installation of TODS. If TODS are required on a local highway for route continuity, the Pennsylvania Tourism Signing Trust shall obtain municipal authorization prior to the installation of any sign.

Costs

Each applicant shall be responsible for the costs established by the Pennsylvania Tourism Signing Trust for installation of each TODS. In addition, the applicant shall be responsible for all costs incurred due to the adjustment, relocation, covering or removal of TODS to comply with the requirements set forth in this policy.

With all new applications, the applicant is required to pay an application fee which must be included with the submission of the TODS application. The application fee will not be used to offset any portion of the costs for installation of each TODS. Participants requesting replacement TODS for an approved facility are not required to pay an application fee.

Maintenance

The Participant is responsible for all maintenance costs performed by the Pennsylvania Tourism Signing Trust. Such maintenance costs will not exceed the cost established at the time of maintenance of a new TODS. The Department reserves the right to maintain, and adjust all signs within its right-of-way. If a replacement TODS is necessary due to deterioration, traffic accident or vandalism, the Participant shall be responsible for the sign replacement costs.

The Pennsylvania Tourism Signing Trust Staff will notify Participants of any TODS in a state of disrepair, and the Participant will be responsible for costs associated with any maintenance. Any maintenance costs which are not paid by the Participant will result in removal of their TODS and termination from the program.

Existing TODS which were installed prior to the Pennsylvania Tourism Signing Trust assuming administrative responsibilities for TODS under this policy will only become the responsibility of the Pennsylvania Tourism Signing Trust once maintenance is required. At that time, the participant will be required to execute an agreement with the Pennsylvania Tourism Signing Trust and be subject to their fee structure as explained under the section entitled Costs above. The existing signs will be updated to comply with the current policy. This also applies to TODS which serve as trailblazers for supplemental guide signs. Geographic areas covered by Signing District Agreements will continue to be the responsibility of the sponsor for those agreements.

Missing Signs

It is the responsibility of the Participant to review their TODS and to advise the Pennsylvania Tourism Signing Trust of any missing signs as soon as the problem exists. The Participant will be responsible for costs associated with the replacement of missing TODS and any costs which are not paid will result in the removal of remaining TODS, if applicable, and termination from the program.

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Seasonal Participants

Location of Seasonal TODS

The order of installation of TODS, whether seasonal or non-seasonal, shall be as prescribed under the section on arrangement.

Covering or Removing Signs

When TODS are approved for businesses that are not operated on a year-round basis, the Pennsylvania Tourism Signing Trust will cover or remove the TODS for any period of time greater than 15 days in which the business is not operating except for TODS with a "SEASONAL" supplemental message. The Participant shall be responsible for all associated costs including but not limited to removal , storage and reinstallation of the sign panel, and posts if required.

Removal of a TODS

General

The Pennsylvania Tourism Signing Trust and PennDOT reserve the right to remove TODS if space is needed for necessary official traffic-control devices or if PennDOT determines that the signing is not in the best interest of the Commonwealth or the traveling public. The Participant will not be reimbursed for the sign costs.

Removal of Signs

Except where otherwise provided in these guidelines, TODS may be removed by PennDOT or the Pennsylvania Tourism Signing Trust including but not limited to any of the following reasons:

- Failure to comply with eligibility requirements set forth in the guidelines.
- Because of fire, crash, facility renovation, or similar causes, which result in a qualified Participant becoming inoperable for a period of time exceeding 15 days.
- If the facility closes for an extended period without a scheduled reopening date, or if in the opinion of the Pennsylvania Tourism Signing Trust, the owner or responsible operator does not proceed with necessary repairs within a reasonable time, the Participant shall lose its right to continued placement of its TODS.
- If the facility ceases to operate in accordance with these guidelines.
- If a Signing District is established and existing TODS do not provide consistent guidance.
- Because the TODS conflicts with road modifications or safety concerns.

Application Procedure

Application

Participants desiring TODS shall request an application from the Pennsylvania Tourism Signing Trust or download one from its website (https://palogo.org/). Each applicant shall provide the following (for an airport contact PennDOT's Bureau of Aviation):

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- A completed application form and fee. A separate application shall be submitted for each Participant's site where TODS are proposed.
- A map or neatly drawn sketch of the area to indicate the locations of the requested TODS and the location of the Participant.
- A notarized application attesting to the authenticity of the signatures. If TODS are installed and it is subsequently determined that the applicant was not truthful, the TODS shall be removed and the Participant shall be billed for the actual removal costs.
- Approval on the application from the local municipality(s) that the installation of TODS does not conflict with any local ordinances.

Excess Number of Eligible Participants

If applications are received for any one intersection for more than the allowable number of TODS, the order of priority shall be based on the date of receipt of a properly completed application and the required fee. Once approved for TODS, the Participant shall remain eligible for these signs unless it is declared in violation of these guidelines.

Applicant Appeals

A business may appeal a denial for TODS under Title 2, Pa. C.S., Sections 501-508 (relating to the Administrative Agency Law), by submitting a written request for a hearing within 30 days of the date of the denial notification. Businesses should submit appeals to:

Administrative Docket Clerk
Pennsylvania Department of Transportation
400 North Street-9th Floor
Harrisburg, PA 17120-0096

The written request shall include a filing fee made payable to the "Commonwealth of Pennsylvania" and a copy of the denial notification.

At the time of publication, filing fees are listed at 34 Pa.B. 4081 (see http://www.pabulletin.com/secure/data/vol34/34-31/1410.html). Filing fees for appealing a TODS decision is a Level II fee, and comes under the category of "motorist information sign matters." ~~Businesses may verify the current fee by contacting the Administrative Docket Clerk at 717-772-8397.~~

The Administrative Docket will also accept electronic transmission of filings, including but not limited to, a request for a hearing, subsequent correspondence, briefs, pleadings, or other documents relating to a case. All administrative appeals and filings can be sent electronically to ra-pddotadmindocket@pa.gov.

Signing Districts

General

As opposed to signing individual facilities from the nearest access point from a Conventional Road with an average of at least 2,000 vehicles per day, the purpose of a Signing District is to provide an overall, uniform signing concept for various facilities located in a specific municipality. A cohesive signing concept may

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encourage traffic flow to general destinations including, but not limited to cultural Participant areas, recreational Participant areas, shopping areas, and universities, and may then direct motorists to specific Participant locations. Only participants eligible under the TODS program are eligible for inclusion in the Signing District.

Agreement

In order to establish a Signing District, a governmental sponsor shall submit an application to PennDOT (see ~~Exhibit 2-15~~~~Exhibit 2-16~~) and agree to enter into an Agreement with PennDOT to coordinate, obtain, erect and maintain all signs associated with the Signing District. The governmental sponsor must ensure that all facilities eligible for signing under the provisions of these guidelines are provided an opportunity to participate in the Signing District. A public meeting shall be held to provide Participants with an opportunity to become involved. The removal of existing "illegal" or permitted advertising signs shall be evaluated to avoid and reduce sign clutter on the highways. Existing TODS installed by the Department or the Pennsylvania Tourism Signing Trust shall be inventoried prior to removal. In the event the governmental sponsor or the Department terminates the agreement, the governmental sponsor shall reinstall the TODS that existed prior to the Signing District. ~~Sign designs and color schemes will comply with those indicated in Exhibit 2-14.~~

Installation

Department approval shall be obtained for the proposed sign locations. Governmental sponsor shall provide a map with all proposed sign locations. An Agreement shall be executed between the parties before the manufacture or installation of any signs. The governmental sponsor shall be responsible for manufacture, installation and maintenance of signs as outlined in the Agreement.

Design

Signs for Signing Districts shall comply with the following:

- Signs shall comply with Publication 408, Section 1103.
- Signs shall be manufactured by a Department approved sign manufacturer.
- Sign font shall be Highway Gothic.
- Sign posts shall be an approved breakaway device.
- Sign background colors shall not conflict with the colors of standard regulatory and warning signs.

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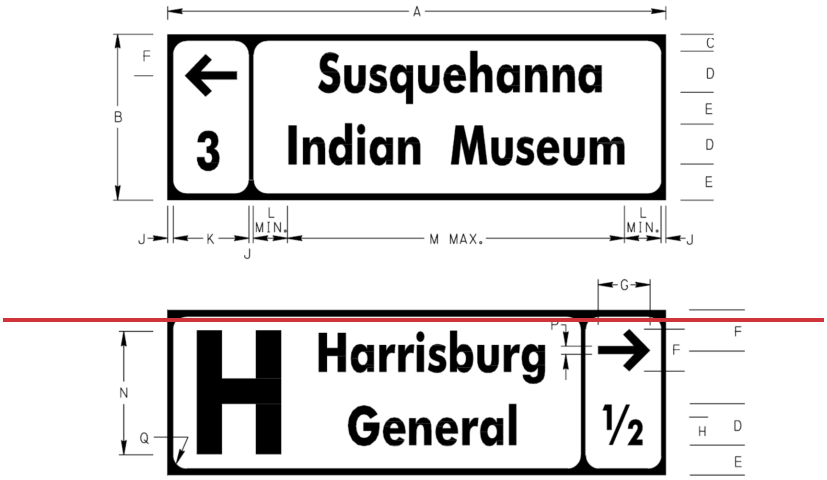
~~Exhibit 2-14 TODS (D7-4)~~

(a) Justification. The Attraction Sign (D7–4) may be used on conventional highways to direct motorists to large tourist attractions in accordance with the Department's Attraction Signing Guidelines. One or two lines of legend may be used to identify the name or abbreviation of the attraction.

(b) Design. A rectangular directional box should generally be located on the left side of the sign for attractions that are straight ahead or to the left, or on the right side of the sign for attractions to the right. The box should generally include a directional arrow and a distance of 1/4, 1/2, 3/4 or the nearest whole mile, but the box may be eliminated if it is more appropriate to use directional information such as "DRIVEWAY ON LEFT", "LEFT 1000 FEET", etc., on the second line of legend. All legend should be "Clearview 1W, 2W or 3W" font, of the highest series possible. If necessary, the legend may be further condensed up to 35 percent. A generic symbol for hospital, campground or airport may be used in advance of the legend message.



DIMENSIONS – mm (IN)													
SIGN SIZE A x B	C	D	E	F	G	H	J	K	L	M	N	P	Q
1200 x 400 (48" x 16")	50 (2)	100 (4)	75 (3)	100 (4)	125 (5)	65 (2.6)	15 (0.6)	185 (7.4)	50 (2)	870 (34.8)	275 (11)	20 (0.8)	25 (1)
1800 x 600 (72" x 24")	90 (3.6)	150 (6)	105 (4.2)	165 (6.6)	188 (7.5)	100 (4)	20 (0.8)	280 (11.2)	75 (3)	1310 (52.4)	400 (16)	30 (1.2)	45 (1.8)

COLOR:

LEGEND AND BORDER:
WHITE (REFLECTORIZED)

BACKGROUND:
BLUE (REFLECTORIZED)

APPROVED FOR THE SECRETARY OF TRANSPORTATION

By : Glen C Rowe Date : 01-03-06
Chief, Traffic Engineering and Operations Division
Bureau of Highway Safety and Traffic Engineering

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Exhibit 2-~~14~~15 Acceptable Symbols

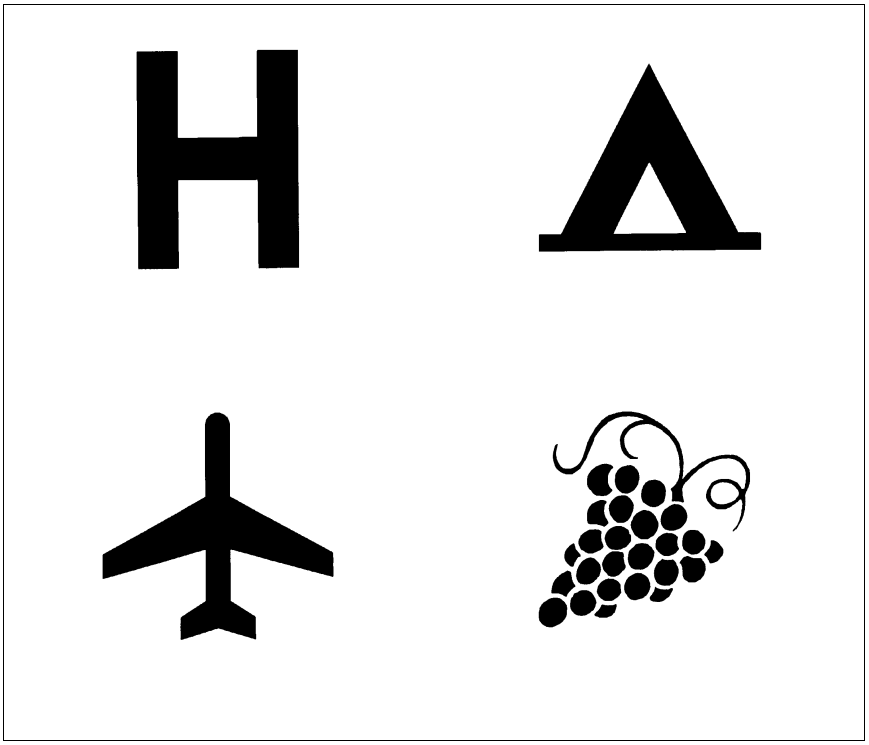

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Exhibit 2-~~15~~16 Application for Signing District

Please print or type the following information.

1. Name of Governmental Sponsor:
2. Mailing Address:
3. Name of contact person:
4. Phone number of contact person:
5. Has a map of the proposed signing district been included? _____
6. Name of Consultant:
7. Address of Consultant:
8. If consultant has not been hired, will the service of one be used? _____ If not, who will design the system?
9. Have all illegal signs been removed? _____
10. Has an inventory of existing permitted signs been completed? _____

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11. Does the governmental sponsor understand that all businesses or facilities that participate in the signing district must meet one of the definitions and satisfy the General Eligibility Requirements set forth in this policy?

    Yes _____ No _____

12. Are there any plans contemplated to expand the signing district beyond its boundaries and become a signing region? If yes, is there a timetable (attach or explain)?

13. Note: Execution of an agreement between the governmental sponsor and the Commonwealth designating the signing district must be completed before construction of the signs begins.

14. Do you understand all costs will be borne by the governmental sponsor? Further, the governmental sponsor may recoup some or all of the administrative costs of the program by the establishment of a fee structure for applicants.

15. Indemnification. The Governmental Sponsor shall indemnify, save harmless, and defend the Department from any and all claims, actions, damages, injuries, and/or expenses arising out of the subject Signing District or on account of any act, omission, neglect, or misconduct by an applicant or a third party.

    I hereby certify that the information provided on this application is true and correct and to the best of my knowledge, and _____ (name of Governmental Sponsor) is fully prepared to move forward to completion of the signing district. It is also my understanding that if signs are installed, they may be removed by PennDOT or the Pennsylvania Tourism Signing Trust as detailed in these guidelines.

    Sworn before me this _____ day of _____, 20_____.

    Notary:

    Signature of Representative: _____

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2.8 Acknowledgement Signs

General Requirements

The Federal Highway Administration (FHWA) allows the use of signs to acknowledge the provision of highway-related services. State and local programs for acknowledgment signs are growing in popularity because they can provide additional revenue for highway maintenance programs. Section 2H.13~~08~~ of the *MUTCD* provides guidance on the use of Acknowledgement Signs.

Existing acknowledgment signs already installed do not have to be changed, but Engineering Districts need to consider the guidance when replacing or upgrading existing signs. Always attempt to follow good, basic engineering practices such as simplifying sign message content, reasonable sign sizes, and minimizing driver distraction.

Acknowledgment signs are a way of recognizing a company or business, or a volunteer group that provides a highway-related service. Acknowledgment signs include sponsorship signs for adopt-a-highway litter removal programs, maintenance of a parkway or interchange, and other highway maintenance or beautification sponsorship programs. Acknowledgment signs should clearly indicate the type of highway services provided by the sponsor. The FHWA recognizes a distinction between signing intended as advertising and signing intended as an acknowledgment for services provided. Advertising generally has little if any relationship to a highway service provided. An advertiser wants to get its recognizable message, company emblem, or logo before the public, and if possible, information on how or where to obtain the company's products or services. In most cases, if the sign goes beyond recognizing the company's contribution to a particular highway service at a specific highway site or includes telephone numbers or internet addresses, the sign is an advertising sign and not an acknowledgment sign.

This policy position is consistent with the principles and intent of several laws including 23 U.S.C. §1.23(b), 23 U.S.C. §109(d), and 23 U.S.C. §131. Section 1A.01 of the *MUTCD* states that "Traffic control devices or their supports shall not bear any advertising message or any other message that is not related to traffic control." This position is founded on safety and operational concerns, particularly as related to driver distraction. Highway signs and other traffic control devices convey crucial information. In order for road users to perceive and respond appropriately to critical information, we must ensure the conspicuity of traffic control devices to avoid compromising the safe and orderly movement of traffic.

Sign Placement

With respect to placement of traffic control signs, regulatory, warning, and guide signs have a higher priority than acknowledgement signs. In fact, acknowledgment signs are the lowest priority of information-type signs and may only be placed where adequate spacing between higher priority signs is available. In no case shall an acknowledgment sign be placed such that it obscures road users' view of other traffic control devices. Therefore, follow the following minimum spacing requirements:

1. On roads with speed limits of less than 30 mph, do not place acknowledgment signs within 150 feet of any other traffic signs, except parking regulation signs.
2. On roads with speed limits of 30 to 45 mph, do not place acknowledgment signs within 200 feet of any traffic signs, except parking regulation signs.
3. On roads with speed limits greater than 45 mph, do not place acknowledgment signs within 500 feet of any traffic control signs, except parking regulation signs.

Due to public safety concerns, do not allow acknowledgment signs at the following locations:

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1. On the front, back, adjacent to or around any traffic control device, including traffic signs, signals, changeable message signs, traffic control device posts or structures, or bridge piers.
2. At key decision points where a driver's attention is more appropriately focused on traffic control devices, roadway geometry, or traffic conditions. These locations include, but are not limited to exit and entrance ramps, intersections controlled by traffic signals or by stop or yield signs, highway-rail grade crossings, work zones, and areas of limited sight distance.

If the placement of an acknowledgment sign conflicts with newly installed higher priority signs, or traffic signals, or temporary traffic control devices, or other priority devices, remove, cover or relocate the acknowledgment sign.

Adopt-A-Highway Signs

In the Adopt-A-Highway Program, businesses, groups of people, or individuals agree to pick up litter along a section of highway in exchange for the erection of a sign bearing their name at the beginning of the section.

The program not only helps reduce the maintenance workload, but also fosters a public awareness of the magnitude of the littering problem.

The procedures and types of signs for the program are addressed in the Adopt-A-Highway Operational Manual. In each Engineering District, the program is administered under the direction of the Adopt-A-Highway Coordinator, and the oversight of the Bureau of Operations (BOO).

Beautification Area Signs

The Beautification Area Sign (I47-1) and the Beautification Area Sponsor Sign (I47-2) are designed to give recognition to the individual or group of individuals that provides and maintains the plantings or other beautification efforts.

Sponsor-a-Highway

The Sponsor-A-Highway program is a professional maintenance and marketing program intended to provide corporate sponsors that desire to assist in highway beautification the opportunity to fund litter removal services. The program is targeted towards freeways.

A Highway Beatification Contractor is under contract with the Department to solicit corporations that want to pay for litter removal. They market the program, perform maintenance and install signs recognizing the contribution of the companies. The Bureau of Operations administers the Sponsor-A-Highway program; therefore, direct any questions about the program to that office.

2.9 Operational Changes Requiring Transitional Signing

General Discussion of Operational Changes

As traffic patterns change at specific locations on the highway, changes are also necessary in the operational procedures and devices that control those patterns. Unfortunately, these changes may cause an increase in crash rates unless accompanied by good transitions to the new traffic controls. A transitional procedure informs drivers that traffic control will or has already changed before they arrive at the site of the new control, which should modify the driver's expectancy thereby reducing conflicts and crashes.

Pages 2-60~~2-54~~ through 2-61~~2-55~~ provide recommended procedures to insure a safe transition from one type of traffic control to another.

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In addition to the static signs, it is acceptable to use portable changeable message signs (PCMS) to notify drivers of operational changes.

Reversing STOP Signs

Step 1 Create a four-way stop situation for a period of 30 days. During this 30-day period, Stop Ahead (W3-1) signs should be erected on the previously uncontrolled approaches, and a ~~4-WAY (R1-3) or~~ ALL WAY (R1-3P4) supplemental plaque should be added below each R1-1 signs. A Type B flashing light with a red lens may also be placed above the new R1-1 signs.

Step 2 After the 30-day period, on the approaches which originally had the STOP signs, remove the STOP (R1-1) signs, ~~4-WAY (R1-3) or~~ ALL WAY (R1-3P4) supplemental plaques, any Stop Ahead (W3-1) signs, and any stop lines. On the other two approaches, replace the ~~4-WAY (R1-3) or~~ ALL WAY (R1-3P4) supplemental plaques with CROSS TRAFFIC DOES NOT STOP (~~R1-1C~~W4-4P) plaques~~signs~~.

Step 3 At least 60 days after the removal of the original STOP Signs, remove the CROSS TRAFFIC DOES NOT STOP (~~R1-1C~~W4-4P) plaques~~signs~~, the flashing lights, and if not warranted, the Stop Ahead (W3-1) signs.

Four-Way to Two-Way Stop Control

Step 1 Remove the ALL WAY (R1-~~4~~3P) supplemental plaques, any Stop Ahead (W3-1) signs, and any stop lines on the approach which originally had the STOP (R1-1) signs. On the other two approaches, replace the ALL WAY (R1-~~4~~3P) supplemental plaques with STOP SIGN REMOVED FROM SIDE STREET (R1-4-1) signs. A Type B flashing light with a red lens may be placed above the two remaining R1-1 signs.

Step 2 At least 60 days after the removal of the two R1-1 signs, remove the STOP SIGN REMOVED FROM SIDE STREET (R1-4-1) signs, the flashing lights, and if not warranted, remove the Stop Ahead (W3-1) signs.

One-Way to Two-Way Street Operation

Step 1 Notify the general public by news media and abutting residences and/or businesses by direct mail about 30 days prior to the effective date.

Step 2 Provide adequate sight distance at all intersections and driveways by removing parking, clearing vegetation, etc. Prohibit parking on the left side of the one-way street.

Step 3 Install and cover Two-Way Traffic (W6-3) signs on both sides of the existing one-way street at its beginning and immediately beyond all intersections where major left turning movements occur. Also, install and cover Two-Way Traffic (W6-3) signs on all major approaches to the existing one-way street, but rotated 90 degrees to graphically depict traffic going both left to right and right to left.

Step 4 Eradicate any pavement markings on the one-way street or side street approaches which will be in conflict with the new two-way operation. Install centerlines on the "one-way" street.

Step 5 On the agreed upon date, uncover the Two-Way Traffic (W6-3) signs, and remove any non-applicable One-Way signs, BEGIN ONE-WAY (R6-~~6~~12) signs or turn restriction signs. Install appropriate pavement marking arrows as appropriate.

Step 6 At least 3 months after the conversion, remove the Two-Way Traffic (W6-3) signs.

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Two-Way to One-Way Street Operation

Step 1 Notify the general public by news media and abutting residences and/or businesses by direct mail about 30 days prior to the effective date.

Step 2 Install DO NOT ENTER (R5-1), WRONG WAY (R5-1A), and No Right/Left Turn signs, as appropriate.

Step 3 Block off the unused lane(s) with drums or barricades.

Step 4 Revise existing pavement markings to show new one-way direction, both on the affected street and on all side road approaches.

Step 5 Remove drums or barricades.

Step 6 At least 60 days after the conversion, remove any unwarranted DO NOT ENTER (R5-1), WRONG WAY (R5-1A), or No Right/Left Turn signs.

One-Way Street Reversal

Step 1 Notify the general public by news media and abutting residences and/or businesses by direct mail about 30 days prior to the effective date.

Step 2 Provide adequate sight distance at all intersections and driveways by removing parking, clearing vegetation, etc. Prohibit parking on the left side of one-way streets.

Step 3 Replace One-Way Signs with new signs showing appropriate direction. Install flags or flashing lights on the signs, if appropriate.

Step 4 Consider placing drums or barricades at cross streets and pavement markings to emphasize new turning directions.

Step 5 At least 60 days after the conversion, remove drums, barricades, and flashing lights.

Revised Exit Numbers

In 2001, the Department changed from the consecutive exit-numbering system to the milepost exit-numbering system. If any of the "OLD EXIT ##" signs still exist, the District Traffic Unit should provide notification to the County Maintenance District to remove the signs when other maintenance work is being performed in the area.

If it is necessary to change exit numbers, Districts are encouraged to use the following steps, similar to the approach used on the statewide program:

Step 1 Working through the District CRC and Office of Communications, notify the general public by the news media and abutting businesses by direct mail about 1 year and again about 30 days prior to the effective date, so that the residents and businesses can make necessary changes in directions, business cards, yellow pages, etc. If possible, schedule the effective date to coincide with the issuance of the new telephone directory.

Step 2 Revise the exit numbers, and add a panel to each major advance guide sign with the message "OLD EXIT XX."

Step 3 After a predetermined amount of time (2 years minimum) following the conversion, the panels with the old exit number may be removed as part of routine maintenance.

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2.10 Miscellaneous Signs

Anti-Littering Signs

The following five signs help to remind motorists not to litter:

Sign	Size
Keep Pennsylvania Beautiful (I14-1)	48”x30”
Keep PA Beautiful Symbol (I14-2)	30”x30”, 36”x36”
Keep Pennsylvania Beautiful State Outline (I14-3)	48”x30”
Litter Fine (I14-4)	30”x24”
No Dumping Allowed (I14-5)	24”x18”

Only use Anti-Littering signs if their location will not interfere with the proper functioning of other necessary traffic control devices. Do not install these signs along sections of highway that have already been adopted under the Department's Adopt-A-Highway Program, but existing anti-littering signs may remain in place for their useful life along sections of highway that are later adopted.

The I14-1, I14-2, I14-3, and I14-4 signs can be used interchangeably for most situations. When a relatively lengthy, continuous section of highway has experienced recurrent littering, it may be desirable to post an I14-1, I14-2, or I14-3 sign followed by I14-4 signs. Following are recommendations regarding the use of anti-littering signs:

Sign	Comments
I14-1	Normally, this type of anti-littering sign is used on select on-ramps for public education purposes.
I14-2	The circular logo on this sign is consistent with the logo used for all anti-litter programs. Normally, the I14-2 sign is used along exit ramps into (entrances to) welcome centers, parking areas, rest areas, and scenic views.
I14-3	Normally, this is the first type of sign used on conventional road entry points to the Commonwealth.
I14-4	This sign is suggested for use at specific sites where littering has been a recurring problem. The sign is also suggested for entrance ramps from welcome centers, rest areas, parking areas, and scenic views to the mainline roadway.
I14-5	This sign may be used at locations that have recurring illegal dumping of heavy volumes of litter, garbage, or other waste material. Typical placement sites may include areas of excess right-of-way, graded ground adjoining a highway, and pull-off locations in remote areas.

Coffee Break Signs

The Department allows safety-conscious local civic organizations to offer free coffee to motorists using rest areas during specific periods such as holiday weekends. Because these activities encourage the weary motorist to stop and relax, this activity is in the best interest of highway safety.

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The organization must agree in writing to offer free coffee and to indemnify and save harmless the Commonwealth and PennDOT employees, from all suits, actions and claims. Because commercial activities are prohibited in rest areas, the organization must also agree to post a sign with minimum 6-inch letters stating NO DONATIONS, and to leave the area in similar or better condition than it was prior to the coffee break.

When a "coffee break" is approved, the county should erect a SAFETY BREAK FREE COFFEE (I98-1) sign. The last line on the sign should be NEXT RIGHT or other appropriate message. The sign should be placed a minimum of 300 to 500 feet before the Rest Area Directional Sign, and should be removed, folded or covered when free coffee is not being offered.

Heavy User Posted & Bonded Roadway Signs

The purpose of this policy is to establish guidelines for bonded route Heavy Users to install signs on roadways bonded with a weight restriction, in order to direct drivers to the appropriate route(s) to and from operation destinations. Generally the signs will be installed at critical locations where additional guidance is needed, such as at the terminus of a bonded route and at or in advance of intersections in order to direct drivers to the destination. These guidelines include the justification, design, location, installation, and maintenance of these signs.

The Department may authorize the erection of signs within State highway right-of-way through the submission and approval of the Posted and Bonded Roadway – Maintenance Plan Application for Roadway Signing (M-4902ARS). If the bonded route Heavy User elects to install signs, this application is to be included in the Heavy Users Maintenance Plan as part of their Excess Maintenance Agreement (EMA). Policy pertaining to the Maintenance Plan and EMA is stipulated in the Department's policy regarding Posted and Bonded Highways which can be found in Publication 23, Chapter 15. The application requires a signing plan and justification for the request. Possible reasons for requesting signage could include:

- Inaccurate GPS directions
- Route confusions (multiple route possibilities)
- Delineation of unclear turning locations
- Unclear bonded route terminus points
- Multiple bonded users on roadway

Final approval and concurrence by the District Traffic Engineer and the Posted and Bonded Route Coordinator is required for authorization of the placement of proposed signs.

Sign layouts shall be in accordance with ~~Exhibit 2-16~~Exhibit 2-17. The legend shall consist of 4" upper case letter following the standard and spacing requirements specified in PennDOT Publication 111 (Traffic Control-Pavement Marking and Signing Standards), TC-8700 series. The letter series C or series D is to be chosen for best fit of the message on the sign. Spacing may be reduced by up to a 70% maximum. If letter series D is used for the sign message, the smaller letter series C can be utilized for the company name only.

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Permissive signs shall have green reflectorized legend and border on a white reflectorized background. A red reflectorized legend and border shall be used for restrictive signs. All signs shall be fabricated by a Department approved sign manufacturer using Department approved retroreflective sheeting as specified in Publication 35, Bulletin 15. Generally, on permissive signs a directional arrow should be shown. For signs related to Unconventional Oil and Gas hauling operations, a well derrick symbol is optional.

The standard sign sizes shall be 24"x30" or 30"x30", but larger signs are authorized if necessary to convey the proper messages to drivers.

The sign design will only be approved by the District Traffic Engineer through the approval of the M-4902ARS form.

Signs are to be located in accordance with PennDOT Publication 111 (Traffic Control-Pavement Marking and Signing Standards), TC-8702B standards and be post mounted in accordance with PennDOT Publication 408 (Specifications) Section 931-Post Mounted Signs, Type B. A PA One Call System notification for the proposed sign locations shall be placed by the bonded route Heavy User's Contractor to verify utility locations. The signs shall be located so as not to interfere with, obstruct, or divert a driver's attention from any official traffic control device. Official traffic control devices located at intersection approaches shall have precedence as to location. The signs shall be positioned in such a manner that does not restrict a drivers' vision when entering a state roadway from side roads or driveways. Signs may be relocated or removed by the Department as a result of sign priority and/or traffic safety.

Department approval shall be obtained for the proposed sign locations prior to the installation of any signs by the industry participant. Possible sign messages and designs are included in Exhibit 2-17~~Exhibit 2-18~~.

The bonded route Heavy User that requests the signage assumes responsibility for the cost of manufacturing, installation, maintenance and removal of all approved signs specified in the application. Any deferred maintenance may result in the removal of the signs by Department personnel.

When the bonded route Heavy User initiates the close-out process (outlined in Publication 23, Chapter 15.11), the removal of the signs placed as part of the application must be coordinated with the District.

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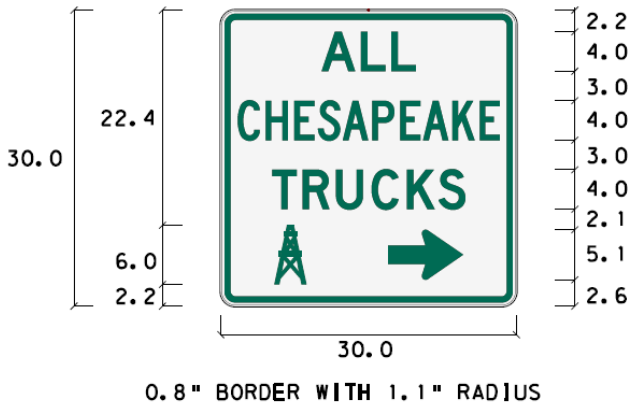
Exhibit 2-~~16~~17 **Sample Sign Layout**



0.8" BORDER WITH 1.1" RADIUS

4" UPPERCASE SERIES D	4" UPPERCASE SERIES C (REDUCE SPACING BY 30%)	4" UPPERCASE SERIES D	SYMBOLS
10.1 -	1.7 -	5.0 -	5.5 -
4.1 - A	2.7 - C	3.2 - T	3.2 - DERRICK
3.2 - L	2.8 - H	3.6 - R	8.3 -
2.4 - L	2.5 - E	3.6 - U	7.6 - ARROW
10.2 -	2.7 - S	3.4 - C	5.4 -
30.0	3.0 - A	3.5 - K	30.0
	2.8 - P	2.7 - S	
	2.4 - E	5.0 -	
	3.0 - A	30.0	
	2.7 - K		
	2.0 - E		
	1.7 -		
	30.0		

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Exhibit 2-~~17~~18 Conceptual Sign Messages and Designs

4" SERIES D
4" SERIES D
4" SERIES D

24" X 30"

4" SERIES D
4" SERIES D
4" SERIES D

30" X 30"

4" SERIES D
4" SERIES D
4" SERIES D

24" X 30"

4" SERIES D
4" SERIES C
(REDUCE SPACING BY 30%)
4" SERIES D

30" X 30"

4" SERIES D
4" SERIES D
4" SERIES D
4" SERIES D

24" X 30"

4" SERIES D
4" SERIES D
4" SERIES D

30" X 24"

NOTE: DERRICK SYMBOL IS 3" X 6" AND IS OPTIONAL

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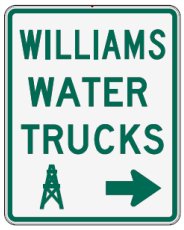
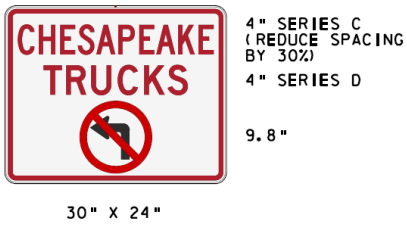
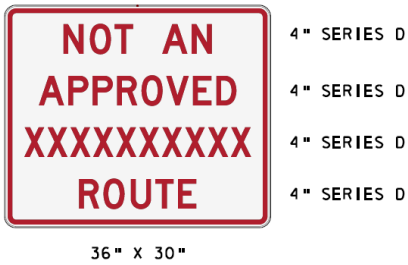
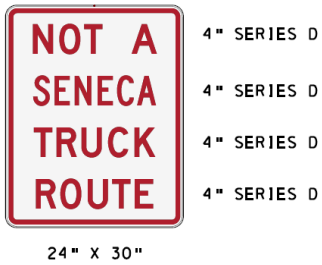
Exhibit 2-~~18~~17 Conceptual Sign Messages and Designs (continued)









NOTE: DERRICK SYMBOL IS 3" X 6" AND IS OPTIONAL

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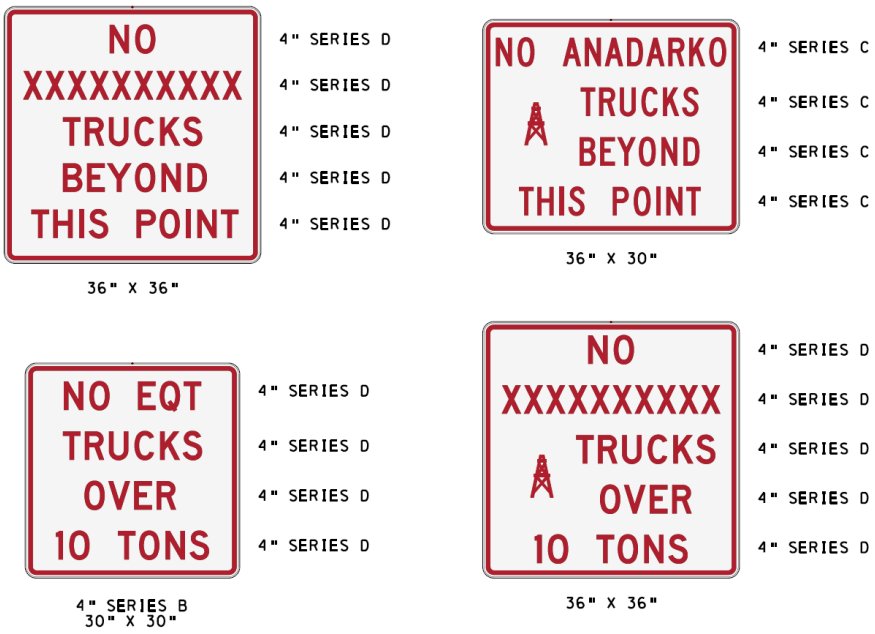
Exhibit 2-~~17~~18 Conceptual Sign Messages and Designs (continued)



Historical Markers

Concrete monuments and cast aluminum historical markers are the responsibility of the Pennsylvania Historical and Museum Commission. If these markers are in need of repair, the following office should be contacted:

Historical Marker Program
Division of History
Pennsylvania Historical and Museum Commission
Commonwealth Keystone Building, Plaza Level
400 North Street
Harrisburg, PA 17120-0053
PHMC Historical Marker Program

On the other hand, the cast iron historical markers for towns or rivers were installed by the Department. The Engineering Districts are encouraged to enter into agreements with local civic groups to maintain these markers. If the markers are not protected by guide rail or bridge abutments, or as a minimum non-mountable curbs in urban areas, the markers should be relocated or stockpiled for potential future use. Erect any new or refurbished installations on breakaway supports.

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Library Signs

On State highways, libraries are responsible for providing and erecting Library (I4-~~1~~8) signs after receiving authorization from the Department. When requested, the District Office shall approve appropriate locations on conventional State highways, directing motorists to public libraries from the nearest numbered traffic route or other major highway.

Memorial ~~Markers~~Signing

The Department will only authorize or erect memorial ~~markers~~ signs on highways designated by the legislature. ~~and on Interstate highways Districts shall submit plan sheets to Central Office showing the sign's proposed location(s), the location of existing signs and sign fabrication drawings for submission to FHWA. Authorization is contingent upon final approval and concurrence of FHWA.~~ In order to manage this program, Central Office maintains a log of official named highways and bridges.

The following types of signs ~~markers~~ are available:

~~1. Bronze plaques may be locally procured in accordance with specifications available from Central Office. Common sizes are 15"x12" and 30"x24".~~

~~2.~~1. Non-Interstate memorial signs (D7-101)~~markers~~ have white reflectorized legend and border on a ~~green~~ brown reflectorized background. Common sizes are 36"x12" and 48"x16", depending upon the speed limit and available space. ~~The legend is typically 3" or 4" UC/LC.~~ Signs may be ordered from the Sign Shop using material number 326716 for 36"x12" signs and 326717 for 48"x16" signs. These same material numbers are to be used for creating sign equipments in Plant Maintenance. The D7-101 standard is found in the *Handbook of Approved Signs* (Publication 236). ~~A sample design detail is shown below in **Exhibit 2-19**.~~

~~Exhibit 2-19 Sample Memorial Highway Sign Design~~

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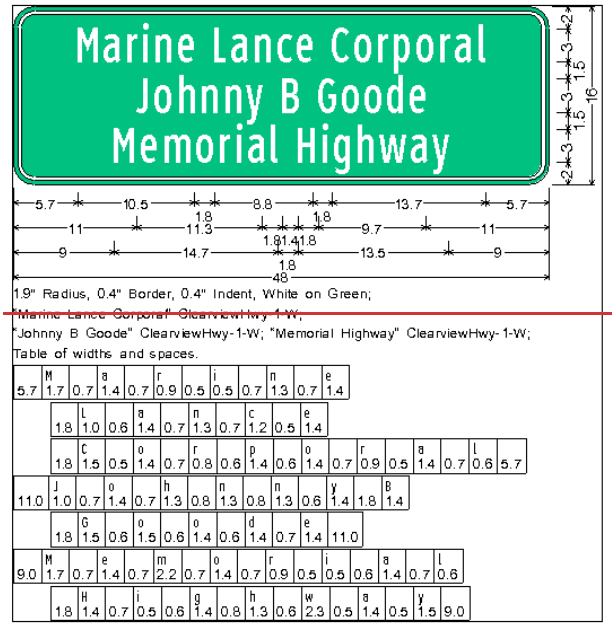

2. Interstate memorial signs ~~markers~~ have 8-inch upper/lower-case white reflectorized legend on a ~~green~~ brown reflectorized background. ~~Before memorial markers may be erected on an Interstate Highway, FHWA must be obtained. When legislation designating signs be erected on the Interstate System, a copy of the sign fabrication detail and a plan sheet showing the proposed location and existing signs must be submitted to BOO who will coordinate FHWA approval.~~ Signs may be ordered from the Sign Shop using a D5 material number corresponding to the appropriate size.

~~3.~~ Memorial signs shall not interfere with the placement of any other traffic control devices and shall not compromise the safety or efficiency of traffic flow. The legend displayed on memorial signs shall be limited to the name of the person or entity being recognized and a simple message preceding the name, such as "Dedicated to." Additional legend, such as biographical information, as well as decorative or graphical elements, pictographs, logos, or symbols shall not be displayed on memorial signs.

Each memorial designation shall be limited to two (2) signs. Signs are normally mounted at the following locations:

a) Memorial bridges ~~should have either a bronze plaque or a memorial marker. Anti-theft nuts are recommended for all memorial markers.~~shall have one (1) sign facing each direction of traffic approaching the bridge.

b) Non-Interstate memorial highways ~~may have memorial markers~~shall have one (1) facing traffic at the beginning of the designation in each route direction.~~and may also be installed at select locations along the highway.~~

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c) Interstate memorial highways may have memorial ~~plaques or markers~~signs placed in rest areas, scenic overlooks or at other appropriate locations where parking is provided with the signing inconspicuously located relative to vehicle operations along the highway. If installation of memorial ~~markers~~ signs off the mainline is not practical, the signing shall be limited to one memorial ~~marker~~ sign D5-~~1~~series sign at an ~~appropriate location~~at the beginning of the designation in each route direction. If installed on the mainline highway, memorial signs must be independent of other guide and directional signing and not adversely compromise the safety or efficiency of traffic flow.

d) Memorial interchanges may have ~~memorial markers, a D5-series~~ sign~~s,~~ installed on two (2) ~~all non-Interstate~~ approaches. ~~–~~Memorial signs must be independent of other guide and directional signing, and shall not adversely compromise the safety or efficiency of traffic flow, particularly with regard to entering or exiting traffic in the interchange area. Signs may be post-mounted or attached to the side of the overhead structure provided other guide signs are not already in place.~~-~~

Motorist Alert Signs

Motorist Alert (W23-series) signs may be erected prior to the start of a construction project as a courtesy to the motorist. A Type B warning light may be added to increase the sign's effectiveness.

General messages are included on the standard sign panels so that the signs may be reused on future projects. However, the messages on the W23-101 and W23-102 signs may be tailored to the particular project. With reference to the THIS BRIDGE TO BE CLOSED FOR MAINTENANCE (W23-101) sign, suggested overlay panels using 6-inch legend are as follows:

- 36"x8" HIGHWAY or STREET panel to cover "BRIDGE"
- 60"x8" NEXT 3 MILES panel to cover "THIS BRIDGE"
- 90"x8" FOR CONSTRUCTION or FOR REPAIRS panel to cover "FOR MAINTENANCE"
- 90"x8" JUNE 28, 2007 panel to cover "NEXT WEEK"

The W23-series signs should generally be included as a special provision in applicable Department construction projects. It is desirable to stipulate that the signs become Department property at the end of the project, thus providing for their reuse.

Municipal Name Signs

The Department will generally install 36"x12" municipal name signs (I10-series signs) on all State highways.

When requested by local authorities, the Department will fabricate and install oversized I10-series signs if the local authorities agree to pay for the signs. The cost of new or replacement oversized signs will be as noted below, plus a one-time $100 administrative fee (one $100 fee per request of one or more signs). These signs will generally have dimensions proportionally larger than the standard I10-series sign:

48"x16"	For use on two-lane highways – $400
72"x24"	For use on multilane highways – $500

On conventional roads and expressways, local authorities may install custom-made name signs as an alternative to the oversized I10-series signs after approval is granted by the appropriate Engineering District. Approval is contingent upon satisfying the following requirements:

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1. Sign dimensions are as follows:

Type Highway	Max. Width	Max. Area (Sq. Feet)	Max./Min. Legend Size
Two-lane	48"	12	6"/2"
Multilane	72"	24	8"/3"

2. The primary message should be something like "Welcome to _____", with the municipality's name composed of the largest-size legend. A smaller-size supplemental slogan with up to six words may be added, e.g., "The White Rose City", "The Christmas City", etc., and/or a symbol may be used.
3. No lights, animation, directions, distances, names of officials, or advertising are permitted.
4. All signs shall be manufactured by a Department-approved sign manufacturer using approved Type III or IV retroreflective sheeting material, and installed in accordance with Publication 111.
5. The installation of special name signs may not be possible if insufficient space exists for the signs, or if the municipality changes too often within a short distance. (Existing traffic signs may be relocated at the municipality's expense in order to provide room for the oversize municipal signs.)

The District Executive has the authority to install or authorize the municipality to install the signs in accordance with these guidelines.

Names on Pedestrian Bridges

Only governmental bodies or institutes of education can include their name and/or emblem on a structure owned by the governmental body or institute of education crossing over a Department owned roadway. The name and/or emblem can be incorporated into the structure under the following guidance:

1. This only applies to pedestrian bridges. Names and/or emblems are not permitted on municipal owned vehicular bridges that cross over state or local roadways.
2. The name and/or emblem shall be imprinted or embossed into the building material or be raised letters constructed of metal or other suitable weather resistant material attached to the structure with stainless steel fasteners. Adhesive anchors will not be permitted. An emblem embossed into the back of a parapet must maintain the minimum clearance over the reinforcement. The type and size of the name/and or emblem, method of attachment, vertical clearance and the location on the bridge where the name/and or emblem will be attached must be defined and submitted to the District Bridge Engineer for approval.
3. Name and/or emblem shall not be lighted or retroreflective.
4. Colors and/or configurations shall not resemble or conflict with official traffic control devices.
5. The emblem shall be the official designation adopted by the governmental body or the official seal or other alternative logo adopted by the institute of education.
6. Only the name of the governmental body or institute of education is permitted. Additional text such as “Welcome to”, “Home of”, etc. will not be permitted.
7. Legend and emblem size should be limited to a minimum height and size needed for conspicuity.
8. No advertising, product logos, sponsorship information, distances to destinations or names of officials are allowed.

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9. Legend and/or emblem shall be approved by the Department as part of the Highway Occupancy Permit (HOP) process for approving the construction of the pedestrian bridge over a state roadway. Language shall be included in the approval stating the Department is not liable for any damage caused by materials falling off of the structure.

Recreational and Cultural Interest Symbol Signs

Recreational and cultural interest area symbol signs for State or federal parks may be used on conventional roads that pass through or are immediately adjacent to a State or federal park. They may also be used inside these areas to direct tourists to non-vehicular services such as trails and rest rooms.

Symbols may be used as legend components of a directional sign assembly, but no more than four symbols shall be used on a single assembly. The following additional guidelines shall apply:

- Recreational and cultural interest area symbols shall have white legend on a brown rectangular background. Acceptable symbols are included in the "Guide Signs Chapter" of FHWA's *Standard Highway Signs and Markings* book.
- Educational plaques may be placed underneath symbol signs whose meaning is not readily obvious from the symbol graphic itself.
- When an activity is prohibited within a recreational or cultural interest area, a red diagonal slash may be placed on the symbol sign.

Recycling Program Signs

The Recycling Services (I45-1) sign is designed for use within roadside rest areas to encourage the use of recycling services and to identify the group providing the services.

The Recycling Center Sign (I4-2~~11~~) may be used to direct motorists to permanent recycling collection centers from the nearest numbered traffic route or other major highway. The center must be open to the public and consistently take a minimum of three (Act 1988-101) materials. This sign shall not be used in urban areas or on freeways and expressways.

Scenic River Signs

When a creek or river has been legislatively designated as a scenic river, scenic river signs may be installed along State highways when the river is clearly visible from the highway and the Pennsylvania Department of Conservation and Natural Resources (DCNR) requests the signs. Scenic river signs can be ordered from the Sign Shop (48"x24" D5-series) and installed on a reimbursable basis.

The following scenic rivers have been legislatively approved:

Bear Run (Act No. 88-161)

French Creek (Act 82-97)

Lehigh River (Act 82-71)

LeTort Spring Run (Act 88-42)

Lick Run (Act 82-324)

Lower Brandywine (Act 89-7)

Octoraro Creek (Act 83-43)

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Pine Creek (Act 92-124)

Schuylkill River (Act 78-33 & 88-17)

Stony Creek (Act 80-18)

Tucquan Creek (Act 88-161)

Tulpehocken Creek (Act 92-118)

Yellow Breeches Creek (Act 92-118)

In addition to Scenic River Signs along State highways, the Department has agreed to cooperate with DCNR in providing overpass road name signs on canoeable rivers. These signs would be similar to the overpass signs identified in Section Overpass Roadway Identification Signs~~Overpass Roadway Identification Signs~~, except a smaller size may be used on rivers less than 100 feet in width.

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Signs and Banners across State Highways

No person, municipality or corporate entity may place a sign or banner across a State highway or within the highway right-of-way, unless the local municipality has:

1. passed a resolution designating their intention to erect such a sign or banner, and
2. received confirmation from the Department that it has on file a copy of the resolution and all required issues have been adequately addressed.

Resolutions may be for a single event, an event that recurs on a regular basis, or multiple events throughout the year. Permanent cables across the right-of-way for erection of banners are permissible provided they are noted in the resolution. Any municipal sponsored sign or banner placed across a State highway without a resolution on file with the Department can be removed; however, the municipality should first be given the opportunity to pass a timely resolution. No sign or banner may be placed across or within the right-of-way of any limited access highway.

The Department will only consider resolutions that address the following:

- Installation location including SR, Segment/offset and vertical clearance above the roadway (minimum 17'-6").
- Size of the sign or banner, a description of the message, and the event(s) and/or organization(s) for which the banner is being erected. Events must relate to a national, state, regional or local function or charitable affair.
- Approximate date(s) of installation and removal. If the sign or banner is to be installed on a recurring basis, the occasions when it will be displayed and the approximate number of days before and after the occasion when the device will be installed and removed, respectively.
- That the municipality assumes full responsibility for erecting, maintaining and removing the device and all liability for damages occurring to any persons or property arising from any act of omission associated with the sign or banner.
- Acknowledgement that no more than 20-percent of the message will relate to naming or advertising a commercial product, enterprise, business or company regardless of whether they are sponsoring the event or banner installation.
- That traffic control will be performed in accordance with the current Publication 213.

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SR and Segment Markers

SR and Segment markers are valuable in determining field locations for highway maintenance and information-gathering activities. Therefore, the maintenance of these markers is very important.

Any Department employee who observes that a SR or Segment marker is missing or is installed at a questionable location or orientation, should contact the District RMS Coordinator, who in turn will advise the District Traffic Engineer or the Assistant District Traffic Engineer in charge of operations so that the changes can be made. However, under no circumstances should a county install or move a marker without an order from the District RMS Coordinator.

Information on missing and incorrect SR/Segment markers is also collected every year through the STAMPP and LRS QA/QC programs. A computer-generated listing, resulting from the LRS QA/QC, will go to the District RMS Coordinator, who will then work with the appropriate District people to make the changes in the field.

Fiberglass SR and Segment markers are available from contract Legacy No. 9905-13. When ordering the markers, use Exhibit 2-18~~Exhibit 2-20~~ so that all Districts are using the same forms.

As an alternative to purchasing completely finished markers, partially-finished SR and Segment markers may be ordered from the contract. Department personnel can affix the appropriate legend as required (see Exhibit 2-5~~Exhibit 2-5~~). The Sign Shop can provide legend using the following SAP Material Nos.:

SAP Material No.	Description
144489	1.5" numerals for Segment markers
144490	3" numerals for SR markers
144491	4" numerals for Segment markers

Street Name Signs

The 36"x8" Street Name Sign (D3-1) is the standard for this application. In addition, larger signs are authorized and encouraged. Overhead signs mounted on signal mast arms or span wire should have 12-inch upper/lower-case legend, except when engineering justification requires the use of smaller text.

In addition, it is very desirable to place black-on-yellow advance street name signs (D3-2 or D3-3) beneath all intersection warning signs on numbered traffic routes in rural areas (See the Section Advance Street Name Signs~~Advance Street Name Signs~~).

Welcome to Pennsylvania Signs

Welcome to Pennsylvania Signs should be erected on all roadway approaches to the Commonwealth. The standard sizes are as follows:

- Interstate highways – 264"x144" – (I13-2)
- Non-Interstate freeways – 192"x108" – (I13-2)
- Major traffic routes on conventional roads – 144"x78" – (I13-2)
- Other conventional roads – 48"x24" and 72"x36" – (I13-2A)

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Wildflower Area Signs

The Wildflower Area Sign and plaque are designed to advise individuals that wildflowers have been planted and that picking or destroying the wildflowers is illegal. The signs may be procured from the Sign Shop, where they are specified as follows:

18"x24" Wildflower Area Sign, non-reflectorized

18"x12" Wildflower Regulation Plaque, non-reflectorized

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Exhibit 2-~~18~~20 SR and Segment Markers Tabulation Sheet

District _____ **County _____**

Segment Marker (10"x10")			SR Markers (18"x12")					
Qty.	SR No.	Seg. No.	Qty.	1st Line	2nd Line		3rd Line	
				SR No.	Arrow*	Seg. No.	Arrow*	Seg. No.

Arrow Codes:

LH = ←, RH = →, LD = ↖, RD = ↗, UA = ↑

* Arrows to the right should be after the segment number.

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Object Markers

Information on Object Markers can be found in Section ~~3.3~~3.3.

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2.11 Excessive Use of Signs

Sign Clutter

The Districts are requested to regularly review existing signs to ensure that all of the signs are official and are necessary for regulatory, warning or guidance purposes. In addition to removing obsolete and unofficial signs, consider the following suggestions:

a) Use 250-foot typical spacing between no parking signs in rural areas.

b) Review the use of BUMP (W8-1), DIP (W8-2), Slippery When Wet (W8-5) and LOW SHOULDER (W8-9) signs to be sure that they are not left in place after the problem has been corrected.

c) Eliminate the use of 55-mph Speed Limit Signs on non-freeways except when needed to indicate the end of a lower speed limit.

d) Eliminate Stop Ahead (W3-1), Yield Ahead (W3-2) and Signal Ahead (W3-3) signs when the Stop (R1-1) or Yield (R1-2) sign, or the traffic signals are visible by approaching traffic for distances greater than those values noted in the justification for the advance warning sign unless there is a known crash problems. In addition, the "T" Symbol Sign (W2-4) should generally not be used on an approach which also has a Stop Ahead (W3-1) sign.

e) Review the need for existing curve and turn signs.

Double Stop Signs

The installation of one STOP (R1-1) sign on top of another is in conflict with Section 2~~A~~B.11~~0~~4 of the *MUTCD*. Therefore, if this practice exists, the Engineering District should issue the necessary work order to have one of the R1-1 signs removed. Use a larger R1-1 sign if greater emphasis is needed.

If a municipality has any double stop sign installations, advise them in writing that this practice is in conflict with the *MUTCD* and that they should revise the installation.

Sign Grouping

In an effort to improve the roadside environment and to eliminate unnecessary posts, sign grouping and back-to-back installations are encouraged wherever possible. Small relocations of most signs can generally be made without compromising the design standards. Refer to Section 5.1 of the Sign Foreman's Manual, Publication 108.

2.12 Standard Freeway and Expressway Signs

Standards and Approvals

The types of signs unique to expressways and freeways are generally described in Publication 111.

FHWA approval is required for signing on all Interstate highways that does not comply with existing standards:

1. For Federal Oversight projects on the Interstate system, proposed signing is normally included in the PS&E.

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2. For PennDOT Oversight projects on the Interstate system, proposed highway signing that does not comply to existing standards must be sent to the Central Office for submission to the FHWA Division Office. For this submission, include two copies of plan sheets and any sign fabrication details, along with information about the types of posts and breakaway hardware.

Selection of Major Destinations

General

These guidelines are for selecting the most appropriate destinations for major guide signs on expressways and freeways, in order to provide the driver the best orientation possible without overloading the driver with too much information.

Definitions

Destination – The name of an incorporated community, street name, municipal center or large traffic generator, which provides the best orientation for drivers traveling on the expressway or freeway.

Map – The latest edition of the Department's Official Tourism & Transportation Map.

National control city – A city designated as such by the American Association of State Highway and Transportation Officials (AASHTO) for an Interstate highway. A list of appropriate cities is included in Exhibit 2-19~~Exhibit 2-21~~.

Population-to-distance ratio – The ratio of the population of a community identified on the map to the distance in miles from a given interchange.

Urban area – A built-up area which includes any of the following features for a given expressway or freeway:

- Four or more adjacent interchanges serving the same community.
- More than two travel lanes in each direction.
- Interchanges typically spaced at intervals of 3 miles or less.

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Exhibit 2-19~~21~~ National Control Cities in or Adjacent to Pennsylvania

Interstate	National Control Cities
70 EB	Washington, PA; New Stanton; Breezewood; Hancock
70 WB	Breezewood; Wheeling
76	Youngstown; Pittsburgh; Harrisburg; Valley Forge; Philadelphia
78	Harrisburg; Allentown; Bethlehem; Easton; New York City
79	Morgantown; Washington, PA; Pittsburgh; Erie
80	Youngstown; Sharon; Clarion; DuBois; Clearfield; Bellefonte; Williamsport; Bloomsburg; Hazleton; Stroudsburg; Delaware Water Gap, New York City
81	Hagerstown; Chambersburg; Carlisle; Harrisburg; Hazleton; Wilkes-Barre; Scranton; Binghamton
83	Baltimore; York; Harrisburg
84 EB	Milford; Port Jervis
84 WB	Scranton
90	Cleveland; Erie; Buffalo
95 NB	Wilmington; Chester; Philadelphia; Trenton
95 SB	Philadelphia, Chester, Wilmington

Criteria for Selecting Major Destinations

Junction with an Interstate Highway. If the intersecting route is an Interstate highway, the closest national control city to the left and to the right should be used as the destinations on the major guide signs. A list of national control cities in or adjacent to Pennsylvania is included in Exhibit 2-19~~Exhibit 2-21~~.

Interchange with an Expressway or Non-Interstate Freeway. If the intersecting route is an expressway or a non-Interstate freeway, the first major city, borough or municipal center identified on the map in each direction along the intersecting route should be used as the destinations on the major guide signs. Each destination should generally have a population of at least 10,000 people and be within 20 miles in urban areas, and within 50 miles in rural areas. Municipal centers should have a concentrated center, but need not be an incorporated municipality.

Non-Urban Areas – Interchange with a conventional road. In non-urban areas at interchanges with conventional roads, an effort should be made to have a destination to the left and to the right on the major guide signs.

1. If the intersecting highway is a U.S. or PA traffic route, the destinations should generally be the closest city, borough, village or home-rule municipality to the left and to the right as identified on the map. If a more distant community exists along the traffic route having a population-to-distance ratio at least 50 percent greater than any closer community identified on the map, the more distant community name may be used in lieu of the closer community name providing the more distant community:

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- is not directly linked to another interchange along the traveled route within the next 25 miles; and
- is within 15 miles if it has a population less than 10,000 or within 20 miles if it has a population greater than 10,000.

2. If the intersecting route is not a numbered traffic route, the destinations should generally be the closest city, borough, village or home-rule municipality to the left and to the right, on or immediately adjacent to the crossing highway as identified on the map. If a more distant community exists on or immediately adjacent to the crossing route that has a population-to-distance ratio at least 50-percent greater than any closer community, the more distant community name may be used in lieu of the closer community name providing the more distant community is shown on the map and is within 5 miles, or within 10 miles if it has a population over 5,000.
3. If at least one destination cannot be selected which satisfies the criteria in paragraphs (1) or (2), a "point location" which is not shown on the map (for example, a village) may be used.

Urban Areas – Interchange with Conventional roads. In urban areas at interchanges with conventional roads, street names or municipal center names should generally be used instead of community names, after receiving written concurrence of the local authorities. In addition, a Community Next (___) Exits sign and Interchange Sequence signs should generally be used in urban areas.

Special Signing

Trailblazing. Consider trailblazing to traffic routes near the interchange by providing the traffic route shield and the "TO" supplemental message.

Large Non-Municipal Traffic Generators. Bridge and freeway names are effective destinations to provide orientation for drivers, especially in large metropolitan areas. In addition, it is permissible to use the name of a large traffic generator as the destination if the crossing roadway essentially only serves the traffic generator; examples of large traffic generators include airports, national and State parks, industrial parks, etc.

Multiple Signs. Where two or more guide signs are on the same structure, it is desirable to limit destination names to one per sign, or to a total of three in any direction of travel.

Design Considerations. The field location and layout details of the guide signs should be in conformance with Traffic Standards 8701A and 8701D (Publication 111) respectively.

Municipal Name Signs. Signs to identify the municipal boundaries may be installed in accordance with the section Municipal Name Signs~~Municipal Name Signs~~.

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Selection of Supplemental Destinations

The following is the Department's policy for the selection of supplemental destinations which has been developed in accordance with the *AASHTO Guidelines for the Selection of Supplemental Guide Signs for Traffic Generators Adjacent to Freeways* which are incorporated by reference in the *MUTCD*. Only the following policy shall be used when selecting destinations for new Supplemental Guide Signs and for maintaining existing signs.

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Information regarding destinations accessible from an interchange other than the destinations on the major guide signs may be listed as:

1. An attraction on Logo Signs (refer to Section 2.14~~2.14~~), or

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2. A destination on a Supplemental Guide Sign if determined to be appropriate by the Department.

Because Supplemental Guide Signs can only accommodate two destinations per freeway interchange, the preferred method is also to use Logo signs, whenever possible. However, if a destination is not eligible for Logo Signs under Section 2.14~~2.14~~, it may be eligible for inclusion on a Supplemental Guide Sign. The following Exhibit 2-20~~2~~ lists the types of facilities that are eligible for Supplemental Guide Signs and the specific criteria for participation. All other facilities, provided they meet the requirements, will be signed under the Department's Logo Program and application will be made through the Pennsylvania Tourism Signing Trust (PTST).

Exhibit 2-20~~22~~ Eligible Attractions for Supplemental Guide Signs

Type of Facility	Specific Criteria	Maximum Distance from Interchange (miles)
Stadiums /Arenas/Auditoriums	300,000 Annual Attendance	5 urban & rural
College/University	10,000 Fulltime Enrollment & Dormitory Facilities	3 urban, 5 rural
Airports[1]	FAA Designated Commercial Service Airport	10 urban & rural
State & National Parks	100,000 Annual Attendance	5 urban & rural
Military Base	5,000 employees or permanently assigned military	5 urban & rural
Casino	Category I or II[2]	5 urban & rural
City / Borough / Village / Home-Rule Municipality	Identified on the Department's Official Tourism & Transportation Map	15 - Population < 10,000[3] 20 - Population > 10,000[3] 5 - Population < 5,000[4] 10 - Population > 5,000[4]

[1] An airport can be signed as a primary destination on a major guide sign if the interchange provides dedicated access to only the airport.
[2] Category I (racino) or II (stand-alone casino) slot machine license issued by the PA Gaming Control Board. Both licenses permit up to 250 table games and 5,000 slot machines.
[3] The intersecting route is a U.S. or PA traffic route.
[4] The intersecting route is not a numbered traffic route.

All Supplemental Guide Signs shall be erected immediately in advance of the interchange which provides access to the facility. To ensure space for a Logo Service Sign which can accommodate more participants, the last remaining location for signing shall not be used for the placement of a Supplemental Guide Sign. The installation of any Supplemental Guide Sign shall be approved by the Bureau of Operations, and the request for approval shall include a plan sheet depicting all existing signs along with the proposed location of the Supplemental Guide Sign and a fabrication detail. Supplemental Guide Signs should be spaced at least 800' apart from other major guide signs including Logo Signs. No more than two eligible destinations shall be displayed on a Supplemental Guide Sign, and no more than one Supplemental Guide Sign shall be erected in each direction for an interchange. Additionally, Supplemental Guide Signs shall not be installed at freeway-to-freeway interchanges.

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The attraction is responsible for the ownership and maintenance of the Supplemental Guide Sign, which includes monitoring the sign presence and quality, and paying all costs to either repair the sign or to replace the sign at the end of its 18-year service life. This applies to all existing Supplemental Guide Signs as well as new signs. If the attraction fails to maintain responsibility for the sign, then the sign shall be removed and the only option for signing for the attraction will be the Logo Program. Districts/counties can elect to use state funds to make minor repairs to Supplemental Guide Signs. Federal money shall not be expended for maintenance of these signs unless the sign is for a federal facility such as a national park or military base. When signs are repaired or replaced as part of construction projects, reimbursement agreements should be executed with the attraction in advance to recoup the funds expended. Work on Supplemental Guide Signs that are not repaired or replaced as part of construction projects should be accomplished either by the attraction or performed by the Department and the attraction invoiced. In all instances, SAP Plant Maintenance notifications shall be completed to record the maintenance history of the signs.

Motorist Service Signs

Motorist Service Signs are generally installed only on freeways. Two specific types are available: (1) General Motorist Service Signs (Section 2.13~~2.13~~), and (2) Logo Signs (Section 2.14~~2.14~~).

Logo signs are now installed on most Interstate highways and freeways by the Pennsylvania Tourism Signing Trust. Therefore, the counties and Districts should not expend unnecessary monies to replace general motorist service signs on Interstate highways unless it is known that logo signs will not be installed at the interchange.

Reference Location and Enhanced Reference Location Signs

Signs shall be erected on all Interstate highways showing the mileage along the route with increasing order in the same direction as increasing interchange numbering. Historically, these signs were called "mile markers" or "distance markers," but they are now referred to as "reference location signs." These signs should be installed in accordance with the procedures identified in Publication 111.

Exhibit 2-21~~Exhibit 2-23~~ shows three types of "reference location signs" that may be used, but the Version 2 type is required and only to be used on sections of highway where Intermediate Reference Location (D10-1a, D10-2a or D10-3a) signs are used at 1/10th or 2/10th-mile intervals as discussed in the Section, Intermediate Reference Location Signs~~Intermediate Reference Location Signs~~:

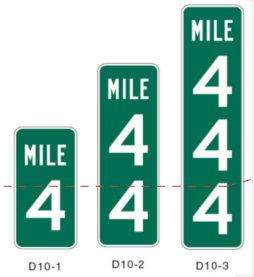

Exhibit 2-21~~23~~ Versions of Reference Location Signs

Version	Nomenclature	Description
1	D10-1, D10-2, D10-3	Reference Location Sign
2	D10-1a, D10-2a, D10-3a	Intermediate Reference Location Signs
3	D10-5	Enhanced Reference Location Sign

Mileage on circumferential freeways shall increase in a clockwise direction, beginning with Mileage 0 (i.e., MP 0) with the first interchange west of a radial freeway or other Interstate route or some other conspicuous landmark in the circumferential route near a south polar location.

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Mileage on spur routes should begin with Mileage 0 at the junction with the main line of the principal route. If the spur route connects two different main line routes, the principal route is the one with the same last two digits in the route number and the spur. For example, I-283 connects both I-76 and I-83, but I-83 is the principal route.

Where numbered freeways overlap, continuity of the mileage shall be established for the RMS priority route only.

When a District elects to install D10-1, D10-2, D10-3 D10-4, or D10-5 signs at 1-mile intervals on non-interstate freeways, the procedures outlined below will be followed for their installation.

a) Only full limited-access highways will be considered.

b) Mileage on the signs will increase south-to-north and west-to-east, consistent with the existing RMS system. Mileage 0 (MP 0) will begin at the southern or western state line respectively, or at the beginning of the numbered traffic route. Determine subsequent distances by traveling the route with a distance-measuring instrument (DMI) and marking locations on the shoulder. At the same time, verify the segment/offset for subsequent entry into the RMS database.

c) Compute distances consecutively, consistent with RMS, regardless of missing sections of limited-access highway. For example, US 15 begins at the Maryland line (MP 0) and increases for a distance of 22 miles before the limited-access portion of the highway terminates. About 15 miles farther, another limited-access portion of US 15 begins with the posting of Distance Marker MP 37.

d) The presence of county lines will have no consequence on the mileage determination just as in the case of the Interstate System.

e) In situations where traffic routes overlap, the standard RMS convention for assigning priority will apply, and the mileage for the priority route will be continuous on the D10-1, D10-2, D10-3 or D10-4 signs. When routes subsequently separate, base distances on each route having carried the distances continuously. For example, where US 22 and US 322 overlap, the signs will carry the mileage based on US 22. Once the routes separate, US 322 will pick-up the mileage as if it had been continuously carried through the overlapped section.

f) Prior to the installation of any D10-1, D10-2, D10-3 or D10-4 signs, each sign must be identified on the "RMS Mile Marker Screen" accessed through the 406-Menu Screen (#21) or through the Jump Screen (#20). The District must identify each proposed sign location by county/SR/segment/offset and enter them in RMS. Note that the segments and offsets will not be modified to correspond with the mileage, as is the case with the Interstate System.

g) When changes in alignment (e.g., construction of new limited-access highway, reconstruction of existing conventional road, etc.) result in recalibration of RMS distances contiguous to the section of highway where D10-1, D10-2, D10-3 or D10-4 signs are installed, the signs will be relocated to correspond with the new RMS stationing. These revised locations must be input in RMS as discussed in paragraph f above. Note that when realignments occur on non-freeway sections that result in actual mileage changes of the route, but do not affect the section of highway where D10-1, D10-2, D10-3 or D10-4 signs are installed, it is not required that the sign be relocated.

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Intermediate Reference Location Signs

To assist in locating incidents, the Department has adopted the Intermediate Reference Location (D10-1a, D10-2a, and D10-3a) signs as identified in Section 2H.06 of the *MUTCD*.

Department policy for Intermediate Reference Location (D10-1a, D10-2a, and D10-3a) signs is as follows:

1. It will be up to each Engineering District to determine when and where to install the D10-1a, D10-2a, and D10-3a signs; however, all initial installations shall be by contract.
2. The D10-1a, D10-2a and D10-3a signs shall only be installed on freeways and full limited-access portions of expressways where Enhanced Reference Location with Decimal (D10-5) signs currently exist or will be installed concurrently with the D10-1a, D10-2a and D10-3a signs. (This may require replacing the existing D10-1, D10-2 and D10-3 signs.)
3. Avoid installing D10-1a, D10-2a and D10-3a signs for short distances (i.e., less than 5 miles) or intermittently. Always use logical termini.

4. Intermediate Reference Location (D10-1a, D10-2a and D10-3a) signs will be installed at 2/10th-mile intervals (i.e., even-numbered tenths) except as follows:
    a. Use 1/10th-mile intervals in urban areas where AADT exceeds 75,000 or the interchange spacing averages less than 1.5 miles
    b. Use 1/10th-mile intervals for crest vertical curves in excess of 1,000 feet where the rate of vertical curvature (K), as defined in the AASHTO Policy of Geometric Design of Streets and Highways, exceeds 380.
    c. Use 1/10th-mile intervals on horizontal curves where the sight distance is less than 1,000 feet and the D10-1a, D10-2a and D10-3a signs are mounted on the same side of the highway as the direction of the curve.
5. Install all D10-1a, D10-2a and D10-3a signs in accordance with TC-8710. Consider mounting the D10-1a, D10-2a and D10-3a signs back-to-back in the median when the median width is 30 feet or less. Otherwise, install them along the right edge of the highway.
6. When traffic routes overlap, use the standard RMS convention to assign priority.
7. For non-interstate freeways, the District must identify each proposed D10-1a, D10-2a and D10-3a sign by county/SR/segment/offset, and ensure that they are in RMS before the physical installation begins. To enter the data, access the "RMS Mile Marker Screen" through the 406-Menu Screen (#21) or through the Jump Screen (#20). Note that the segments and offsets will not be modified to correspond with the mileage as is the case with Interstate highways.
8. Deployment of D10-1a, D10-2a and D10-3a signs will include the distribution of mapping to local first responders and emergency management officials.

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Interchange Numbering

Interchange numbering provides valuable orientation for motorists and is required on all Interstate highways. When used, interchange numbering shall be mileage-based, and conform to the mileage of the nearest Reference Location or Enhanced Reference Location signs as discussed in the Section Reference Location and Enhanced Reference Location Signs~~Reference Location and Enhanced Reference Location Signs~~. Junctions with other freeways, including other Interstate highways shall be numbered.

On multi-exit interchanges, such as a cloverleaf interchange, use the suffix letters A or B. In the direction of increasing interchange numbering, the first exit shall use the suffix A and the second exit shall use the suffix B. In the opposite direction, the exits shall typically be given the suffixes in the opposite order so that both Exit A's go toward the same destination, and both Exit B's go toward the same destination.

If it is necessary to revise exit numbers, use the transitional signing procedure identified in the Section Revised Exit Numbers~~Revised Exit Numbers~~.

Overhead Signs

Luminaires are not required on new overhead sign installations when a minimum 800-foot tangent sight distance exists in advance of the sign and the vertical alignment allows headlights to illuminate the sign. Districts may also disconnect existing luminaires on signs with minimum Type VIII or IX reflective backgrounds when the necessary sight distance exists.

Overhead sign structures shall not be left without any signs on the superstructure, since signs are necessary for vibration-dampening purposes.

Upgrading Temporary Signs

Publication 111 specifies the appropriate legend size for all common expressway and freeway signing. All signs with legend smaller than the specified size are considered temporary. Sections of Interstate highways with temporary signs are eligible for Interstate funding for sign replacement.

Overpass Roadway Identification Signs

The installation of Overhead Roadway Identification (I18-1) signs are encouraged on expressways and freeways to identify the numbered traffic route or local name of the roadway on the overpass bridges.

Center all I18-1 signs over the roadway approach, mounted flush to and at the same grade as the parapet on the overpass. Avoid mounting signs over expansion joints.

Public Relations

When the Department proposes to change signing that may cause street address or directional differences, such as changing exit numbers, exit suffixes, destination names, etc., it is imperative that adequate advance public relations be conducted with local authorities and other community organizations. The notification should be as far in advance as possible, with follow-up information as the event nears.

2.13 General Motorist Service Signs

Purpose and Authorization

This policy establishes uniform guidelines for the approval, design, installation and replacement of general motorist service signs for gas, diesel, electric vehicle charging (EV), compressed natural gas (CNG), liquefied

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natural gas (LNG), liquefied petroleum gas (LPG), hydrogen fuel (HYD), food~~gas, food, diesel~~, lodging, information, camping, hospital and State police, on freeways and locations between the freeway and the motorist service. Since logo signs (Section 2.14~~2.14~~) are anticipated for most Interstate highways, extensive changes in current general motorist service signs are not desirable except on those Interstate highways where logo signs cannot be installed.

The final authorization of signs and the selection of sign locations will rest with the Department. When the signs are to be installed on an Interstate highway, the Department's authorization is contingent upon approval of the Federal Highway Administration if the signing is not in conformance with Publication 111. The authorization of signs should not be construed to be an endorsement of the facility or the services offered, but only means that the minimum standards and criteria are satisfied.

Definitions

Motorist service – A gas, diesel, EV, CNG, LNG, LPG, HYD, food, food~~, diesel~~, lodging, camping, information, hospital or State Police service as identified in the Section Acceptable Types of Motorist Services~~Acceptable Types of Motorist Services~~.

Motorist service directional sign – A sign on off-ramps and on conventional roads, which displays one or more motorist service symbols or legends and a one-way or two-way directional arrow.

Motorist service panel – A sign along a freeway displaying one or more motorist service symbols or legends and the appropriate legend "NEXT RIGHT" or "SECOND RIGHT."

Motorist service symbol – Any of the eight symbols identified in Exhibit 2-22~~Exhibit 2-24~~.

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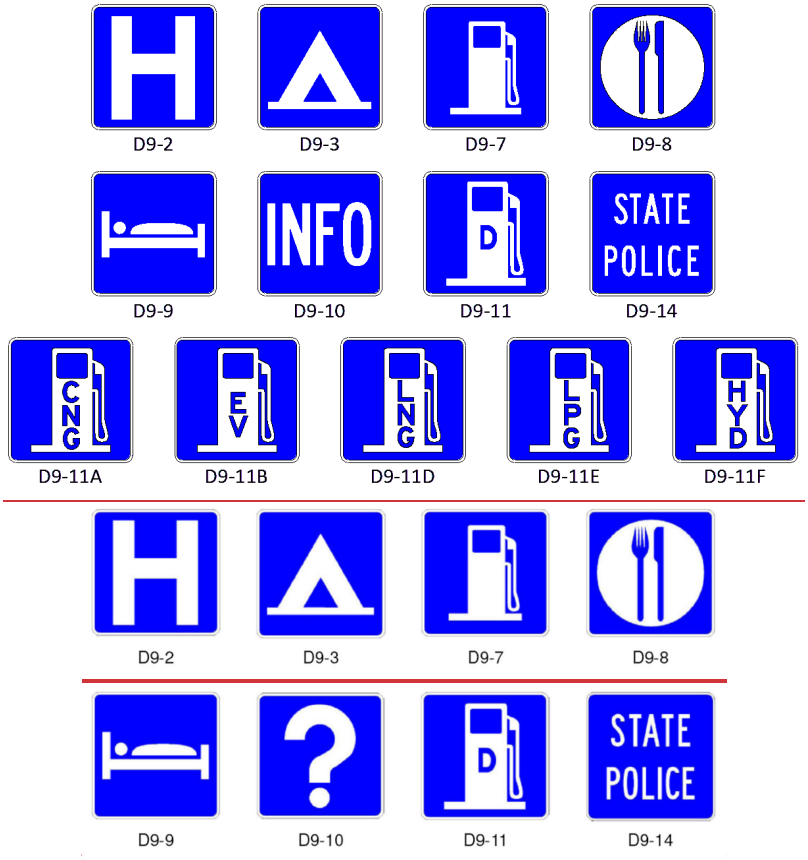
Exhibit 2-22~~24~~ Motorist Service Symbols



Acceptable Types of Motorist Services

1. Camping. A campground licensed by the Department of Environmental Protection (DEP) with continuous operation for at least 6 months each year; accommodations for a minimum of 20 campers; an attendant available during the normal working hours; rest rooms with showers, running water and flush toilets; laundry facilities; and a public telephone. Accommodations sold on a time sharing basis or otherwise not available for general public use will not be considered toward the minimum requirements (Section 2.~~7~~0 allows personalized attraction signs on non-freeway facilities, and Section 2.1~~4~~2.~~14~~ provides for logo signs on select Interstate highways.)
2. Food. A restaurant with a license issued by the Department of Health; seating for at least 20 people; continuous operation for at least 11 consecutive hours, 7 days a week; public rest rooms with sink, running water and flush toilet; and a public telephone.

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3. Gas or Diesel**.** A station with gasoline or gasoline and diesel fuel~~; water for radiators~~; rest room with sink, running water and flush toilet; and continuous operation for at least 16 hours per day, 7 days per week~~.; and a public telephone.~~

~~3.~~4. EV, CNG, LNG, LPG or HYD. A location with EV (must be Level 3 minimum), CNG, LNG, LPG or HYD; continuous operation for at least 16 hours per day, 7 days per week.

~~4.~~5. Hospital. A facility with approval as a hospital by the Department of Health; and continuous emergency care capability to the general public with a doctor on duty 24 hours a day, 7 days a week.

~~5.~~6. Information. An establishment with approval by the Department of Commerce as a tourist or visitor information center; an open season of at least 6 months each year; open at least 10 hours per day, 7 days per week between Memorial Day and Labor Day, and at least 8 hours per day, 7 days a week during the balance of the open season; an attendant on duty during all open hours; and free access to rest rooms, drinking water and telephone service.

~~6.~~7. Lodging. A hotel or motel with adequate sleeping accommodations and off-street parking for at least 20 private rooms with private baths; continuous year-round operation 24 hours a day, 7 days a week; and a public telephone.

~~7.~~8. State Police Station. A station manned by State Police 24 hours a day, 7 days a week.

Additional Criteria

a) Laws and Regulations. All motorist service facilities shall conform to all applicable Federal, State and local laws or regulations, and be open to all persons regardless of race, color, religion, ancestry, national origin sex, age or handicap.

b) Distance from Freeway. The services shall be within the following distances from the ramp terminus and the crossing route:

- Gas, diesel, EV, CNG, LNG, LPG and HYD ~~Gas and diesel~~ – 1.0 mile, except the maximum distance ~~for "gas"~~ may be increased up to a total of 2.0 miles if the average distance to adjacent interchanges is more than 6 miles.
- Food, lodging, and information – 2.0 miles, except the maximum distance for "food" may be increased up to a total of 3.0 miles if the average distance to adjacent interchanges is more than 6 miles.
- Hospitals and State Police stations – 3.0 miles. (5.0 miles for Hospitals in rural areas.)
- Camping – 3.0 to 15.0 miles. If camping services are not available within the 3.0-mile limit, the limit may be extended up to 15.0 miles in increments of 3 miles until there are participants.

c) Urban Areas. Only Information, Hospital and State Police services will be signed at interchanges within the corporate boundaries of a city, or an area which appears as an urban or metropolitan area.

d) Continued Travel. Signs will not be authorized where a U-turn or illegal movement is required or at locations where motorists cannot conveniently return to the freeway for continuation of travel in the same direction. Signs will not be authorized at interchanges with freeways.

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Sign Location

Motorist service panel. When motorist service panels are installed on freeways, they should be erected following the first major guide sign and, if possible, following any supplemental guide sign. A minimum 800-foot spacing will be maintained between this sign and any large guide sign.

Freeway off-ramp. A Motorist Service Directional Sign will be erected on freeway off-ramps if exiting traffic can turn in both directions on the crossing route and the motorist service is not readily visible to approaching motorists.

Conventional road. Except for camping and information services, Motorist Service Directional Signs may be installed along the crossing route and at subsequent locations to indicate directional changes for motorists traveling from the freeway. The distance to the service may also be indicated if the service is not within the immediate interchange area. (Legend-type signs with the campground or visitor center's name may be authorized at the service's expense along the crossing route and at subsequent locations in accordance with Section 2.7~~0~~.) In addition to trailblazing from freeways, signs may also be installed along conventional roads for State police stations and hospitals, directing motorists from the nearest numbered traffic route or other major highway, providing the maximum distance does not exceed the appropriate base mileage identified in the Section Additional Criteria~~Additional Criteria~~.

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Local roadways. If signs are required on local roadways (municipal streets or roads) in order to trailblaze motorists from a State highway to the service, the installations shall be coordinated to ensure signing continuity.

Insufficient space. If insufficient space is available for motorist service signs, do not authorize any Motorist Service Signs will be authorized.

Design of New Installations

Motorist Service Panels and Motorist Service Directional Signs will be designed in accordance with Publication 111. In urban areas (where motorist service panels are not installed) the Department may install "Information," "Hospital," or "State Police" motorist service symbols beneath the last advance major guide sign (the last sign with a distance to the off-ramp included on the sign) before the off-ramp. When only one motorist service symbol is warranted prior to an interchange and a motorist service panel does not exist, the appropriate symbol may be installed beneath the last advance major guide sign prior to the off-ramp. (All signs installed beneath major guide sign shall either be attached only to one of the posts or shall be attached to the major guide sign, so as to avoid interfering with any breakaway hinge.)

Procedures for Application

The Department will review the motorist services when a roadway is being "resigned," and may have signs erected for applicable motorist services.

Requests for service signing may be submitted to the Department at any time. The application (Exhibit 2-23~~Exhibit 2-25~~) should be returned to the appropriate Engineering District Office. The Department will assume all costs associated with the erection of general motorist service signs.

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Exhibit 2-~~23~~25 Application for General Motorist Signs

Instructions:

i. Read Section 2.13~~2.13~~ in its totality.
ii. Complete the questions at the bottom of this sheet.
iii. Send the application to the appropriate Engineering District Office. (The District Office will review the application, determine if the facility qualifies for motorist service signing, and respond to you.)

1. Circle type(s) of Service:

Gas	Diesel	EV	CNG	LNG
LPG	HYD	Food	Lodging	
Camping	Hospital	Information	State Police	
~~Gas~~	~~Food~~	~~Lodging~~	~~Diesel~~	
~~Camping~~	~~Hospital~~	~~Information~~	~~State Police~~	

2. Business name and address _____

_____

_____Telephone No._____

3. Direction from the interchange ._____

Distance from the interchange._____

4. Locations of proposed motorist service signs: Route, Intersecting Route, Interchange name and number:_____

_____

5. Applicant's name and address ._____

_____

_____Telephone No. _____

6. I certify that the requirements of the Section Acceptable Types of Motorist Services~~Acceptable Types of Motorist Services~~ and the Section Additional Criteria~~Additional Criteria~~ are satisfied, and I agree to immediately advise the Department of any changes that the business does that relate to these requirements.

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Signature

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2.14 Logo Program

Purpose

The logo program is a traveler information service provided for motorists that travel Pennsylvania highways. Moreover, since "logo" signing is authorized as a public service, only those services and facilities that are reasonably accessible at interchanges will be signed.

Therefore, the purpose of this subchapter is to establish guidelines for the approval, design, erection, maintenance and funding of logo signing along Interstate highways and other freeways for gas, food, lodging, camping services, and general attraction destinations.

Authority

These guidelines are in accordance with standards issued by the Federal Highway Administration under authority of Title 23, U.S. Code Sections 109(d), 131(f) and 315, the Manual on Uniform Traffic Control Devices, 49 CFR 1.48(b), and Title 75 Pa.C.S. § 6122. Where differences occur between these guidelines and the national standards, the more restrictive shall govern.

Administration

The program is currently administered by the Pennsylvania Tourism Signing Trust whose duties and responsibilities are defined in the Section Duties of a Logo Signing Trust~~Duties of a Logo Signing Trust~~. All signs become the property of the Department after they are erected. Additional information is available at www.palogo.org.

Definitions

Attraction – A facility that is of interest to and destination for motorists and is eligible for participation in the logo program, herein referred to as a business or service.

Freeway – A highway to which the only means of ingress and egress is by interchange ramps.

General public – The people of society who are not members of a particular organization or who do not belong to a particular group.

Logo Panel – A business identification sign panel provided by the business or attraction to identify the business's trademark or business's name. ~~A sign provided by the business or attraction to identify the business's trademark or name.~~ The Logo Panel is attached to the Sign Panel, Ramp Sign or Trailblazer.

Ramp sign – A small sign panel erected along an off-ramp to direct motorists to a particular service. (See Exhibit 2-29~~Exhibit 2-31~~)

Sign panel – The main part or backpanel of a specific service sign to which individual logo panels are attached.

Specific Service Sign – A guide sign that provides business identification and directional information for services and for eligible attractions along limited-access highways. Eligible service categories shall be limited to gas, food, lodging, camping and attractions. (See Exhibit 2-25~~Exhibit 2-27~~, Exhibit 2-26~~Exhibit 2-28~~, and Exhibit 2-27~~Exhibit 2-29~~.)

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Tourist Oriented Directional Sign (TODS) – A 72"x24" or 48"x16" directional sign (D7-4) with white legend on blue or brown background that indicates the name of, and gives directional guidance to the attraction. These signs are located for individual Participant(s) and serve as trailblazers for attraction participants.

Trailblazer – A small sign panel similar to a ramp sign (or D7-4 TODS-type sign for attractions) that is erected on the road network accessed by way of a logo-signed interchange to direct motorists to a particular service.

Types of Services

Services are limited to gas, food, lodging, camping, and attractions. To qualify, services shall be open to the public regardless of their race, religion, color, sex or national origin. They shall have paved driveway entrances which are properly permitted by the Department or municipality, as applicable, except campground and attraction entrances for fairgrounds; recreational areas; state and national parks, forest or cemetery, or state game lands; and unique natural areas may be unpaved. Each facility shall have adequate on-premise signing which is clearly visible to approaching motorists and identifies the service location, and shall satisfy the following:

a) Gas. A station for cars or trucks, which provides gasoline. The station may also provide diesel, CNG, LPG, LNG, HYD, electric (must be Level 3 minimum) or other alternative fuel and may include a supplemental message for only one alternative fuel provided. There must be available at the station oil and free public rest rooms with sinks and running water. The station shall be in continuous operation for at least 16 hours per day, 7 days a week.

~~a) Gas. A station for cars or trucks, which provides any one of gasoline, diesel, CNG, LPG, LNG, electric (must be Level 3 minimum) or other alternative fuel. There must also be available at the station oil and free public rest rooms with sinks and running water. The station shall be in continuous operation for at least 16 hours per day, 7 days a week. A telephone on or within 500 feet of the property shall be available during hours of operation. Any facility that qualifies for participation under the gas service that does not sell gasoline must include supplemental messages of the alternative fuels provided followed by the word "ONLY".~~

b) Food. A restaurant which is licensed by the Department of Agriculture or local health jurisdiction, accessible without an admission fee, and provides seating for at least 20 people within the same building, in continuous operation for at least 10 hours per day, 6 days a week, and contains public rest rooms with sinks and running water. Restaurants within shopping centers will not qualify unless they have an outside entrance directly accessing the restaurant's leased space, which is clearly labeled and readily visible and accessible to approaching motorists. Restaurants only open 6 days a week must include a supplemental message on their logo panel stating the day they are closed. As an alternate to the indoor seating criteria, food services featuring car-side service must provide parking accommodations for at least 18 vehicles under a permanent roof incorporated into the overall structure of the building, and must provide means whereby motorists may conveniently order food, make payment, and receive delivery of meals by either mechanical or electronic means, or by full-service car-side delivery, without having to exit the vehicle.

c) Lodging. A hotel or motel with private rooms and baths, ~~public telephones or telephones provided in each room,~~ adequate off-street parking, and available 24 hours a day, 7 days a week. Condominiums and time-share forms of hotel occupancy may participate, provided they are marketed to the General Public for overnight accommodations.

d) Camping. A campground with continuous operation for at least 6 months per year and a minimum of 20 overnight sites. An attendant shall be available during the hours of operations and rest rooms

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with showers, running water and flush toilets shall be available. ~~A public telephone also shall be available on the site or within 500 feet of the property.~~ Accommodations sold on an annual or a time-sharing basis or otherwise not available for general public use will not be counted toward the minimum requirements.

e) Attraction. An attraction must fall under one of the categories listed below. An attraction, except as otherwise provided, must have adequate legal parking accommodations, provide public restrooms with sinks and running water (Commerce Park excluded), be open a minimum of 30 days per year, and have a minimum annual per capita usage pursuant to Exhibit 2-24~~Exhibit 2-26~~. If there is an admission charge, it must be readily visible to prospective visitors at the point of entry.

- Amusement Park. A permanent area which is open to the general public for activities such as picnicking, hiking, swimming, boating, entertainment rides, etc.
- Arena. A stadium, sports complex, auditorium, civic or convention center or racetrack, which has a capacity of at least 5,000 as determined by the Pennsylvania Department of Labor and Industry.
- Brewery. A licensed site which shall be open to the General Public for tours, tasting and sales, a minimum of 1,500 hours per year, on-site brewing and provide an educational format for informing visitors about beer and beer processing.
- Business District. An area within a municipality which is officially designated and signed as a business district by the local officials of the municipality.
- College or University. An institution which is approved by a nationally recognized accreditation agency and which grants degrees.
- Commerce Park. A group of commercial manufacturing facilities recognized and signed as a commerce park by the local authorities. Any Commerce Park that has been granted Keystone Opportunity Zone status is exempt from the requirements for minimum acreage and number of required businesses in Exhibit 2-24~~Exhibit 2-26~~.
- Cultural Center. A facility for the performing arts, exhibits, or concerts.
- Distillery. A licensed site which shall be open to the General Public for tours, tasting and sales, a minimum of 1,500 hours per year, on-site distillation and provide an educational format for informing visitors about liquor and liquor processing.

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Exhibit 2-~~24~~26 Eligible Attractions for Logos

Type of Attraction	Specific Criteria	Urban Area	Rural Area
College or University	Enrollment (Full & Part Time)	2,500	~~1,200~~800
Business District	Number of Businesses	75	50
	Municipal Population	15,000	10,000
State or National Park, Recreational Area, Forest, State Game Land, Cemetery	Certified Attendance Figures	20,000	20,000
Amusement Park, Arena, Cultural Center, Facility- Tour Location, Fairground, Golf Course, Historic Site/Area, Museum, Observatory, Ski Area, Unique Natural Area, Zoo/Botanical Park	Certified Attendance Figures	20,000	12,000

Type of Attraction	County Population	Acres	Businesses
Commerce Park	< 100,000	5	3
	≤ 500,000	10	5
	≤ 1,000,000	15	10
	> 1,000,000	25	15

- Facility, Tour Location. A business that conducts daily or weekly tours on a regularly scheduled basis. Eligible attractions may be on-site tours that operate year-round at facilities such as plants, factories or institutions. Eligible attractions may also be off-site tour-providers services that operate tours daily or weekly at least six months per year for local attractions of historical, architectural, cultural or scientific interest to tourists, such as battlefields or historic districts. Tours of the off-site type are typically conducted by boat, carriage, motor coach, railway, etc. For tour-provider services, only the point of purchase for the service shall be signed.
- Fairground. A tract of land where fairs or exhibitions are held, and which has permanent buildings including, but not limited to livestock exhibition pens, exhibition halls, bandstands, etc.
- Gaming. A facility issued a Category 1, 2 or 3 slot machine license by the Pennsylvania Gaming Board under provisions of Act 71 of 2004.
- Golf Course. A facility open to the public and offering at least nine holes of play. Miniature golf courses, driving ranges, chip-and-putt courses, and indoor golf shall not be eligible.

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- Historical Site or District. A structure or area recognized by the Pennsylvania Historical and Museum Commission as a historic attraction in the National Register, individual properties, or historic districts in Pennsylvania. Historic districts shall provide the public with a single, central location, such as a self-service kiosk or welcome center, where motorists can obtain information regarding the historic district.
- Museum. A facility, open to the public at least 100 days per year, in which works of artistic, historical, or scientific value are cared for and exhibited to the public.
- Observatory. A facility designed and equipped for making observations of astronomical, meteorological, or other natural phenomena.
- Recreational Area. Recreational attractions including, but not limited to, bicycling, boating, fishing, hiking, rafting, swimming, picnicking, snowmobiling, or cross country skiing.
- Shopping Center/Antique & Flea Market. A shopping center is a group of stores separated by floor to ceiling partitions, which has a minimum of 10 stores and a minimum of 400,000 square feet or has a minimum of 30 stores and a minimum of 100,000 square feet. An antique & flea market is a group of 75 or more vendors or having a total area of 30,000 square feet , that specializes in the sale of antique and/or flea market items; such applicants shall certify that they comply with Pennsylvania's sales tax laws and regulations.
- Ski Area. A downhill skiing area with equipment rentals, or a cross country ski area with equipment rentals and a minimum of 5 miles of marked and groomed trails.
- State and National Park, Forest or Cemetery, or State Game Land. An area designated by and under the jurisdiction of the National Park Service, the Veterans Administration, Pennsylvania Department of Conservation and Natural Resources, or Pennsylvania State Game Commission.
- Unique Natural Area. A naturally occurring area which is of outstanding interest to the general public, such as a waterfall or a cavern.
- Visitor Information Center. A visitors information center open at least 6 months each year, including 9 hours each day between Memorial Day and Labor Day, and 8 hours each day during the balance of the open season. The facility shall have an attendant on duty during the open hours, and provide free access to travel literature, rest rooms, and drinking water. Centers other than those owned and operated by the Commonwealth of Pennsylvania must be administered by the appropriate local tourist promotion agency.
- Winery. A licensed site which produces a maximum of 200,000 gallons of wine per year. Sites shall maintain a minimum of 5~~3,0~~00 vines or 5 acres of vineyard in the Commonwealth; be open to the general public for tours, tasting and sales a minimum of 1,500 hours per year and provide an educational format for informing visitors about wine and wine processing.
- Zoological/Botanical Park. A facility in which living animals or plants are kept and exhibited to the public.

Distance to Services

The normal maximum distance that services may be located from the end of the off-ramp to qualify for a logo is as follows:

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Service		Distance
Gas		1.0 mile
Food		2.0 miles
Lodging		3.0 miles
Camping		5.0 miles
Attraction	-	5.0/15.0 miles*

* 5.0 miles from an interchange identified by the Department's Urban Boundary Classification Maps, or 15.0 miles from a rural interchange

The measurement to each business shall be along both public and private roadways and driveways delineated by pavement markings, signs and other traffic control devices. The distance is measured by computing the travel length from the terminus of the exit ramp of the most convenient interchange, to the following location:

- Gas, food, lodging and camping. The termination point is the primary building entrance for the service.
- Attractions. The termination point is the primary building entrance for the service, except the termination point for attractions with satellite parking is the gate, ticket booth or other type of primary entrance to the parking area.
- Business district or historic site. The termination point is the District boundary.
- Commerce park, recreation area, shopping center, State and National Park, Forest or Cemetery, or State Game Lands. The termination point for measuring is the entrance to the primary parking area for the facility.

The maximum distances for gas, food and lodging may be increased an additional 1.0 mile if the average distance to the two adjacent interchanges is more than 5 miles, as indicated on the Department's Official Transportation Map.

Unacceptable Locations for Logo Signs

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Logo signs shall not be authorized at the following locations or under the following circumstances:

a) At interchanges with other freeways.

b) At interchanges where space for only one sign installation exists except under the following conditions:

- In urban areas, one logo sign shall be authorized, which shall be solely for the Attraction category
- In rural areas, one logo sign shall be authorized, using the three service panel, comprised of two logos for each of three-service categories. At the initial installation, the Attraction service shall be given priority, and the two other services shall be determined in accordance with the Section Space Allocation by Service Type~~Space Allocation by Service Type~~ . After the initial installation, any open service to be filled on the three-service panel shall be filled in accordance with the Section Space Allocation by Service Type~~Space Allocation by Service Type~~ (and Attractions shall not be given specific priority, even if there were no Attractions signed after initial installation).

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c) In areas of high congestion, such as within a central business district or where long traffic delays frequently occur.

d) When the number of turns required from the crossing route prior to the driveway of an establishment is greater than the following:

- Gas – two turns.
- Food – three turns.
- Lodging – three turns, except four turns if the facility is within one mile of the exit ramp terminal.

e) Where an illegal movement is required to access a business, or where it is not convenient to return to the original direction of travel.

f) Where long sections of structure, retaining wall and/or installations of noise wall limit the ready placement of ground-mounted logo signing.

g) At interchanges where it is necessary to direct motorists back in direction to service establishments located at a previous interchange.

h) Where the Department determines that for safety, operational, or other explained reasons the installation of logo signs is not in the best interest of the traveling public.

i) At any interchange approach other than that which most directly and conveniently accesses the service establishment.

j) Where a maximum of four logo sign installations exist on any approach to an interchange.

k) Where a trailblazer for a business would be required off the right-of-way of a State highway, unless the business obtains all required approvals and permits from the local officials for the trailblazer within 130 days from its application for logo signing.

l) In no event shall a participant be signed at more than one interchange for each direction, for each service on a specified traffic route.

Continuation of General Motorist Service Signs

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General motorist service signs display symbols or words for services such as "GAS," "DIESEL," "ELECTRIC VEHICLE CHARGING," "COMPRESSED NATURAL GAS," "LIQUEFIED NATURAL GAS," LIQUEFIED PETROLEUM GAS," "HYDROGEN FUEL," "FOOD," "LODGING," "CAMPING," "VISITOR INFO," ~~"DIESEL,"~~ "HOSPITAL," and "STATE POLICE.". Whenever possible, these general motorist service signs should be removed as soon as logo signing is installed at a particular location.

However, if only certain types of services at an interchange participate in the logo signing program (e.g., only gas and lodging), the remaining services (e.g., food and camping) can continue to be signed via a general motorist service sign provided sufficient spacing is available along the mainline to erect the signs. In no cases, other than mentioned above, should general motorist service signs duplicate logo signing for a particular service. General motorist service symbols may be attached to the supports of mainline logo signs in the absence of separate mainline general motorist service signs. When general motorist service directional signs are placed along ramps, if possible, the signs should not be placed together with logo ramp signs on the same post.

Businesses with billboards in violation of State or federal laws or regulations, will not be authorized to participate in the Logo Sign Program.

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Logo Requirements

a) Design. Business logos may consist of a symbol, trademark, or a legend message identifying the name or abbreviation of the specific business. The business logo shall not display the symbol, trademark or legend message of more than one business. Attraction logos shall include a legend message identifying the name of the attraction. All logo designs shall be reviewed and approved in accordance with Department standards prior to fabrication. Logos which resemble any official traffic-control device or which are determined to be in poor taste by the Department will be prohibited.

- Size and Shape. All logos shall be rectangular in shape and conform to the following sizes:
- Mainline logos (logos directly along the Interstate highway or other freeway) shall be 60"x36" for gas services, food services, lodging services, camping services and attractions.

b) All ramp and trailblazer logos shall be 30"x18", except where authorized otherwise by the Department.

c) Legends. A legend which is not part of a regionally or nationally recognized trademark should be as large as possible, preferably with only one or two lines of messages. Only one registered trademark may be included on a logo panel. Any portion of the trademark that appears to be a supplemental message may be excluded. The maximum amount of legend shall be three lines, each having up to 12 characters (i.e., letters, numerals, or spaces). The minimum size legend shall be 8-inch for mainline logos and 4-inch for ramp and trailblazer logos.

d) Color. Logos may use any contrasting combination of standard highway colors, i.e., white, yellow, red, blue, green, orange, brown and black. Transparent inks or electronic cuttable films may be used to correlate with standard trademarks providing the colors provide good readability during both daylight and nighttime hours. A legend message logo that does not use a trademark shall have a blue background with white legend and border. Colors that are critical to nighttime readability shall be at least as reflective as the standard silk-screened blue color, as determined by Department instrument testing. Fluorescent colors are not permitted.

e) Supplemental Messages. When used, the minimum legend height for supplemental messages shall be 6 inches on mainline logos and 3 inches on ramp and trailblazer logos ~~except for the RV Access Symbol~~. Supplemental messages shall not extend beyond the edge of the logo and onto the sign panel and shall be black legend on yellow background. Dual branding on lodging logos (e.g., "BY") is not permitted. The following supplement messages may be used as applicable on logos:

- "24-HRS" on gas or food logos provided the facility satisfies all eligibility criteria for all 24-hour periods subject to those criteria.
- ~~"DIESEL" on gas logos.~~
- "NO TRUCKS" on gas logos (if a station has no facilities or parking for trucks).
- "DIESEL," "CNG," "LNG," "LPG," or "HYD" on gas logos if the station provides an alternative fuel in addition to gasoline.
- "EV Charging" on any logos if the establishment provides a minimum of one DC fast charger (Level 3) electric vehicle charging connector and offers electric vehicle charging to the

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general public without purchasing the primary service (gas, food, lodging, camping, or attraction). ~~"EV Charging" on any logos if the establishment provides a minimum of one Level 3 (480-AC three-phase circuit) electric vehicle charging connector.~~

- "SEASONAL" on attraction and camping logos for those facilities open less than 12 months a year.
- "CLOSED ____DAY" shall be used on food logos if a food establishment is only open 6 days a week.
- "RV Acces~~ss Symbol~~" shall ~~as shown in **Exhibit 2-34** and placed in the lower right-hand corner of the logo panel. The supplemental message will~~ only be shown on the mainline panel and used for participants that meet all of the following criteria:
    i. Minimum 50-foot radii for entering, exiting and negotiating thru the property
    ii. Minimum 14-foot clearance for all overhead obstructions
    iii. Gas establishments must sell diesel and have pumps with non-commercial nozzles
    iv. Food, attraction and lodging establishments must provide at least two parking spaces with minimum dimensions of 12 feet in width and 58 feet in length
    v. Camping establishments must provide two or more sites with vehicle spaces a minimum of 18 feet wide and 45 feet long
    vi. The participant requesting approval for use of the "RV Access" message~~Symbol~~ must provide written documentation signed by a Professional Engineer licensed in Pennsylvania that all of the criteria are met

f) Materials. Logos shall be fabricated on an aluminum substrate with a minimum thickness of 0.080 inch. All colors in the logo shall be made from either Department approved minimum Type III or IV retroreflective sheeting or transparent inks on minimum Type III or IV white retroreflective sheeting.

g) Approvals. All logo designs and supplemental messages, and any revisions thereto, shall be submitted to the Department (through the Logo Signing Trust) for review and approval. Submissions shall include sufficient layout information to determine compliance with size, shape, color, legend and material requirements. Letter sizes for all legend proposed as part of the logo design must be clearly marked. The Department may request a small retroreflective sign sample of any custom-mixed colors to determine nighttime reflectivity. No logos or supplemental messages shall be manufactured until approval is received.

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Sign Panels

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Location

a) Separate Sign Panel. Except as provided later in this section, a separate sign panel shall be provided for each type of service for which logos are displayed. In the direction of traffic, the sequential order of sign panels shall be in the order of attraction, camping, lodging, food, and gas, except for existing installations that do not conform to this order, which installations will remain until new signing work requires relocation of such panels. Additionally, a new sign may be installed out of sequence if in the future it is installed in a combined service format, with the future additional service placed in the correct sequence. Signs shall be positioned to take advantage of natural terrain or guide rail, to have the least impact on the scenic environment and to avoid visual conflicts with other signs.

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b) Specific Service Signs. Specific service signs may be installed between the previous interchange and a point 800 feet in advance of the exit direction sign or "NEXT RIGHT" sign at the interchange from which the services are available. A minimum 800-foot spacing shall be provided between specific service signs, and between specific service signs and existing major guide signs. Excessive spacing should be avoided. Space which is closer to an exit should be fully used before specific service signs can be placed in advance of the first major guide sign.

c) Ramp Signs. At single-exit interchanges where service facilities are not readily visible from the ramp, ramp signs (see Exhibit 2-29~~Exhibit 2-31~~ and Exhibit 2-30~~Exhibit 2-32~~) shall be installed along the ramp or at the end of the ramp. Signs along the ramp should generally be installed on the right side of the ramp, but are permitted on the left side. A minimum 200-foot spacing shall be provided between all ramp signs, and between all ramp signs and other traffic signs on the same side of the ramp. Ramp signs are only authorized for businesses which are participating on the specific service signs.

d) Trailblazers. Trailblazers may be installed for specific service sign participants when it is necessary to provide additional guidance to motorists after they exit from the ramp. All trailblazers shall be installed up to 300 feet before any required turn. Once the turn (or turns) is accomplished, no other confirmation trailblazers will be placed. Trailblazers for camping, lodging, food and gas are similar to ramp signs but do not include the generic type of service (see Exhibit 2-29~~Exhibit 2-31~~). For attraction facilities, trailblazers will be the D7-4 ~~TODS~~Attraction signs~~-type signs~~ (see *Handbook of Approved Signs* (Publication 236)~~Exhibit 2-33~~). At double-exit interchanges, trailblazers may be installed along the crossroad near the end of the off-ramp for all services over 1 mile from the end of the ramp; distances and arrows shall be included.

Trailblazers will be grouped at the intersection by direction (straight, left and right) and stacked totem pole style beginning at the top with camping, then food, then lodging, and with gas on the bottom. Attraction trailblazers will be separate sign assemblies and shall not be mixed on the same sign assembly with trailblazers for camping, lodging, food or gas. Trailblazers for camping, lodging, food and gas are to be stacked a maximum of six signs in height on posts in accordance with Department criteria. Trailblazers for attractions are to be stacked a maximum of three signs in height on posts in accordance with Department criteria.

For attraction trailblazers a maximum total of six signs, three on each sign assembly, shall be installed at a given location. Attraction logo trailblazers will be on separate installations from Department TODS unless an agreement between the Trust and the Department provides otherwise. Existing Department TODS immediately become the responsibility of the Logo Signing Trust when functioning as attraction logo trailblazers, and will be subject to the annual fees discussed in the Section Annual Fee and Additional Costs~~Annual Fee and Additional Costs~~.

e) Local Signing Ordinances. Logo Signs are not advertising signs, but are guide signs designed to facilitate the safe flow of vehicular traffic by providing directions to essential highway motorist services and general attractions. § 2002(10) of the Administrative Code of 1929, 71 P.S. § 512(10), bestows on the Department "exclusive authority and jurisdiction over all State designated highways." The Department is accordingly not subject to the mandates of local ordinances with regard to matters such as the type, size and location of signs within the right-of-way of a State highway. Nevertheless, the location of all signs will be established to avoid blocking motorists' lines of sight when entering the highway from side roads and driveways.

f) Outdoor Advertising Sign Structures. Because Logo Signs are for the purpose of facilitating the safe flow of vehicular traffic, installation is subject to this policy and referenced statutes, regulations,

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policies, and handbooks. Where, however, a Logo Sign may be properly sited at various points in a given area, the location of any legally existing Outdoor Advertising Sign Structure, as defined in 67 Pa. Code Chapter 445, relative to the Logo Sign may be considered prior to final location approval. The physical obstruction of visibility of an Outdoor Advertising Sign Structure on the same side of the traveled way and within 500 feet of the proposed location of the Logo Sign will be considered adequate justification for selecting an alternative location within the allowable range.

Composition

a) Single-Exit Interchanges. Specific service signs shall include the name of the type of service followed by the exit number displayed in one line above the logos. Specific service signs may have up to six ~~"gas," "food," "lodging," "camping," or "attraction"~~ logos except that "attraction" specific service signs only should be limited to no more than 4 logos. Half-size specific service signs (as illustrated in Exhibit 2-25~~Exhibit 2-27~~) may be used if full-size specific service signs are not necessary. Four-panel size specific service signs should be used if a six-panel specific service sign is not necessary. A 5-year future time frame should be considered to determine the sign size. As noted earlier, a single sign may be installed for the Attraction category at urban exits and a single three-service panel sign may be installed at rural exits.

b) Double-Exit Interchanges. At double-exit interchanges, such as a cloverleaf interchange, specific service signs shall generally consist of two sections, one for each exit. The top section should display the logos for the first exit and the lower section should display the logos for the second exit. The name of the type of service followed by the exit number should be displayed on a line above the logos in each section. The number of logos in each section shall generally be limited to three each for "gas," "food," "lodging," "camping," or "attraction." When a type of motorist service is only at one exit, a full-size or half-size specific service sign may be used as discussed in the Section Composition~~Composition~~ (part b). As noted in the Section Unacceptable Locations for Logo Signs~~Unacceptable Locations for Logo Signs~~ (part b), a single sign may be installed for the Attraction category at urban exits and a single three-service panel sign may be installed at rural exits.

c) Remote Rural Interchanges. In areas where only one or two qualified facilities are available for each of two types of services, logos for a maximum of two types of services may be displayed on the same specific service sign. The name of each type of service shall be displayed above its respective logo(s) as indicated in the bottom drawing in Exhibit 2-26~~Exhibit 2-28~~. Logos should not be combined on a sign when it is anticipated that additional service facilities will become available during the next 5 years. When it becomes necessary to display a third logo for a type of service displayed in combination, the logos involved shall then be displayed in compliance with the Section Composition~~Composition~~ (part a and b).

d) Ramp Signs. Ramp signs shall conform to the general requirements of Exhibit 2-29~~Exhibit 2-31~~ and Exhibit 2-30~~Exhibit 2-32~~. A maximum of six logos for gas, food, lodging, camping service, and attractions shall be displayed along the ramp. A maximum of three logos for each of two different types of services may be combined on the same sign panel. The name of each type of service shall be displayed above its logo(s). For services over 0.5 mile from the ramp terminal, ramp signs shall include the distance to the service (to the nearest whole mile) below the directional arrow.

e) Dual Signing. It will not be permissible to insert wording for a convenience store or a mini-mart on a gasoline logo sign panel. Current policy does not permit such dual signing on either the small or large size gasoline logo sign panel. All gasoline logos will conform to the general requirements of Exhibit 2-28~~Exhibit 2-30~~. A similar dual combination of signing is not permitted for other services

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(i.e. attraction/food, lodging/gasoline, lodging/food, etc.). The combining of two or more logos for the same service type (i.e., food/food) on the same logo panel is also not permitted.

Logo Position Orientation

Logo positions on panels are determined by nearness to interchange in accordance with the Section Excess Number of Eligible Businesses~~Excess Number of Eligible Businesses~~ (part a and b), beginning at the top left position on the panel and proceeding to the right, then left to right on the second and third rows, ending at the bottom right position. Existing logo orientations which are not oriented in this manner shall be permitted to remain so.

Space Allocation by Service Type

Sign space is generally allocated according to demand on a first come, first serve basis. Where the number of service types with eligible businesses fills or exceeds the capacity of the available sign space, the following procedures shall apply. The intent of these procedures is to provide directional information for the greatest variety of motorist service types rather than limit such information to service types with the highest concentration of businesses to the exclusion of other service types.

a) New Exits in the Program. First priority shall be given to provide sign space in each service type for which there are eligible applicants. Afterwards, sign space shall be allocated proportionately to the number of eligible applicants within each service type. Allowances shall be made for adjustments to this procedure necessitated by limitations imposed by sign design formats, geographical features in the field and sign sequence requirements.

b) Existing Exits in the Program. Where an application from an eligible business would require that an existing sign of its same service type be expanded to accommodate the additional business, resulting in the exclusion of any other unsigned service type from the program due to a lack of remaining sign space, a re-inventory shall be made of the eligible businesses of the remaining unsigned service types. Any eligible businesses will be contacted and provided an opportunity to apply for signing. After the deadline for applications, the sign space shall be allocated with priority given to any unsigned service type in proportion to the number of eligible applicants in each of the unsigned service types. If no business in an unsigned service types responds to this application opportunity, an existing service sign may be expanded even if it would result in the future exclusion of an unsigned service type.

c) All Exits. When applications from eligible businesses are received from more service types than can be accommodated, the closest eligible applicant to the approach, as determined in accordance with Section Excess Number of Eligible Businesses~~Excess Number of Eligible Businesses~~ shall be the determining factor for sign space allocation. However, a second sign panel of the same service type will be permitted to accommodate the excess businesses provided none of the provisions under the Section Unacceptable Locations for Logo Signs~~Unacceptable Locations for Logo Signs~~ are violated.

Discontinuation of a Service

If a service is no longer available from an interchange, the specific service sign for that service should be removed when the logos are removed. If the service is no longer available but may be available in the near future, the sign may remain but the service type legend shall be covered so motorists do not misinterpret the sign as a general motorist service sign implying that the service is available.

~~c)~~

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Application and Agreements

Application

a) Initial Contacts. If an interchange is approved by the Department for logo signs, businesses in the vicinity of the interchange will be surveyed to determine eligibility. The program and the costs involved will be explained to the eligible businesses by the administering agency.

b) Logo Agreement. An eligible business that wishes to participate in the program and which can be accommodated will be required to enter into a "Logo Agreement" with the administering agency and pay specified "up-front costs" which will be used to pay the business' share of the total project costs (e.g., the costs of making, providing, and erecting the sign panels, attaching the logos and administering the program). The arrangement will further bind the business to pay an annual fee as discussed in the next section (Annual Fee and Additional Costs~~Annual Fee and Additional Costs~~). Subject to policy limitations on bumping, the same participant-entity may enter into two or more separate logo agreements with the administering agency, requiring separate sign fees, in the same or different sign classification (i.e., Food, Gas, Lodging, Attraction), at the same exit, using separate and distinct trade names/logos. Further, participants may share qualifying requirements, such as rest rooms, seating, drinking water, availability, etc. on the same business site/tract of land wherever this can be reasonably accomplished.

Annual Fee and Additional Costs

a) Annual Fees and Compliance Forms. Participating businesses will be assessed an annual fee designed to cover preventative maintenance, the replacement of damaged sign panels, and the continuing administration of the program, and be required to return a completed compliance form satisfactory to the Administrator. The fee will be evaluated periodically by the administering agency to ensure an adequate fund for future projected expenses. Failure to pay the fee and/or return the compliance form within the specified time shall constitute breach of the Logo Agreement and will be cause for removal of the logos, and the assignment of liquidated damages incurred by the Trust because of the breach. At the time the annual fee is assessed, the businesses ~~also~~ shall also be required to complete a business ~~eligibility~~ compliance form included on the invoice. Businesses participating in the attraction service category will not be assessed an annual fee for their trailblazer signs, but will be required to pay the full costs of repair and replacement of any attraction trailblazer as costs are incurred.

b) Temporary Removal. If a business is closed for more than 2 weeks, its logos shall be removed, except for attraction and camping logos with the "SEASONAL" supplemental message. It will be the responsibility of the owner to notify the administering agency to remove the logos at the beginning of a closed period and to reinstall or uncover the logos upon reopening the business. A fee will be charged for temporary removal and installation.

c) Logos. Businesses shall supply all new and replacement logos, and shall be responsible for the cost of installing replacement logos. All field work for new or replacement logos shall be performed by a Department pre-qualified contractor and authorized by the administering agency.

d) Refurbishment. When the majority of logo sign panels need to be replaced (assumed to be every ~~10 to~~ 185 years), additional fees may be assessed to cover the cost of replacing the signs or sign panels.

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e) Attraction Signs. A business that has an existing highway sign (e.g., a supplemental guide sign) may only qualify for a logo sign if they agree to fund all necessary construction costs associated with accommodating their sign.

Excess Number of Eligible Businesses

a) General Rule. When all eligible businesses desiring logo signs cannot be accommodated, the order of opportunity to participate will be as follows:

1) With respect to food, gas, lodging, and camping logo signs, the closest establishments will be given the first opportunity to participate.

2) With respect to attraction logo signs, those eligible businesses will be required to submit a traffic study prepared in accordance with guidelines established by the Institute of Transportation Engineers and certified by a professional engineer licensed to do business in Pennsylvania. The businesses with the greatest Annual Average Daily Traffic (AADT) volumes will be given the first opportunity to participate.

b) Single-Exit Interchanges. When a surplus of eligible gas, food, lodging, camping, or attraction businesses exist at single-exit interchanges, businesses in those categories within 0.5 mile to the right or straight ahead of the exit ramp terminal will be given preference, followed by the businesses within 0.5 mile to the left. (This practice will help to share the available space on the two sides of the interchange and reduce the number of left-turn movements). After all participating businesses within 0.5 mile have been signed, the closest business to the ramp terminal in either direction will be signed.

Sale or Termination of Business

a) Participants may not reassign a Logo Sign Agreement without the prior written consent of the Trust, which consent shall be the Trust's sole discretion. Participants agreements run with the tract of land for which the application was initially made and shall not be assigned to another tract of land, except if a Participant moves its location at the same logo-signed exit, and there is no change in business entity (i.e., no transfer of business ownership), the following shall apply:

1) If the business still qualified for signing under the Guidelines at its new location, it can remain in the Logo Program, under its existing Participant's Agreement, provided that the Participant executes an Addendum, modifying the location of the business and its signs, and pays the full cost of any removal of existing ramp or trailblazer signs, or the installation of any new ramp or trailblazer signs.

2) If the Participant does not qualify for participation in the Logo Program at its new location, the Participant shall be removed from the logo program with no refunds, since the relocation was the result of action by the participant alone.

3) If the business still qualifies under the Guidelines at its new location, it will still be subject to the bumping procedures as outlined in the Section Removal of Logo Signs~~Removal of Logo Signs~~.

b) Businesses which withdraw from the logo program because of the sale or closing of their business, or for any other reason shall not receive any reimbursement.

c) If a participating business is sold, and the new owner wants to continue in the logo program, the new owner shall proceed as follows:

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1) If the business is sold for a different use or if the owner withdraws from the logo program, the privilege to participate in the logo program shall be offered to the next qualified business as discussed in the Section Excess Number of Eligible Businesses~~Excess Number of Eligible Businesses~~, which may or may not include the new owner, depending on the qualifications set forth. If the participating business is sold for a different use and the new owner wants to qualify for the logo program, then the new owner shall follow the qualification procedures for any new business participant and shall pay the same fees as any new participant in the logo program; or

2) If a participating business is being sold to a new owner for the same use, and the new owner wants to continue participation in the logo signing program at the same location, the existing participant and the new owner shall apply jointly for Assignment of the existing Logo Sign Agreement, verifying that the business will continue in the same classification (i.e., gas, food, lodging, campground, or attraction), at the same location; then in such event, the existing Agreement may be assigned for the remainder of the term of such existing Logo Sign Agreement. Such Assignment shall be in a form determined by the administering agency, and subject to the payment of a fee for Assignment as determined from time to time by the administering agency. The application for Assignment by the existing participant and the new owner shall be made not later than the date of closing on the transfer of the participating business or the effective date of transfer of ownership of the participating business, whichever shall first occur, and such request for assignment shall include a verification by the participating business and the new owner of said closing date and such date of transfer of ownership.

New Businesses

If a new business is established or if a non-participating business is interested in participating in the logo program, the business may request to participate in the program subject to the following:

a) All new businesses will be required to pay the same costs as outlined in the Sections Application~~Application~~ and Annual Fee and Additional Costs~~Annual Fee and Additional Costs~~.

b) If the maximum number of logos is in place, applications will be considered in accordance with the priorities established in the Section Excess Number of Eligible Businesses~~Excess Number of Eligible Businesses~~ and the removal provisions of in the Section Removal of Logo Signs~~Removal of Logo Signs~~. Businesses will not, however, be forced to vacate a sign due to another business during their first 5 years in the logo program. If a participating business is forced to vacate a sign panel due to another business, the business will be reimbursed for a depreciated portion of the up-front cost, based on a 10-year straight-line depreciation schedule.

c) Businesses under construction, or closed businesses planning to reopen under new management, may submit applications for logo signs up to 3 months in advance of the scheduled date of the business opening.

Removal of Logo Signs

a) Removal Necessitated by Department Action. Since the amount of available signing space at interchange areas is limited, the Department reserves the right to remove logo signs and to provide an initial cost reimbursement to participating businesses under certain circumstances. Logo sign removal may prove to be necessary under any of the following circumstances: (1) if the space is needed for necessary traffic control signs; (2) if the access control features of either the mainline or

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the crossing routes are changed; or (3) for other safety or operational reasons based on an engineering study.

If logo signs are to be removed for any of these reasons, the businesses will be reimbursed by the Logo Signing Trust for a portion of the up-front costs over the first 10 years. Reimbursement will be computed based on straight-line depreciation. The costs of sign removal and sign disposal will be borne by the Department.

b) Renovations. A business will be given 6 months from the date of closing to complete renovations and reopen for business, provided that the participant maintains its logo sign contract in an active status by paying the annual fees in a timely fashion. The temporary removal provisions of the Section Annual Fee and Additional Costs~~Annual Fee and Additional Costs~~ (part b) shall apply during the closed period. If renovations are not completed within 6 months, then the logo is to be removed permanently and the contract voided. If a business is closed for any purpose other than renovations, and no assignment agreement is presented for approval at the time that the business is closed pursuant to guidelines procedures, the contract immediately becomes void, and the logo sign is to be removed.

c) Removal Caused by an Excess of Eligible Businesses. If the maximum number of logos is in place on a sign panel, new applications by other businesses for inclusion on an existing logo sign will be considered in accordance with the priorities established in the Section Excess Number of Eligible Businesses~~Excess Number of Eligible Businesses~~. These priorities are consistent with standard logo signing practice, and they reflect the concept of providing maximum service to the motorist. An excessive number of eligible businesses present at a signed interchange may necessitate the removal of one or more existing participants. This removal will be accomplished according to the following:

1) Closer Business Bumping Criteria (Gas, Food, Lodging and Camping).

A. Implementation of "Closer Business Bumping" will be applied in sequential order by type of service beginning with the farthest participating business and proceeding inward toward the closest participating business. At single-exit interchanges, the ranking will be in accordance with the Section Excess Number of Eligible Businesses~~Excess Number of Eligible Businesses~~ (part b) when all businesses of a type are within 0.5 mile of the ramp terminals.

B. No replacement of a business (bumping) will take place at any interchange for any reason until the furthermost located business on any filled (and already expanded) three-or-six-panel logo sign has been participating in the logo program for a minimum of 5 years. Applications and bumping requests will not be accepted more than 60 days prior to the 5-year anniversary date, and a physical re-inventory will not commence until on or after the 5-year anniversary date.

C. Participating businesses will be entitled to receive a full 5-year duration of sign use. In no case will a participating business be forced to vacate a logo sign for another business during the first 5 years after installation of their logo.

D. Bumping will not be authorized where the business wishing to replace another business is already signed for another type of service at the same interchange with the same logo or essentially the same logo.

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E. Specific interchange locations and specific logo signs subject to bumping procedures (i.e., those signs deemed to be already filled to capacity with existing, participating businesses) will be determined by the Logo Signing Trust in coordination with the Department.

F. No new "bumping" procedures shall be initiated at a specific ramp location until at least 1 year has transpired since the date of administering agency action on the last "bumping" request for the same service at the same ramp location. A "bumping" procedure will be initiated at an exit ramp location only upon written request of an eligible business operating at that exit ramp location, within the mileage distance specified by the Guidelines. Provided, however, one exception will be allowed to this 1-year policy; specifically, a brand-new business (which is located at an exit ramp qualified for the program and which business is opening for business for the first time or was constructed within such 1-year period) may initiate a "bumping" procedure before the 1-year period has transpired.

2) Greatest AADT Volume Bumping Criteria (Attractions).

A. Implementation of "Greatest AADT Volume Bumping" will be applied in sequential order beginning with the participating business with the lowest AADT volume and proceeding upward toward the participating business with the largest AADT volume. At single-exit interchanges, the above criteria shall also be applicable.

B. No replacement of a business (bumping) will take place at any interchange for any reason until the business with the lowest volumes on any filled (and already expanded) three- or-six-panel logo sign has been participating in the logo program for a minimum of 5 years.

C. Participating businesses will be entitled to receive a full 5-year duration of sign use. In no case will a participating business be forced to vacate a logo sign for another business during the first 5 years after installation of their logo.

D. Bumping will not be authorized where the business wishing to replace another business is already signed for another type of service at the same interchange with the same logo or essentially the same logo.

E. Specific interchange locations and specific logo signs subject to bumping procedures (i.e., those signs deemed to be already filled to capacity with existing, participating businesses) will be determined by the Logo Signing Trust in coordination with the Department.

F. No new "bumping" procedures shall be initiated at a specific ramp location until at least 1 year has transpired since the date of administering agency action on the last "bumping" request for the same ramp location. A "bumping" procedure will be initiated at an exit ramp location only upon written request of a business operating at that exit ramp location, within the mileage distance specified by the Guidelines. Provided, however, one exception will be allowed to this 1-year policy; specifically, a brand-new business (which is located at an exit ramp qualified for the program and which business is opening for business for the first time or was constructed within such 1-year period) may initiate a "bumping" procedure before the 1-year period has transpired.

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3) Implementation Procedure. The following steps will be used when carrying out all Bumping Criteria.

   A. Whenever a business becomes aware, or is otherwise officially notified, that a specific logo sign for food, lodging, gas, camping, or attraction is filled to capacity, the business wishing to apply to replace another participant will contact the Logo Signing Trust and request information pertaining to replacement options and bumping.

   B. The first step to effect possible replacement of an existing business logo by another business will be the submission of a completed application.

   C. The Logo Signing Trust, in cooperation with the Department, will verify all qualifying data on the application and will conduct a complete resurvey of the interchange. All businesses eligible to "bump" will in turn be required to enter into a "Logo Agreement" and pay a specified fee by a specific date.

   D. A determination will be made as to what business must vacate the sign. Schedules will be established to effect as timely a removal and replacement of logo panels as possible.

   E. The business being replaced will be paid a prorated portion of the original cost by the Logo Signing Trust together with a prorated amount of their annual fee if paid. The reimbursement for the "up-front costs" will be the original cost to the business less 10 percent of that cost for each year the business logo sign being replaced has been on the panel. After 10 years, no reimbursement will be made as the life of the sign is considered to have been fully used.

   F. The effective date of logo removal and replacement under the above procedures will be the date resolved by the Trustees. This date will serve as the end of the billing period for establishing annual fee reimbursements.

Relocation of Logo Signs, New (Added) Signs

If Department projects or operations involving maintenance, design, utilities, traffic control, drainage or construction necessitate the temporary or permanent relocation of logo signs, the Department will make every effort to relocate the logo signs to an agreed upon location at Department expense. In general, the Department will first determine: (1) if the services still meet applicable guidelines for signing; (2) if the relocation of existing logo signs is possible; and (3) whether new (added) signs or changed signs are needed as a result of changes in routing. Access control, travel distance, existing signing and the route of return to the freeway will be factors in such a determination. The cost of relocating or changing existing logo signs due to Department initiated actions will be paid for entirely by the Department. The cost of installing new (added) logo signs and/or new (added) trailblazers, if determined necessary as per Department signing policy, will continue to be the responsibility of the logo applicant. Agreements and cost arrangements for new (added) signs as per the Sections Application~~Application~~ and Annual Fee and Additional Costs~~Annual Fee and Additional Costs~~ will apply.

Construction of New Interchange or Reconstruction of Existing Interchange

When Department construction occurs which results in an exit that is deemed more operationally efficient than the exit at which a participant is currently participating and located, then the participant shall be required to transfer the location of its logo sign to the more operationally efficient interchange and be given

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two options: (1) the participant's logo sign will be moved to the more operationally efficient interchange, and the participant's logo signing agreement will be amended to change the description of its location; all other terms and conditions of the agreement would remain the same including the initial date of the agreement (for program longevity purposes); the participant would not be charged for moving their logo sign to the new exit; or (2) the participant could apply as a new applicant/participant at the more operationally efficient interchange under the guidelines; in such an event, the participant agreement would reflect the current date which begins a new 10-year period for amortization purposes; the participant would pay full, current "up-front costs" as defined under Application~~Application~~; they would have their 10-year "up-front costs" rebated as defined under Removal of Logo Signs~~Removal of Logo Signs~~. Under both alternatives, the participant's current logo sign will be removed.

Expansion of Existing Four-Logo Sign Panels to Accommodate Six-Logo Panels

Prior to January 1990, a maximum of four lodging, food, or camping logos were permitted on a single sign installation. The current Department policy now permits a maximum of six lodging, food, camping, or attraction logos for these services (see Exhibit 2-25~~Exhibit 2-27~~).

In those locations where four participating businesses have filled a four-panel logo sign, and when additional qualifying businesses wish to join the logo program, a site review will be conducted to determine if it is feasible to expand the sign or to relocate it to a position where an expanded six-panel logo sign can be installed.

If there is a demonstrated need and if sign expansion is feasible, the administering agency upon approval will systematically replace four-panel logo sign with six-panel signs as part of future construction projects incorporating at least eight interchanges. The two extra logo spaces on the larger signs will be made available to qualifying businesses as per established guidelines and fees. No separate costs for design or construction of the expansion will be assessed when the work is performed as part of a construction project involving eight interchanges or more.

If a four-panel logo sign is filled and if a single new business wishes to participate in the logo program immediately, the option available is that the business pay the normal program fees or bear the full design and construction costs of the expansion to six panels, whichever is greater. The above option would also apply if two new businesses wish to participate in the program immediately. In such case, normal program fees will be paid by each or the full cost of the expansion will be shared by the two new businesses, whichever is greater.

The expansion of mainline logo signs may be accomplished by expanding the sign back panel either horizontally or vertically, and by relocating or extending the posts. The decision as to how best to add sign area should be made after a thorough review of site conditions and in consideration of existing logo installations, the type, number and spacing of posts, aesthetics, and structural design requirements. Design proposals for logo sign expansion shall be reviewed and approved by the Department before sign design is finalized and before any construction work takes place. Proper mounting height and required breakaway characteristics for logo signs should be followed when mainline logo signs are expanded.

The Department or the Logo Signing Trust will not at their expense reconstruct a six-panel sign to reallocate unused space for the benefit of new business applicants. The determination that a sign is filled to capacity will be made by the Department. Any reallocation of space on an existing logo sign which involves deleting services, separating exits, or moving logos from top to bottom (or vice versa) will be made by the Department. In general, split service signs (those with two types of services displayed) will be considered filled whenever each specific service panel is filled. Reallocation of space on a sign from one service to another will not be allowed unless space is available along the mainline to properly accommodate one or

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more new signs. All changes to logo signs will be made consistent with applicable state and national standards and will require concurrence from the Federal Highway Administration.

Funding and Responsibilities

General

All costs associated with the design, erection, maintenance and administration of logo signs will be assessed of all participating businesses. The program will be administered on a non-profit basis by a trust. All signs will become Department property after erection.

The program is currently administered by the PA Tourism Signing Trust, and information is available at www.palogo.org.

Duties of a Logo Signing Trust

If the logo program is administered by a logo signing trust, the trust will be responsible to:

a) Select an engineering firm to inventory eligible exits to identify potential businesses.

b) Contact the businesses for promotional purposes.

c) Establish the fee schedule and enter into an agreement with the businesses on a contractual basis.

d) Collect fees from the businesses.

e) Obtain signed compliance forms from applicants to verify business eligibility.

f) Authorize an engineering firm to develop construction plans for Department and Federal Highway Administration approval.

g) Coordinate with the Department relative to sign placement and obtain concurrence from Department District Offices upon completion of a construction contract.

h) Bid and award the construction project.

i) Inspect and maintain the sign panels.

j) Report to the Department inquiries and/or complaints which may be received relative to existing logo signing.

k) Prepare an annual report and submit it to the Department.

l) Administer the program on a day-to-day basis.

Audit

The logo program is administered by a Trust, and a financial audit shall be performed on at least a biennial basis.

Annual Report

The ~~The Department, in conjunction with the~~ Trust Administrator ~~,~~ will prepare an annual report ~~for submission to the House and Senate Transportation Committees~~ within approximately 120 days after each fiscal year, i.e., the 12-month fiscal period used by the program Administrator. The report shall summarize the number of businesses participating in the program, the fees charged for such participation, the methodology used to determine these fee amounts and the program's annual financial statements.

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Department Action

Department Responsibility

Although the Logo Signing Trust administers the Logo Program, the Department will cooperate with, share file information, and provide expertise to the Trust and to engineering consultants who represent the Trust. The Department, through the Engineering District Offices, will assist the Trust and its design consultants in determining suitable locations for logo signing. The Department will field review logo signing and will accept in writing the completed logo signs at the conclusion of construction. The Department will maintain file copies of plans prepared by the Trust that show the logo sign locations. The Department will be responsible for logo program guidelines and regulations. The Department will conduct Quality Assurance field reviews to inspect logo sign installations.

Due to construction and other activities, the Department may occasionally undertake the resetting of existing logo signs. Logo signs are Department property and the Logo Signing Trust merely administers the program on our behalf to include installation and maintenance. Logo signs are to be accommodated during construction projects similar to accommodations for other guide signs. Note that the design criteria used for sizing the foundations for the breakaway systems and steel posts for existing logo sign panels is often significantly different than that used for a guide sign. Logo signs are designed for future expansion while using the same support foundation design, thus, the design criteria must take future expansion into consideration. The Department should contact the Trust before undertaking design work for resetting logo signs.

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Applicant Appeals

A business may appeal a denial for logo signing or bumping actions under Title 2, Pa. C.S., Sections 501-508 (relating to the Administrative Agency Law), by submitting a written request for a hearing within 30 days of the date of the denial notification. Businesses should submit appeals to:

Administrative Docket Clerk
Pennsylvania Department of Transportation
400 North Street-9th Floor
Harrisburg, PA 17120-0096

The written request shall include a filing fee made payable to the "Commonwealth of Pennsylvania" and a copy of the denial notification.

At the time of publication, filing fees are listed at 34 Pa.B. 4081 (see http://www.pabulletin.com/secure/data/vol34/34-31/1410.html). Filing fees for appealing a logo decision is a Level II fee, and comes under the category of "motorist information sign matters." ~~Businesses may verify the current fee by contacting the Administrative Docket Clerk at 717-772-8397.~~

The Administrative Docket will also accept electronic transmission of filings, including but not limited to, a request for a hearing, subsequent correspondence, briefs, pleadings, or other documents relating to a case. All administrative appeals and filings can be sent electronically to ra-pddotadmindocket@pa.gov.

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Changes in Program Administration

If for any reason the services of the non-profit Trust are terminated, all financial resources and records will become the Department's property for use as an on-going program.

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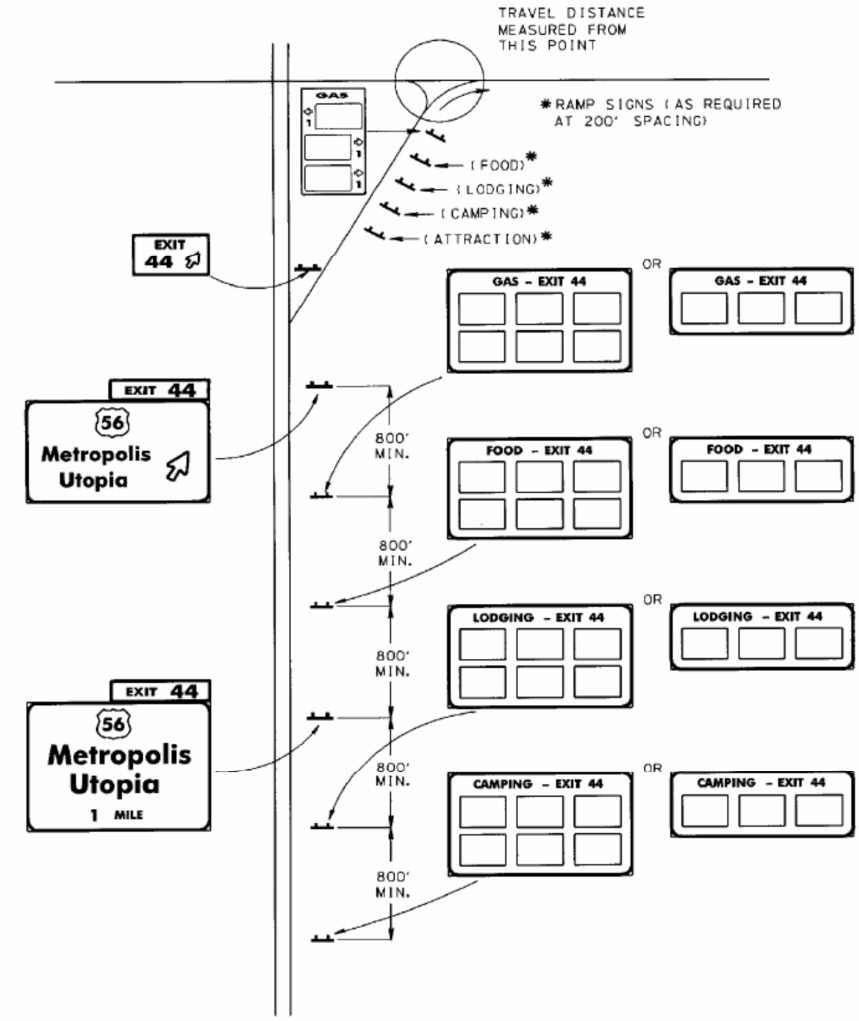
Exhibit 2-~~25~~27 Typical Signing for Single-Exit Interchanges



Note: A maximum of four logo sign installations (with a maximum of five specific service types) are permitted at a given interchange approach. In the above figure, an attraction logo may be substituted for any of the other services, provided the appropriate sequencing of signs is maintained. Each panel may be designed to accommodate two, three, four or six logos.

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Exhibit 2-~~26~~28 Typical Specific Service Signs

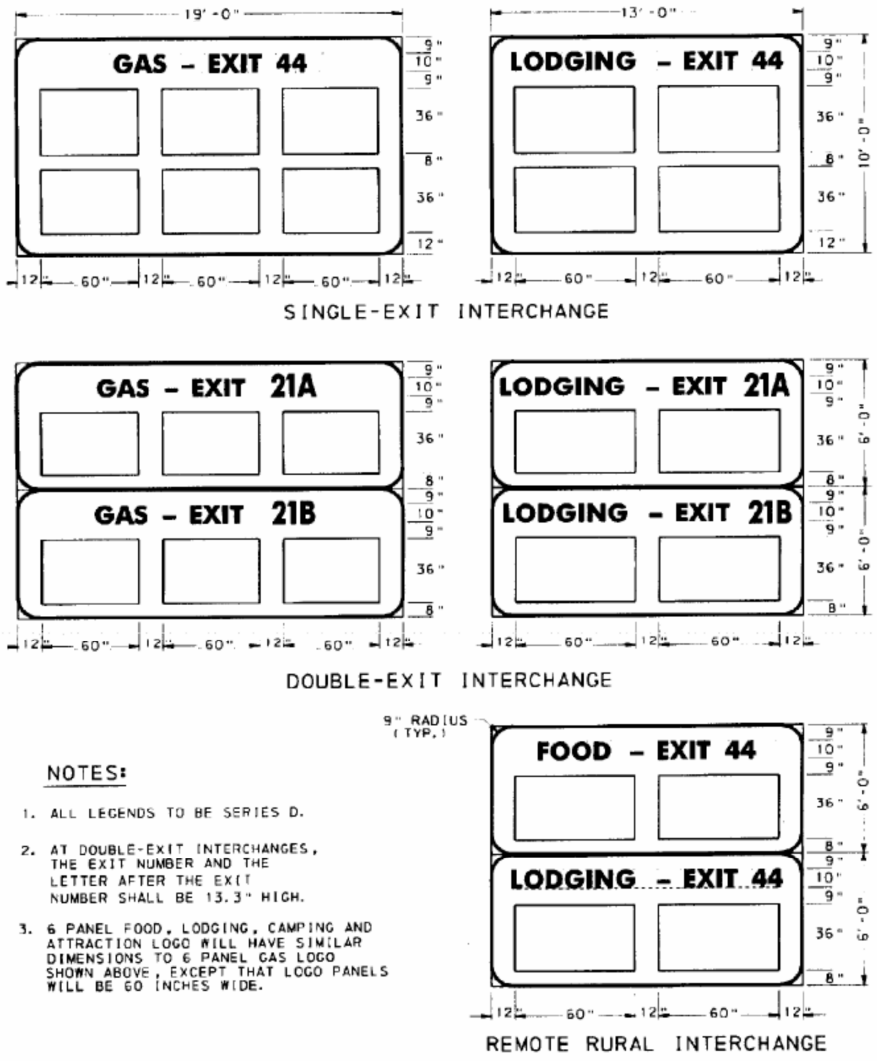

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Exhibit 2-~~27~~29 Typical Three-Service Sign

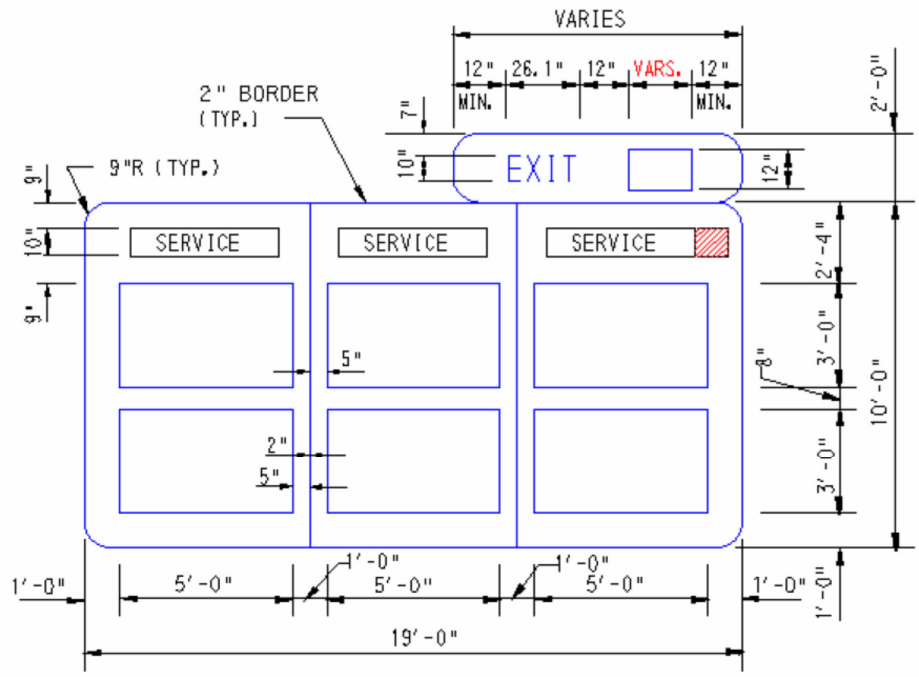

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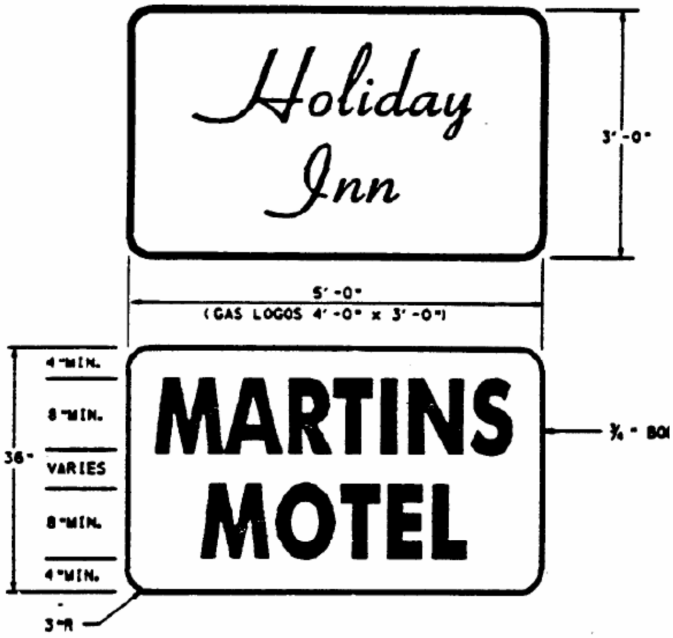
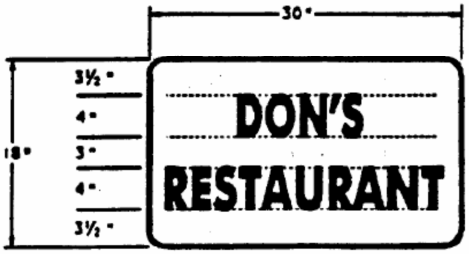
Exhibit 2-~~28~~30 Typical Logos



LOGOS ON SPECIFIC SERVICE SIGNS



LOGOS ON RAMP SIGNS AND TRAILBLAZERS

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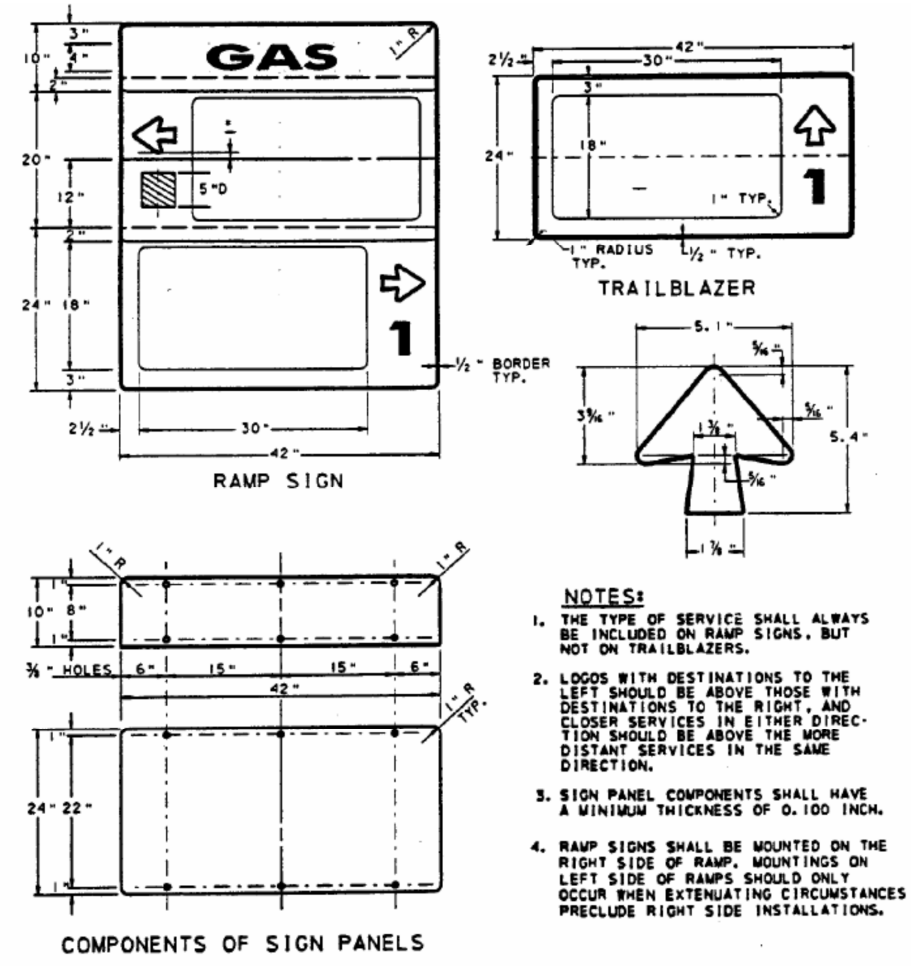
Exhibit 2-~~29~~31 Ramp Signs and Trailblazers



NOTES:

1. THE TYPE OF SERVICE SHALL ALWAYS BE INCLUDED ON RAMP SIGNS, BUT NOT ON TRAILBLAZERS.
2. LOGOS WITH DESTINATIONS TO THE LEFT SHOULD BE ABOVE THOSE WITH DESTINATIONS TO THE RIGHT, AND CLOSER SERVICES IN EITHER DIRECTION SHOULD BE ABOVE THE MORE DISTANT SERVICES IN THE SAME DIRECTION.
3. SIGN PANEL COMPONENTS SHALL HAVE A MINIMUM THICKNESS OF 0.100 INCH.
4. RAMP SIGNS SHALL BE MOUNTED ON THE RIGHT SIDE OF RAMP. MOUNTINGS ON LEFT SIDE OF RAMPS SHOULD ONLY OCCUR WHEN EXTENUATING CIRCUMSTANCES PRECLUDE RIGHT SIDE INSTALLATIONS.

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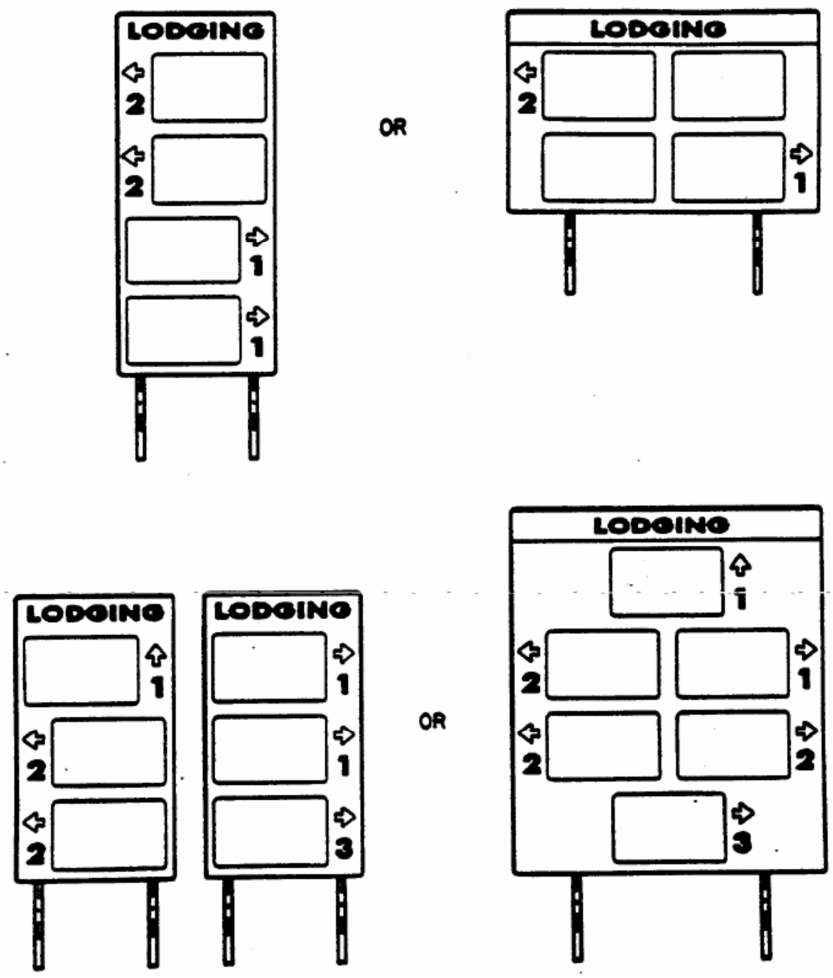
Exhibit 2-~~30~~32 Ramp Sign Installation (4- and 6-Panel Logos)



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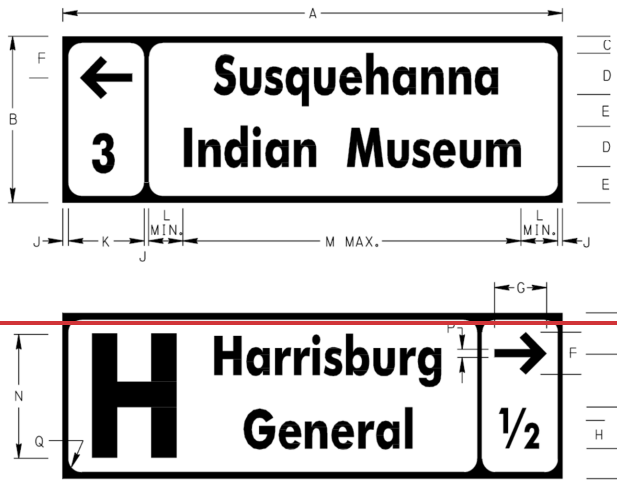
~~Exhibit 2-33 Attraction Trailblazer~~

(a) Justification. The Attraction Sign (D7–4) may be used on conventional highways to direct motorists to large tourist attractions in accordance with the Department's Attraction Signing Guidelines. One or two lines of legend may be used to identify the name or abbreviation of the attraction.

(b) Design. A rectangular directional box should generally be located on the left side of the sign for attractions that are straight ahead or to the left, or on the right side of the sign for attractions to the right. The box should generally include a directional arrow and a distance of 1/4, 1/2, 3/4 or the nearest whole mile, but the box may be eliminated if it is more appropriate to use directional information such as "DRIVEWAY ON LEFT", "LEFT 1000 FEET", etc., on the second line of legend. All legend should be "Clearview 1W, 2W or 3W" font, of the highest series possible. If necessary, the legend may be further condensed up to 35 percent. A generic symbol for hospital, campground or airport may be used in advance of the legend message.



DIMENSIONS – mm (IN)													
SIGN SIZE A x B	C	D	E	F	G	H	J	K	L	M	N	P	Q
1200 x 400 (48" x 16")	50 (2)	100 (4)	75 (3)	100 (4)	125 (5)	65 (2.6)	15 (0.6)	185 (7.4)	50 (2)	870 (34.8)	275 (11)	20 (0.8)	25 (1)
1800 x 600 (72" x 24")	90 (3.6)	150 (6)	105 (4.2)	165 (6.6)	188 (7.5)	100 (4)	20 (0.8)	280 (11.2)	75 (3)	1310 (52.4)	400 (16)	30 (1.2)	45 (1.8)

COLOR:

LEGEND AND BORDER:
WHITE (REFLECTORIZED)

BACKGROUND:
BLUE (REFLECTORIZED)

APPROVED FOR THE SECRETARY OF TRANSPORTATION

By : Glen C Rowe Date : 01-03-06
Chief, Traffic Engineering and Operations Division
Bureau of Highway Safety and Traffic Engineering

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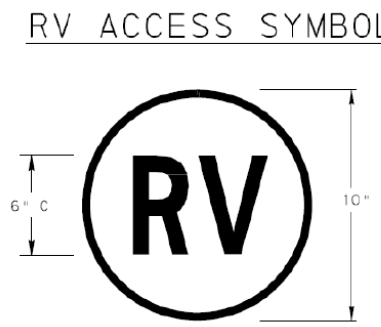
~~Exhibit 2-34 RV Access Symbol~~



~~Yellow background~~
~~Black text & Border – ½"~~

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2.15 Congestion Management Signs

General

Our highways are becoming more crowded every year and the traditional morning and afternoon "peak hours" in some metropolitan areas have expanded to encompass several hours.

Because of the congestion, highway improvements are necessary to eliminate the bottlenecks. However, since it is not physically possible to build our way out of congestion, traffic restrictions are frequently necessary to enhance highway operations.

This section identifies some techniques to help manage congestion. It is anticipated that the use of these signs and other similar types of signs will become more common in the future.

Park and Ride Signing

One of the major purposes of congestion management signing is to move people and goods, rather than just moving vehicles. Therefore, an important congestion management objective is to increase the number of occupants per vehicle. The following types of signs encourage carpools and vanpools, and are especially valuable in the fringe metropolitan areas:

- Park and Ride Sign (D4-2)
- Car Pool Information Sign (D12-2)

High Occupancy Vehicle Signs

High Occupancy Vehicle (HOV) lanes are sometimes established to give preferential treatment to high occupancy vehicles. These lanes are typically operated as inbound traffic lanes to metropolitan areas in the morning hours and as outbound traffic lanes during the afternoon hours. In addition to the following signs, blank-out or variable message signs, moveable gates and channelizing devices are normally required in order to provide a safe operating system:

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- HOV Restricted Lane ~~Ahead~~ Sign (R3-10)
- HOV Preferential Lane Sign (R3-11A)
- HOV ~~Buses and Carpools Only Sign~~Preferential Lane Ahead Sign (R3-12~~11 1~~)
- HOV Preferential Lane Ends Sign (R3-12A)
- HOV Preferential Lane Ahead Overhead Sign (R3-15)
- HOV Preferential Lane Ends Overhead Sign (R3-15B)
- ~~—~~
- ~~Carpool (_____) or More Occupants Sign (R3-11-2)~~
- ~~Restricted Lane Ends Sign (R3-12)~~
- ~~Restricted Lane Ahead Sign (R3-13)~~
- ~~Preferential Lane Sign (R3-14)~~
- ~~Restricted Lane Ends Sign (R3-15)~~

Lane Restriction Signs

In order to enhance the capacity of a highway, the following signs may prove useful:

- Trucks Use Right Lane Sign (R4-5)
- Truck Lane (_____) Feet Sign (R4-6)
- Left Lane No Buses Sign (R4-101)
- Left Lane No Trucks Sign (R4-10211-1)
- No Trucks Buses Trailers in Left Lane Sign (R4-10311-2)

Ramp Metering Signs

Ramp metering signals are in operation on some freeway ramps in the Philadelphia area and at a limited number of locations in other major metropolitan areas. The signing associated with ramp metering is determined on a case-by-case basis.

2.16 Incident Management Signs

General

~~**Incidents are random events that reduce roadway capacity. A breakdown of 58,284 incidents recorded by Engineering District 6-0's Service Patrol from July 18, 2000 through June 26, 2007 is as follows:**~~

~~Incidents~~	~~Percent~~
~~Disabled Vehicles~~	~~72.4~~
~~Abandoned Vehicles~~	~~11.7~~

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~~Crashes~~	~~11.5~~
~~Debris~~	~~1.9~~
~~Pedestrians~~	~~0.1~~
~~Fires~~	~~0.2~~
~~Miscellaneous~~	~~2.2~~

Incidents are random events that reduce roadway capacity.

On freeways, the average incident frequency is normally estimated to be 40 per million vehicle miles of travel. When incidents occur, they frequently set off a vicious chain reaction, causing congestion, driver fatigue, driver impatience, driver frustration, and secondary incidents. ~~Over the past few years, most o~~Most of the large metropolitan areas have developed an incident management program designed to detect and remove incidents and restore the roadway capacity as quickly and safely as possible.

Electronic surveillance in the form of inductance loop detectors is the primary means of detection on most freeway management projects. Other information sources include the media, cellular telephone, police patrols, maintenance vehicles, service patrols, and fleet dispatchers. Incident verification is increasingly being done by Closed Circuit TV (CCTV), using solid state cameras.

This section identifies some of the useful signs to assist in avoiding primary or secondary incidents; identifying and responding to incidents when they do occur; and keeping the motorists apprised of the situation.

Emergency Detour Signing

A key component of incident management is to establish a clearly defined detour route to assist motorists around a crash, natural disaster, hazardous material spill, or other unplanned incidents. Detour routes need to be instituted in a timely manner to reduce delays, queues and the potential for secondary crashes. Emergency Detour Route signs will facilitate the driver in navigating around an incident providing these signs are consistent, conspicuous, and convey clear concise messages.

Therefore, all District Traffic Units shall have pre-established emergency detour route plans for roadway segments between every interchange on all limited access highways. Emergency detour routes shall be determined with input from but not limited to: PSP, County Emergency Management, local municipalities and emergency responders, and the Pennsylvania Turnpike Commission when applicable. After development and confirmation of the detour routes, the plan should be distributed to the key stakeholders.

Moreover, on a semi-annual basis, each District is to validate the detour plans, confirm roles and responsibilities for activations and deactivations, and exchange contact information. These semi-annual meetings may also serve other purposes such as discussing seasonal maintenance operations.

In order to implement an emergency detour route in a timely manner, signing for emergency detours ~~Emergency Detour Color trailblazer (D15-1) signs~~ shall be used at the end of off-ramps and in advance of all required turns and important decision points along the emergency detour route. ~~Therefore, in addition to the trailblazers, the Emergency Detour – Follow (Color) Arrow (D14-1) sign should be erected on the off-ramp either as a hinged permanent sign installation, or placed on temporary supports on an as-needed basis.~~

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The Emergency Detour Color Trailblazer (D14-102) and Emergency Detour – Follow (Color) Arrow (D14-101) signs that have been the standard signing for emergency detours established by the Department do not comply with Section 2D.59 of the *MUTCD*. Therefore, when establishing new emergency detour routes or updating existing routes, the signing shall consist of the Emergency Route To (M4-11CP) plaque used in conjunction with M1 series route markers, M3 series cardinal direction markers and M5 series turn markers as shown in **Exhibit 2-31**.

Exhibit 2-31 Emergency Detour Route Signs ~~If permanent folded signs are used, it is recommended that alternate messages be incorporated on the otherwise blank front side of the sign panel to make good use of supports and to avoid the "blank sign" appearance.~~

~~To develop statewide consistency in color usage, the following rule should be applied:~~

~~Blue.....North Detour~~
~~Red.....South Detour~~
~~Green.....East Detour~~
~~Black.....West Detour~~

The Emergency Color Detour signs ~~Recognizing that most emergency detours routes have been~~ established prior to this policy~~,~~ may continue to be used through the end of the service life of the majority of the signs. The District Traffic Units shall determine a systematic approach for updating the existing signing to the new *MUTCD* approved signing such as updating the signs as part of construction projects. If select Emergency Color Detour signs are damaged or missing, they may be replaced as needed until the signs for the entire emergency detour route are updated to the new *MUTCD* approved signs. ~~conformance changes or modification will not be required. The above color pattern should be used for newly established routes, except if conflicts exist, alternate colors may be used.~~

~~Emergency Color detour signs may not be practical to implement on all detour routes due to confusion or conflicts with existing signing (e.g., confusion with Pittsburgh's colored beltway signing). Therefore, the following three types of alternatives may be used in lieu of color detour signs:~~

~~1) Additional "TO" routes – the interstate shield or route marker with a TO (M4-5 or M4-5-1) sign can be effective on directing motorists back to the interstate. This method is typically effective on simple parallel detour routes. Care must be taken to ensure that confusion with existing TO signs will not exist.~~

~~2)~~ Changeable Message Signs (CMS) and Highway Advisory Radios (HAR) ~~– the use of CMS and HAR~~ will~~may~~ be the ~~a~~ primary means of guiding motorist thru an emergency detour route. However, if temporary CMSs are used, a delay in positioning the devices will present a challenge. A dependable and systematic plan for activation and deactivation of temporary and/or permanent signs must exist. Refer to Sections **Changeable Message Signs** ~~Changeable Message Signs~~ and **Highway Advisory Radio Signs** ~~Highway Advisory Radio Signs~~ in this chapter for additional information concerning CMS and HAR.

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~~3)~~
s an alternate to permanent signs, ~~T~~temporary d~~D~~etour s~~S~~igns may be utilized although~~,~~ the timely deployment of temporary signs is a challenge. A dependable and systematic plan for activation and deactivation of signs must exist. Districts may address timeliness by:

- Establishing a stockpile at a nearby location.
- Erecting signs in the field in a covered or folded mode.
- Erecting signs in the field in a meaningless or dormant mode.
- Any combination of the above.

~~The above three options can only be used if colored detours cannot be practically implemented. Districts shall document their rational for not using colored detours.~~

Incidents affecting a regional area, such as snowstorm, may require several interchanges or long sections of highway to be closed. Typically, an emergency regional detour will be communicated to motorists with ITS devices (CMSs, HARs, and Wizards) and notices to media outlets, trucking industry, adjacent states and Transcom. It is not prudent for the Districts to pre-establish detour routes for all logistical combination of regional impacts. However, Districts shall be prepared to spontaneously layout and establish a regional detour. It is also imperative that Districts have an ongoing inventory of ITS devices so devices can be readily deployed. The District Traffic Engineer or his/her designee should provide guidance on the emergency route layout, and County Maintenance shall have a plan for systematic deployment of ITS devices.

Crash Investigation Site Signing

Although it is advantageous to have disabled vehicles moved from the roadway to the shoulder, additional benefits occur if vehicles can be moved to special crash investigation sites that are not visible from the mainline. These sites should accommodate vehicles involved in minor crashes in which vehicles can still be driven. The sites not only help alleviate traffic congestion, but also allow motorists to exchange insurance information in a safer environment.

Special signing to identify the location of these crash investigation sites should be included whenever these sites are available as part of the construction project.

~~Fire Hose Access Signs~~

~~Fire Hose Access Signs (D17-1) are very useful in helping the fire companies locate the location of hose connections at bridges and access doors through noise barriers. The signs should generally be oriented parallel to the direction of traffic flow.~~

Changeable Message Signs

Changeable message signs may be effectively used to provide valuable information to motorists regarding incidents, estimated delay time and alternate routing. Even if motorists can not be rerouted, they will be more content if they are made aware of the specifics.

Due to the complex nature of many highway incidents, highway advisory radio can be used to supplement changeable message signs. Alternating messages such as “ACCIDENT AHEAD” and “TUNE 530 AM” can provide almost unlimited information for the motorists.

In order for changeable message signs to be effective, the importance of monitoring traffic conditions cannot be overemphasized.

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Highway Advisory Radio Signs

Highway Advisory Radio (HAR) is an alternative to changeable message signs. In order for HAR to be effective, HAR signs should be erected in advance of and at intervals within the range of the transmitted signal. The message broadcast on HAR must be transportation related. FHWA approval is required for the installation of HAR signs on the Interstate.

2.17 Welcome Center and Rest Area Signs

General

Install Welcome Center, Parking Areas and Rest Area Signs in accordance with the standards in Publication 111 (see TC-8701P, TC-8701R, and TC-8701W).

Supplemental Signs

Additional internal signs include the following:

- No Pets (A2-4)
- Pet Area (A2-4-2)
- Pet Area with Arrow (A-2-4-3)
- No Trespassing (A3-1)
- Roadside Rest Rules (A2-6-2)
- Recycling Services (I45-1)

2.18 Procuring Signs and Sign Accessories

County Sign Inventory

Minimum Inventory.

The Department cannot afford the luxury of overstocked supplies, nor can the counties afford to be out of some of the most popular or critical signs. Therefore, a suggested list of some of the most popular and critical signs are included as Exhibit 2-32~~Exhibit 2-35~~. In most cases, the suggested reorder points for Storage Location 01 includes both a numerical value and a 2-month normal usage – the greater of these two values is the recommended "reorder point."

Reorder Quantities.

"Reorder quantities" for Storage Location 01 should be similar to, but not greater than the reorder point.

Overstocked Items.

If a county has more than a 2-year supply of any sign or sign accessory, other counties in the district should be contacted to determine if any of the items could be transferred to them. If none of the counties in the District can use the overstocked item, Districts are encouraged to send an administrative message to all terminals, advising of the availability of the overstocked item.

If the excess stock continues, counties are encouraged to return overstocked items to the Sign Shop, except the Sign Shop will also not accept any obsolete items or signs with custom text. Although counties receive financial credit for items transferred to other counties, counties do not receive any direct credit for items

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returned to the Sign Shop. However, the Sign Shop recalculates the unit price of inventoried items at the Sign Shop, thereby passing the savings on to the next county that purchases one of the signs.

Materials from the Sign Shop

Traffic signs and most sign accessories are generally available from the Sign Shop. However, SR plaques, cutout letter and occasionally some signs will be available thru contract. BOO will determine where materials are to be procured and ensure that the necessary settings in Plant Maintenance are made.

Ordering Materials from the Sign Shop.

The Sign Shop provides signs for permanent sign installations, some work zone signs and other ancillary accessories. All materials are to be ordered through the SAP Plant Maintenance system. However, depending on the material, it may be ordered thru the sign inventory functional area as part of a sign work order or it may be necessary to order the material through the procurement area of SAP. Permanent signs that are inventoried as equipment records in Plant Maintenance may be ordered as part of the Sign Inventory Work Order process. Other commodities should be ordered via standard SAP procurement procedures. The Bureau of Office Services should be contacted with specific procurement questions not related to permanent signs ordered as part of a Sign Inventory Work Order.

When SAP Material Numbers exist for signs, preference should always be given to ordering signs by their specific numbers. Signs with custom text, including those with an "(x)" in the description column, have to be ordered using the SAP Plant Maintenance Sign Inventory Work Order Process with the custom information included in the long text (LT) field.

Occasionally, the District will need to include SignCAD drawings with the sign orders, but the county will order the sign in Plant Maintenance. To accomplish this, use the following procedures:

a) The District creates a SignCAD drawing for the subject sign and places this in their District folder at ~~P:\bhste_shared\SignCAD_Files_for_Sign_Orders\District~~P:\bhste_shared\SignCAD_Files_for_Sign_Orders\District

b) The District creates a notification for the subject sign equipment record. In the "Subject" screen area at the bottom of the notification the path to the specific SignCAD file is placed.

c) The ACMM will subsequently create a Sign Inventory Work Order for the subject sign that will include linking the notification to the work order (using the IW3K transaction). The sign that requires the SignCAD file will be identified as one with an N (non-stocked) in the item category (IC) field. The file path must be manually copied from the "Subject" screen area of the notification to the item's LT field on the component screen of the work order.

d) The information contained in the LT field functions similar to the spec file in MORIS and is automatically copied into the Purchase Requisition and eventually the Stock Transport Order where it is visible for the Sign Shop.

e) The Sign Shop will access the required SignCAD drawing in the folder specified for fabrication of the sign. The file will be deleted from the folder upon completion of the order so the District must save the original file in another folder elsewhere if they want it for future use.

f) Orders that do not contain the necessary/sufficient information to properly fabricate the sign will be canceled. A notice of cancellation with explanation will be generated within SAP.

Some typical examples are shown in Exhibit 2-33~~Exhibit 2-36~~.

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a) When ordering City Name, Borough Name, Township Name, etc., double check the spelling in the LT field and ensure that spaces in the names are used when, and only when, the name is more than one word.

b) If a sign does not have its own SAP Material Number, it should be order as a R99 1 or W99 1 sign if it is a standard-size regulatory or warning sign, or otherwise as a D5 sign.

Types of Sign Fabrication.

Signs may use any of the following substrates:

1. Flat sheet aluminum.
2. Flat sheet aluminum with extruded aluminum stiffeners (all Exit Gore signs and D5-series signs larger than 96"x48").
3. ~~Fiberglass (SR paddles only).~~

Sign messages may be created by any of the following methods:

1. Silk-screened message and border (e.g., DO NOT PASS, Turn, Curve, Crossroad, signs, etc.).
2. Silk-screened background (reverse-screened, e.g., STOP, YIELD, DO NOT ENTER signs).
3. Cut-out legend and border (e.g., used on custom-made signs such as destination signs, where the legend is usually cut by a computerized sign maker).
4. Electronic cuttable film with the message cut from the sheet and applied to a covered blank.
5. Combination of silk-screening and cut-out legend (e.g., used on many Weight Limit signs, most Route Marker signs, etc., where most of the sign message is silk-screened and the numerals are applied by hand).

Identification of Sheeting Materials and Time of Manufacture.

Each sign manufactured at the Sign Shop has a code to identify the year and quarter of the year that the sign was made and the manufacturer and class of reflective sheeting. On silk-screened signs, this information is typically screened near the border on the lower half of the signs. On signs made with cut-out legend, one sticker is generally applied – one in the lower left corner of the sign.

The code for the year is the last two digits of the year, e.g., 07, 08, 09, 10, etc., (only the last digit was used on silk-screened signs prior to 1980 and on custom-made signs prior to 1986). The letters A, B, C and D represent the first, second, third and fourth quarters of the year. The reflective sheeting manufacturer is identified by the following symbols:

Manufacturer	Symbol
Nippon	■
3M	●
Avery Denison	◆

Materials Available From Statewide Contracts.

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- Posts and Accessories (channel bar posts, steel square posts, wood post sleeves and breakaway hardware and anti-theft bolts).
- Delineation Devices (post-mount guide rail delineators, web-mount guide rail delineators, top-mount mount barrier delineators and side-mount barrier delineators).

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~~Legacy Contract No.~~ ~~Title~~

~~9550-10~~ ~~Posts and Accessories (channel bar posts, steel square posts, wood post sleeves, W-beam posts and breakaway hardware and anti-theft bolts).~~

~~9905-09~~ ~~Delineation Devices (post-mount guide rail delineators, web-mount guide rail delineators, top-mount mount barrier delineators, side-mount barrier delineators, and temporary non-plowable chip seal markers).~~

~~9905-11~~ ~~Work Zone Traffic Control Devices (traffic cones, drums, and temporary pavement marking tape).~~

~~9905-13~~ ~~Traffic Signs (primarily used for cutout letters and SR blanks).~~

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Exhibit 2-~~32~~35 Suggested County Sign Safety Stock

Nomen-Clature	Size	Description	Safety Stock Quantity
R1-1	30x30	Stop	6 signs or 3 mo.
R1-2	36x36	Yield	2 signs or 3 mo.
R2-1(35)	24x30	Speed Limit (35)	2 signs or 2 mo.
R2-1(40)	24x30	Speed Limit (40)	3 signs or 2 mo.
R2-1(45)	24x30	Speed Limit (45)	2 signs or 2 mo.
R4-1	24x30	Do Not Pass	2 signs or 2 mo.
R4-7	24x30	Keep Right	3 signs or 2 mo.
R5-1	30x30	Do Not Enter	1 sign or 3 mo.
R5-1	36x36	Do Not Enter	1 sign or 3 mo.
R5-1~~A~~9	36x24	Wrong Way	1 sign or 3 mo.
R6-1(R)	36x12	On Way Right	2 signs or 2 mo.
R6-1(L)	36x12	On Way Left	2 signs or 2 mo.
R8-3~~A~~	24x24	No Parking Symbol	1 sign or 2 mo.
R11-2	48x30	Road Closed	1 sign or 2 mo.
R12-1	24x30	Weight Limit 10 Tons	4 mo.
R12-1	24x30	Weight Limit ( ) Tons	4 mo.
R12-1-2	24x12	Bridge	4 mo.
~~R12-1-1~~	~~24x18~~	~~( ) Mile Ahead~~	~~4 mo.~~
R12-5~~A~~4	24x18	Except Combinations ( ) Tons	4 mo.
W1-1R	30x30	Right Turn	2 signs or 2 mo.
W1-1L	30x30	Left Turn	2 signs or 2 mo.
W1-2R	30x30	Right Curve	2 signs or 2 mo.
W1-2L	30x30	Left Curve	2 signs or 2mo.
W1-4R	30x30	Right Reverse Curve	1 sign or 2 mo.
W1-4L	30x30	Left Reverse Curve	1 sign or 2 mo.
W1-6	48x24	Large Arrow (Single)	2 signs or 2 mo.
W1-8	18x24	Chevron Alignment Marker	3 signs or 2 mo.
W1-8	24x30	Chevron Alignment Marker	3 signs or 2 mo.
W2-1	30x30	Cross Road	2 signs or 2 mo.
W2-2	30x30	Side Road	2 signs or 2 mo.
W2-4	30x30	T Symbol	2 signs or 2 mo.
W3-1~~A~~	36x36	Stop Ahead	2 signs or 3 mo.
W3-5	36x36	Speed Reduction (40)	1 sign or 2 mo.

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Nomen-Clature	Size	Description	Safety Stock Quantity
W14~~3~~-3~~10~~	48x36	No Passing Zone Pennant	2 signs or 2 mo.
W5-2A	30x30	Narrow Bridge-Underpass Sym.	2 signs or 2 mo.
W13-1P(20)	18x18	Advisory Speed (20)	1 sign or 2 mo.
W13-1P(25)	18x18	Advisory Speed (25)	1 sign or 2 mo.
W13-1P(30)	18x18	Advisory Speed (30)	1 sign or 2 mo.
W13-1P(35)	18x18	Advisory Speed (35)	1 sign or 2 mo.
W13-1P(40)	18x18	Advisory Speed (40)	1 sign or 2 mo.
~~W16-1~~OM1-3	18x18	~~Hazard~~ Object Marker	3 signs or 2 mo.
~~W16-2R~~OM-3R	12x36	Right Clearance Marker (B & Y)	5 signs or 2 mo.
~~W16-2L~~OM-3L	12x36	Left Clearance Marker (B & Y)	5 signs or 2 mo.
W16-9P	24x18	( ) Mile Ahead	4 mo.
W16-103P	24x18	Distance Ahead Plaque	4 mo.
W2~~1~~0-1-~~7~~	36x36	~~Work Area Ahead (Plastic)~~Road Work	1 sign or 2 mo.
W21-10	24x24	Stop and Slow Paddle	1 sign or 2 mo.
M2-1P	21x15	Junction Marker (B & W)	1 sign or 2 mo.
M3-1P	24x12	Card Direct Marker North	2 signs or 2 mo.
M3-2P	24x12	Card Direct Marker East	2 signs or 2 mo.
M3-3P	24x12	Card Direct Marker South	2 signs or 2 mo.
M3-4P	24x12	Card Direct Marker West	2 signs or 2 mo.
M6-1P	21x15	Directional Arrow 90 Deg.	2 signs or 2 mo.

* In addition, month pressure-legend for partially stock a 4-supply of sensitive these finished signs.

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Exhibit 2-~~33~~36 Ordering Custom Signs

Nomen-Clature	Sign Name	Example
R1-3	(X) WAY	2 WAY
R2-2CP-1~~-1~~	TRUCKS OVER (X) TONS~~LBS~~ SPEED LIMIT(X)	1~~0~~0,000 TONS~~LBS~~ SPEED 15
R4-6	TRUCK LANE (X) FEET	1500 FEET
R12-1	WEIGHT LIMIT (X) TONS	12 TONS
~~R12-1-1~~	~~(X) MILES AHEAD~~	~~3 MILES~~
R14-16-1	VEHICLES OVER (X) PROHIBITED	10' WIDE
W1-5-1	WINDING ROAD NEXT (X) MILES	5 MILES
W5-1-1	NARROW ROAD NEXT (X) MILES	5 MILES
W12-2	LOW CLEARANCE (X)' (X)"	13' 2"
W16-9P	(X) MILES AHEAD	3 MILES
W16-103P	DISTANCE AHEAD PLAQUE	3 MILES
W99-1	W99-1 SPECIAL WARNING	Curve sign with Unusual Side Road Geometry
D1-1	SINGLE LINE DESTINATION	LA SCRANTON 10 *
D1-2	DOUBLE LINE DESTINATION	SAA COLUMBIA 15 * YORK 12 RA **
D2-2~~1~~	DOUBLE LINE DISTANCE	YORK 9 HARRISBURG 36 **
D5	72" X 60" SPECIAL DIRECTIONAL	EXIT 13 WITH RIGHT DIAGONAL
D10-5~~4~~	ENHANCED ~~INTERMEDIATE DISTANCE MARKER~~REFERENCE LOCATION WITH DECIMAL	WEST, US 12, MILE 221
I10-1	CITY NAME	PITTSBURGH
I10-5	COUNTY NAME	LACKAWANNA

* SAA = straight-ahead arrow, LA = left arrow, RA = right arrow,
LDA = left diagonal arrow, RDA = right diagonal arrow.

** Put signs second-line message in second line of the spec file instructions. Similarly, put the third-line message of a three-line sign in third line of the spec file instructions

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2.19 Chapter 2 Appendix

Proposed Traffic Route Change

_____ County
Proposed Relocation of PA _____

_____, Director
Bureau of Operations
ATTN: Chief, Highway Safety and Traffic Operations Division

District Executive
Engineering District _____

In order to eliminate traffic congestion and improve traffic flow through _____ _____, we are recommend the partial elimination and the partial relocation of PA _____. This action would move PA _____ from a predominantly commercial area.

This change would take effect immediately upon securing the necessary approvals and delivery and installation of the necessary signing.

Co. / SR	From Segment / Offset	Intersection	To Segment / Offset	Intersection
		Partial Elimination of _____		
48 / 0412	0020 / 0032	SR 3002	0070 / 0016	SR 3008
		Partial Relocation of _____		
48 / 3002	0100 / 0012	SR 0412	0140 / 0492	SR 3008
		Northbound		
48 / 3008	0030 / 0082	SR 3002	0030 / 0497	SR 1001
48 / 1001	0100 / 0025	SR 3008	0230 / 0063	SR 2010
		Southbound		
48 / 1001	0231 / 0065	SR 2010	0101 / 0028	SR 3008
48 / 3008	0031 / 0499	SR 1001	0101 / 0025	SR 3002

Also enclose the following: (1) a listing of the physical limitations of the roadways for the proposed partial relocations; and (2) either one reproducible map graphically showing the location of the proposed partial elimination or partial relocation, or nine color-coded originals.

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Enclosures

Physical Limitations of the Proposed Traffic Route

Date _____

County _____

Traffic Route No. _____

ESTABLISHMENT _____ EXTENSION _____ RELOCATION_____

SR / segment →				
ROAD WIDTH				
Roadway				
Berm				
Overall				
BASE				
Depth				
Type				
SURFACE				
Type				
Designation				
BRIDGE RESTRICTIONS				
Width (min.)				
Load (min.)				
OVERPASS				
Clearance				
CURVES				
No. over 6-degree				
Maximum				
GRADES				
No. over 6%				
Maximum length				

Does this route

(a) Save Mileage Distance? Yes ___ No ___ If yes, how much mileage? _____
(b) Re-route a present route? Yes ___ No ___

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Is the complete route over State Highways? Yes ___ No ___ If no, an agreement(s) must be executed and enclosed.

Is the proposed route properly marked with signs and pavement markings? Yes ___ No ___

Submitted by _____ Date _____
(District Traffic Engineer)

Approved by _____ Date _____
(District Executive)

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Municipal Agreement re Traffic Route Change

THIS AGREEMENT, made this _____ day of _____, 20___, between the Commonwealth of Pennsylvania, acting through the Department of Transportation, hereinafter called the COMMONWEALTH,

and

_____,

hereinafter called the MUNICIPALITY.

WITNESSETH:

WHEREAS, the parties desire to designate certain highways under the jurisdiction of the MUNICIPALITY as traffic routes; and,

WHEREAS, the parties desire to have such traffic routes established and marked in accordance with standards, policies and regulations of the COMMONWEALTH's Department of Transportation; and,

WHEREAS, the parties desire to enter into this Agreement for the purpose of outlining their respective obligations.

NOW, THEREFORE, the parties agree to the following:

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1. Following highways under the jurisdiction of the MUNICIPALITY are hereby established as traffic routes.

Via	From Intersection	To Intersection	Direction	Traffic Route No.

These routes are more specifically shown on a map which is attached as Exhibit A and made a part of this Agreement. The establishment and maintenance of these traffic routes shall be subject to the conditions set forth below.

2. The MUNICIPALITY shall, at its cost, be responsible for policing and maintaining the roadway and provide for snow removal.

3. The COMMONWEALTH shall provide and maintain all traffic route markers. The MUNICIPALITY shall, at its cost, be responsible for providing and maintaining all other traffic-control devices including pavement markings.

4. The COMMONWEALTH's Secretary of Transportation shall have the right, in his/her sole discretion, to discontinue any or all of the above highways under the jurisdiction of the MUNICIPALITY as traffic routes. In the event that any such determination is made, the COMMONWEALTH shall remove all signs and markings indicating the highway to be a traffic route.

5. The MUNICIPALITY shall indemnify, save harmless and defend COMMONWEALTH, the Department of Transportation, their officers, agents and employees, from all suits, actions or

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claims of any character, name or description, brought for or on account of any injury, death or property damage as a result of the design, construction and/or maintenance of the above-noted highways, whether the same be due to the use of defective materials, defective workmanship, neglect in the MUNICIPALITY and/or the MUNICIPALITY's contractor, their officers, agents and employees during the performance of any work on the above-noted highways under the jurisdiction of the MUNICIPALITY.

6. If the MUNICIPALITY shall fail to perform any of its obligations under this Agreement, and if the COMMONWEALTH desires to continue any or all of the above-noted highways as traffic routes, and the MUNICIPALITY shall fail to cure any defaults and performance within thirty (30) days of notice from the COMMONWEALTH, the MUNICIPALITY authorizes the COMMONWEALTH to withhold so much of the MUNICIPALITY's Liquid Fuels Tax allocation as may be necessary to complete necessary work and/or to reimburse the COMMONWEALTH in full for all costs incurred, and does hereby and herewith authorize the COMMONWEALTH to withhold such amount and to apply such funds, or portions thereof, to remedy such default.

7. The MUNICIPALITY agrees to be bound by the Act of May 20, 1937, (P.L. 728, No. 193), as amended by Act of October 5, 1978, (No. 260), which provides, in substance, that the Board of Claims shall have jurisdiction of claims against the COMMONWEALTH arising from contracts and the power to order the interpleader or impleader to other parties when necessary for a complete determination of any claim or counterclaim in which the COMMONWEALTH is a party.

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IN WITNESS WHEREOF, the parties have executed this Agreement on the date first above written.

ATTEST COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

_____ BY _____
Deputy Secretary of Transportation

(SEAL)

ATTEST:

_____ _____
Title

(SEAL)

APPROVED AS TO LEGALITY AND FORM

BY _____
Chief Counsel

BY _____
Deputy Attorney General

* Resolution designating signature authority attached.

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Resolution Designating Signature Authority

BE IT RESOLVED, by authority of the_____
(Name of governing body)

_____ of the _____,
(Name of Municipality)

_____ County, and it is hereby resolved by authority of the same,

that the _____ of said Municipality Authority be authorized and
(designate official title)

directed to sign the attached Agreement on its behalf and that the _____
(designate official title)

be authorized and directed to attest the same.

ATTEST _____
(Name of Municipality)

_____ By:_____
(Signature and designation of official title) (Signature and designation of official title)

(SEAL)

I, _____, _____
(Name) (Official Title)

of the _____, do hereby certify that the
(Name of governing body and municipality)

foregoing is a true and correct copy of the Resolution adopted at a regular meeting of the

_____, held the_____ day of _____, 20___.
(Name of governing body)

DATE _____ _____
(Signature and designation of official title)

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CHAPTER 3 - MARKINGS

3.1 General

Purpose

Markings are a common and expected component of the highway system. The primary purpose of markings is to provide the driver clear visual information to operate his vehicle in a variety of situations. Markings define the intended travel path during both daylight and nighttime hours, and during various weather conditions. Common types include the following:

- Pavement markings (includes lines, words, symbols, pavement markers, and curb markings).
- Object markings.
- Delineators.
- Barricades, channelizing devices, and islands.

Markings also perform a function in the overall traffic-control system. In general, markings supplement other traffic control devices and provide guidance and warning. However, in accordance with ~~§3307(b)~~§3307(b) of the Vehicle Code, they also perform a regulatory function because no-passing zone pavement markings are required in addition to signs to enforce no-passing zones.

As with all traffic-control devices, markings should be readily recognized and understood.

Laws, Regulations and Other Publications

~~*Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines*~~*ADA Standards for Accessible Design*, United States ~~Access Board~~Department of Justice, ~~July 23, 2004~~September 15, 2010. ~~Available online at http://www.access-board.gov/ada-aba/final.pdf.~~

Manual on Uniform Traffic Control Devices (MUTCD). ~~Note: PennDOT adopted NCHRP Report 672 as the Roundabout Guide (http://www.trb.org/Main/Blurbs/164470.aspx).~~

~~Manual on Uniform Traffic Control Devices (MUTCD).~~ A manual adopted by the Federal Highway Administration and which establishes national guidelines for traffic-control devices, including signs. ~~The MUTCD is available through the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. Specifically,~~ Part 3 addresses pavement markings~~ngs, and is available at http://mutcd.fhwa.dot.gov/.~~

Pavement Marking Handbook (Publication 648). This PennDOT manual provides detailed guidance for Department work force in the day-to-day operation of the Department's pavement marking program, including the operation of the truck-mounted and small paint machines.

Pennsylvania Drivers Manual. This manual provides guidance for drivers, including the purpose and meaning of the various types of markings~~, available at http://www.dmv.state.pa.us/drivers_manual/index.shtml~~.

Qualified Products List for Construction – Bulletin 15 (Publication 35). A listing of PennDOT approved materials and manufacturers.

Construction Specifications (Publication 408). ~~*Specifications (Publication 408).*~~ Specifications referenced for all Department construction projects, which includes requirements for the installation of signs and sign accessories. Specifically, Sections 961, 962, 963, 964 and 965 address pavement marking materials and

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delineation devices. ~~Pub. 408 is also available at http://www.dot.state.pa.us/Internet/Bureaus/pdDesign.nsf/ConstructionSpecs408and7?OpenForm~~

Traffic Control – Pavement Markings and Signing Standards (Publication 111). This publication includes PennDOT's 8600 and 8700-series standards. Specifically, the 8600-series deal with markings: the types, dimensions, and locations of pavement markings (TC-8600), snowplowable raised pavement markers (TC-8602), and delineators (TC-8604). ~~The publication is available at ftp://ftp.dot.state.pa.us/public/PubsForms/Publications/PUB%20111M.pdf~~

Vehicle Code (75 Pa. C.S.). The Pennsylvania Vehicle Code is law that typically defines actions required by drivers and the Department. It discusses markings in several sections, but of specific importance is the requirement in ~~§3307(b)~~§3307(b) that both signs and markings are required to enforce no-passing zones.

Temporary ~~Work Zone~~ Traffic Control Guidelines (Publication 213). This publication shows drawings for temporary traffic control, including the use of temporary pavement markings.

Definitions

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

Delineator – A retroreflective device mounted on the road surface or at the side of the roadway in a series to indicate the alignment of the roadway, especially at night or in adverse weather.

Divided highway – A highway divided into two or more roadways and so constructed as to impede vehicular traffic between the roadways by providing an intervening space, physical barrier or clearly indicated dividing section.

85th percentile speed – The speed on a roadway at or below which 85 percent of the motor vehicles travel.

Expressway – A divided arterial highway for through traffic with partial control of access and generally with grade separations at major intersections.

Freeway – A limited access highway to which the only means of ingress and egress is by interchange ramps.

Illustration – A picture, depiction, design or diagram of a person, place, concept or object, whether real, imaginary or abstract.

Narrow bridge or underpass – A bridge, culvert or underpass with a two-way roadway clearance width of 16 to 18 feet, or any bridge, culvert or underpass having a roadway clearance less than the width of the approach travel lanes.

School zone – A portion of a highway that at least partially abuts a school property or extends beyond the school property line that is used by students to walk to or from school or to or from a school bus pick-up or drop-off location at a school.

3.2 Pavement Markings

Pavement markings are the only traffic control device that is visible without the driver taking ~~his or her~~their eyes off the roadway. Quality pavement markings aid in the reduction of roadway departure incidents by providing better visibility at night and in adverse weather conditions.~~Since pavement markings are on the physical road surface, they are superior to all other markings in showing the intended travel path. Quality pavement markings also make drivers feel more comfortable and reduce their stress level.~~

The Department's Pavement Marking Handbook (Pub 648) is the primary document for Department personnel that are directly involved with the operation of the Truck-Mounted Paint Machine Program and

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the Small Paint Machine Program. The handbook gives detailed guidance on how to run the Department's in-house program.

Pavement Marking Components~~Materials~~

Pavement marking materials are either liquid or premanufactured materials that are applied to the pavement surface to provide guidance to motorists. In general, pavement markings are made up of the following components:

Binding Material – The binding material provides the pavement marking physical presence and its color and serves as a holder of retroreflective elements. The binding material can be a liquid or a preformed solid that is glued or melted onto the roadway surface. The primary components of the binding material are pigment, filler, and resin. Pigment gives the material color, opacity, presence while providing retroreflection. Filler is used to supplement the more expensive pigment as a cost effective measure. Resin acts as the glue which holds the components together and the pavement marking to the roadway surface.

Retroreflective Component – Retroreflective components are added to the binding material, or provided in addition to, for improved driver visibility by redirecting light back to its source, e.g. a vehicle's headlights. This process is detailed in **Exhibit 3-1**. These components are variable in size and material, enabling them to provide different types of retroreflectivity under varying environmental conditions. There are several approaches to make pavement marking materials retroreflective described as follows:

1. Dry Retroreflective Elements – Retroreflective glass beads are typically sprayed or dropped into the binding material to provide retroreflectivity of the pavement marking primarily in dry or slightly wet roadway conditions. Beads of different types and sizes may be added to the binding material to enhance retroreflectivity under multiple conditions.
2. Wet Retroreflective Elements – Wet retroreflective elements are sprayed or dropped into the binding material in addition to the dry elements (glass beads). These elements are comprised of smaller beads clustered around a central core (See **Exhibit 3-2**) and are retroreflective only while submerged in water.
3. Raised Pavement Markers (RPMs) – RPMs are provided in addition to longitudinal pavement markings along the edge line or centerline of a lane. These markers provide additional retroreflectivity to the motorist during nighttime and/or adverse weather conditions.

An image showing both a dry element (glass bead) and wet element applied to a binding material can be seen in **Exhibit 3-2**.

~~This section provides a brief description of the various marking materials that are approved and available for use in Pennsylvania. The Materials and Testing Division conduct the testing of these materials on the Department's test deck and in the laboratory, with the assistance of the Highway Safety and Traffic Operations Division.~~

~~The only materials that can be sold for or used on any public highways in Pennsylvania are those materials listed in *Bulletin 15 (Publication 35)*. **Exhibit 3-1** lists materials used in Pennsylvania and appropriate cross-references.~~

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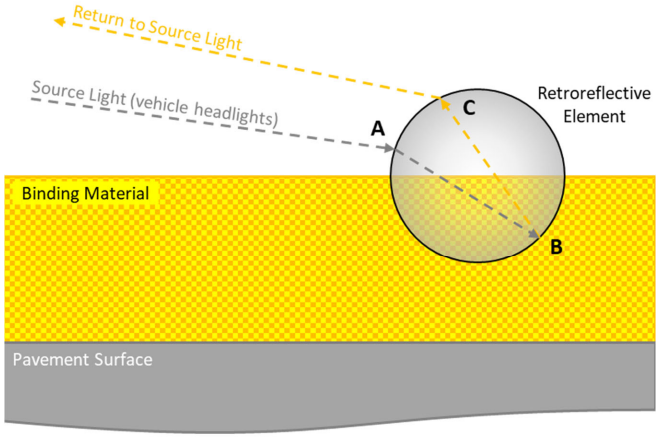
Exhibit 3-1 ~~Pavement Marking Materials~~Element Retroreflectivity Diagram



A: Light bends (refracts) at point of entry
B: Light reflects off back of element with the color of the binding material
C: Light bends (refracts) at point of exit, directed back to source of light

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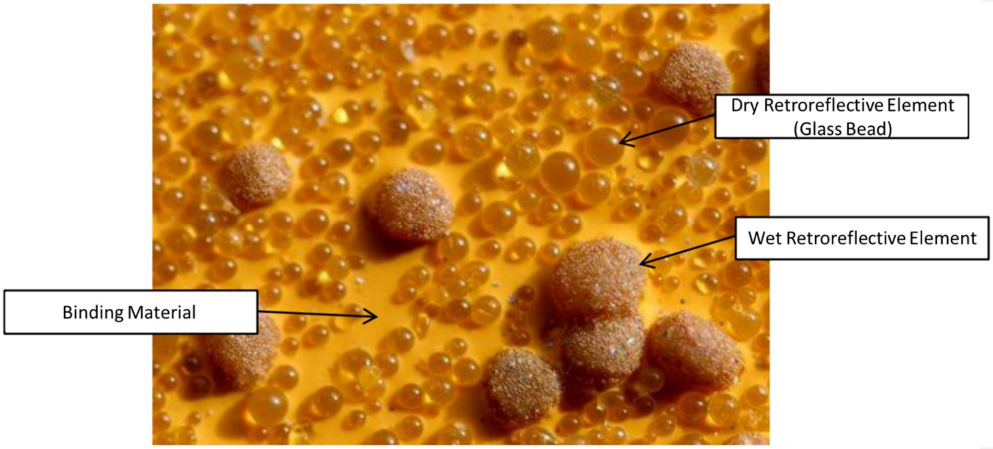
Material	Section in Publication 408	Section in Publication 35
Hot thermoplastic	960	960
Cold plastic	961	961
Waterborne paint	962	962
Epoxy markings	964	964
Preformed thermoplastic	965	965
Snowplowable RPMs	966	966
Glass beads for traffic paint	1103.14	1103.14
Methyl methacrylate	*	Miscellaneous: Traffic Division
Polyurea	*	
Polyester	*	
Wet reflective tape	*	

Exhibit 3-2 Retroreflective Elements



* Specifications are on file with the Highway Safety and Traffic Operations Division

The Vermont Agency of Transportation report entitled *Pavement Marking Comparison Study – I-89 Liquid markings*, December 2018, by Ian Anderson, Research Engineer.

Types of Applications

Pavement markings are used for many different types of application. The standards and guidance of each application is further detailed within the Manual on Uniform Traffic Control Devices (*MUTCD*) and PennDOT Publication 111, *Traffic Control – Pavement Markings and Signing Standards*.

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Longitudinal

Longitudinal pavement markings are markings used primarily to delineate travel lanes. These markings include center lines, edge lines, and broken lane lines. Longitudinal markings are installed directly on the pavement surface (surface applied) or within a recessed groove (recessed) to extend the life of the pavement marking.

Transverse

Transverse pavement markings are markings that are generally placed perpendicular and across the flow of traffic. These may include crosswalks, stop lines, yield lines, etc.

Legends and Symbols

Legends and symbol pavement markings are used to supplement signs and provide additional emphasis for regulatory, warning, or guidance messages. Legends specifically refer to text or words on the roadway, and symbols consist of arrows, route shields, shared lane markings, etc.

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Pavement Marking Materials

This section provides a brief description of the various marking materials that are approved and available for use in Pennsylvania. The Materials and Testing Division conduct the testing of these materials on the Department's test deck and in the laboratory, with the assistance of the Highway Safety and Traffic Operations Division (HSTOD).

A list of prequalified pavement marking materials, eligible for use on Department construction projects, are in Bulletin 15 (PennDOT Publication 35). **Exhibit 3-3** lists these pavement marking materials and their appropriate cross-references.

Exhibit 3-3 Approved Pavement Marking Materials

Material	Section in Publication 408	Section in Publication 35	Durable Pavement Marking?
Hot thermoplastic	960	960	Y
Cold plastic	961	961	Y
Waterborne paint	962	962	N
Epoxy markings	964	964	Y
Preformed thermoplastic	965	965	Y
Snowplowable raised pavement markers (RPMs)	966	966	N/A
Methyl methacrylate	*	N/A*	Y
Polyester	*		Y
Polyurea	*		Y
Removeable Temporary Tape	901		Y
Nonremovable Temporary Tape	901		Y
Recessed Wet-Reflective Polyurea	**		Y
Recessed Wet-Reflective Tape	**		Y

*Specifications are on file with HSTOD
**Specifications are on file in PennDOT Engineering and Construction Management System (ECMS)

Non-durable Markings

Non-durable markings are designed to be used for short periods of time, typically less than one year. The most commonly used non-durable pavement marking in Pennsylvania is waterborne paint.

Waterborne Paint – Waterborne Paint is the most common type of pavement marking material used in Pennsylvania. This paint is the least expensive of all pavement marking materials but is installed with a low retroreflectivity level that degrades significantly over a short time.

Durable Markings

Durable markings can be installed on the roadway surface, or in a recessed groove depending on the type of application. These markings are typically comprised of the base material, resin, and retroreflective elements. Descriptions of the durable pavement markings used in Pennsylvania are as follows:

Hot Thermoplastic – Hot thermoplastic material is generally a synthetic resin that softens when heated and hardens when cooled without changing the properties of the material. Although the

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material contains retroreflective elements, an additional coating of elements is applied after installation to provide initial retroreflectivity. Hot thermoplastic material can be applied by screed, ribbon or spray methods. A sealer should be used on concrete and old bituminous roadways immediately prior to application of the thermoplastic.

Cold Plastic Tape and Legends – Cold plastic tape and legends are pre-formed and white or yellow in color. They have pressure-sensitive adhesive on the back surface and are capable of being applied to bituminous and/or concrete roadway surfaces. These materials can be surface-applied or recessed. If surface applied, a sealer will generally be required. This material is further classified into the following two categories, and each has its own specifications:

1. Cold plastic pavement marker or legend – Has an adhesive back and is 60 mils or 90 mils thick. This pavement marking material is intended for permanent installation.
2. Temporary pavement marking tape – Has an adhesive back and is from 20 to 50 mils thick. Types of temporary tape include:
   - Non-removable.
   - Removable, Type I.
   - Removable, Type II.

   The discerning difference between removable Type I and Type II tape is that Type II tape does not leave a noticeable mark on the highway 30 days after its removal.

Epoxy – Epoxy pavement markings consist of resin paint with either two or three types of reflective elements. This marking may be applied to both bituminous and concrete pavement after the roadway surface is thoroughly cleaned of old pavement markings or curing compound. Several drawbacks of using epoxy are its dull, fading color and its long curing time without the use of additives.

Preformed Thermoplastic – Preformed thermoplastic consists of a preformed polymer thermoplastic (white or yellow) with reflective elements uniformly distributed throughout its cross section and installed on bituminous and concrete pavements.

Methyl Methacrylate (MMA) – MMA is a two-part compound which can be extruded, sprayed or manually applied to either concrete or bituminous pavements. It contains both reflective elements and anti-skid aggregate.

Polyester – Polyester is a two-component system which is applied separately on the roadway and cures to a durable marking. It can be applied to both concrete and bituminous pavements but has not performed well on concrete. It should not be applied to new bituminous surfaces until the surface oils have disappeared (approximately 2 weeks).

Polyurea – Polyurea-based liquid pavement marking material consists of a two-component, 100 percent solid, thermosetting material. This pavement marking is sprayed onto the roadway and is fast curing.

Temporary Wet-Reflective Tape – Temporary wet-reflective tape is a highly reflective tape under both dry and wet roadway conditions, even when fully submersed in water. Temporary wet-reflective tape is used in work zones when pavement markings are required temporarily. Temporary wet-reflective tape should not be installed over the winter months due to potential winter maintenance interference with the marking.

Recessed Wet-Reflective Pavement Markings (RWRPMs)

Recessed durable pavement marking are either liquid or premanufactured and installed in a recessed groove within the pavement surface, which is necessary to protect the larger-sized retroreflective elements

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from being broken and dislodged due to general roadway use and roadway maintenance procedures, such as snowplowing. These markings are comprised of a binding material and dry and wet retroreflective elements. The following materials, eligible for use on PennDOT roadways, are as follows:

Recessed Wet-Reflective Polyurea – Polyurea-based liquid pavement marking consists of a two-component, 100 percent solid, thermosetting material. Polyurea has comparable durability to epoxy and hot thermoplastic with the benefits of cure times of less than 2 minutes, low installation temperatures, adhesion to all types of pavement surfaces and resistance to color fading or dulling due to ultraviolet light exposure. Polyurea is very sensitive to moisture and must meet strict moisture specifications during and immediately after installation. Recessed wet-reflective polyurea has a life expectancy of 3-4 years.

Recessed Wet-Reflective Tape – Recessed wet-reflective tape is a highly reflective tape under both dry and wet roadway conditions, even when fully submersed in water. Permanent installations of wet-reflective tape should be installed in a recessed groove. This application type, known as Recessed Wet-Reflective Tape is highly durable and abrasion resistant with a service life greater to most other materials. Recessed wet-reflective tape has a life expectancy of 8-10 years.

Restriping Compatibility

Some materials are more durable than other materials, but not all materials are compatible with each other or with some road surfaces. When considering the installation of a new material on an existing material, **Exhibit 3-4** can be used as a reference to determine compatibility between materials.

~~Pavement marking materials are further described as follows:~~

1. ~~Waterborne Traffic Paint. Waterborne Traffic Paints (white and yellow) is the most common type of pavement marking used in Pennsylvania. This paint is pre-heated prior to application, applied by truck-mounted paint equipment for center, lane and edge lines, and normally dries in 90 seconds or less.~~
2. ~~Glass Beads. Since there are various marking materials approved for use in the state, the Department has developed specifications for several types of beads for use with these materials. To view the gradation of the following bead types, go to Publication 408, Section 1103.14.~~
   - ~~Type A Beads. These are the standard beads specified in AASHTO M 247, Type I, Moisture Resistant. Type A Beads can be used with all marking materials.~~
   - ~~Type B Beads. This gradation is much larger than the standard beads (Type A), and was developed for use with durable materials to provide better wet-night visibility of the pavement markings. Commercially available trade names include Visibeads, Big Beads, Megalux, etc.~~
   - ~~Type C Beads. These beads are another large gradation similar to the Type B Beads, but are used primarily with waterborne and polyester pavement marking materials for improved wet-night visibility.~~
   - ~~Type D Beads. This gradation is only slightly different from the standard beads (Type A) with a greater percentage of beads in the bigger sieve sizes. Type D Beads may be used with waterborne paints as an alternate to Type A Beads.~~
3. ~~Hot Thermoplastic. Hot thermoplastic material is generally a synthetic resin that softens when heated and hardens when cooled without changing the properties of the material. Although the material contains glass beads, an additional coating of beads is applied after installation to provide initial reflectivity. Hot thermoplastic material can be applied by screed, ribbon or spray methods. A~~

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~~sealer should be used on concrete and old bituminous roadways immediately prior to application of the thermoplastic. Existing marking materials should be removed for proper adherence to the roadway.~~

4. ~~Cold Plastic Tape and Legends. This material is pre-formed and is white or yellow in color, has pressure-sensitive adhesive on its back surface, and is capable of being applied to bituminous and/or concrete roadway surfaces. These materials can be surface-applied or inlaid. If surface applied, a sealer will generally be required. Purchase materials via the Pavement Marking Legend Contract (No. 9905-04).~~

   ~~This material is further classified into the following two categories, and each has its own specifications:~~

   - ~~Cold plastic pavement marker or legend. This has an adhesive back and is 60 mils or 90 mils thick. This material is usually considered to be of the permanent type.~~
   - ~~Temporary pavement marking tape. This has an adhesive back and is from 20 to 50 mils thick. Temporary tape comes as:~~

     1. ~~Non-removable.~~
     2. ~~Removable, Type I.~~
     3. ~~Removable, Type II.~~

        ~~The discerning difference between removable Type I and Type II tape is that Type II tape does not leave a discernible mark on the highway 30 days after its removal.~~

5. ~~Epoxy. This material is a two-part, 100 percent solids system, which contains resins and a catalyst, and can be hot-spray applied after mixing. It is a very durable material that can be applied to both bituminous and concrete pavement after the roadway surface is thoroughly cleaned of old pavement markings or curing compound.~~

6. ~~Preformed Thermoplastic. This material is a preformed polymer thermoplastic (white or yellow) with glass beads uniformly distributed throughout its cross section, and used on bituminous and concrete pavements. This material is surface applied, and usually fused in place by a propane torch. Purchase materials via the Pavement Marking Legend Contract (No. 9905-04).~~

7. ~~Methyl Methacrylate. This material is a two-part compound which can be extruded, sprayed or manually applied to either concrete or bituminous pavements. It contains both glass beads and anti-skid aggregate. Existing marking materials should be removed for proper adhesion.~~

8. ~~Polyurea. Polyurea-based liquid pavement marking material consists of a two-component, 100 percent solid, thermosetting material. Limited experience indicates that it is a durable pavement marking material that dries to no-track in 3 to 8 minutes at all temperatures down to about 40 degrees.~~

9. ~~Polyester. Polyester is a two-component system (resin and catalyst) which is applied separately on the roadway and cures to a durable marking. It can be applied to both concrete and bituminous pavements but has not performed well on concrete. It should not be applied to new bituminous surfaces until the surface oils have disappeared (approximately 2 weeks). It can be applied over old markings.~~

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~~10. Wet Reflective Striping Tape. This material is a highly reflective tape under both dry and wet roadway conditions, even when fully submersed in water. There are two types of wet reflective striping tape – "temporary" for work zones and "permanent" for normal applications.~~

~~11. Pavement Markers. Pavement markers are used as positioning guides in conjunction with other longitudinal markings without conveying information to the motorist as to passing or lane use restrictions. Their purpose is to provide delineation during darkness and/or adverse weather conditions that may render other pavement markings ineffective. These markers are available as either one-way or two-way markers depending on the number of reflective faces. In addition, there are two basic models:~~

- ~~Temporary raised pavement markers (TRPMs).~~
- ~~Snowplowable raised pavement markers (RPMs).~~

~~There are also recessed markers, but these are not for new installations.~~

~~Waterborne paint with glass beads is the most popular pavement markings used in United States. This is the least expensive of the materials used today, but unfortunately, despite improvements in durability, it is generally the least durable of all pavement marking materials.~~

~~Some materials are more durable than other materials, but not all materials are compatible with each other or with some road surfaces. **Exhibit 3-2** shows material compatibility between existing and new striping materials.~~

Exhibit 3-~~42~~ Material Compatibility for Restriping

Original Material	New Material									
	Water borne Paint	Hot and Preformed Thermoplastic	Cold Plastic Tape and Legends	Epoxy	MMA	Polyester	Polyurea	Temporary Wet-Reflective Tape	Recessed Wet-Reflective Polyurea ***	Recessed Wet-Reflective Tape ***
Waterborne Paint	Y	Y	N	Y*	N	-	Y	N	N	N
Hot and Preformed Thermoplastic	Y	Y	N	N	N	-	N	N	N	N
Cold Plastic Tape and Legends	N	N	N	N	N	-	N	N	N	N
Epoxy	Y	Y	N	Y**	-	-	-	N	N	N
MMA	Y	Y	N	-	Y	-	-	N	N	N
Polyester	-	-	-	-	-	-	-	N	N	N
Polyurea	Y	Y	N	-	-	-	Y	N	N	N
Temporary Wet-Reflective Tape	N	N	N	N	N	N	N	N	N	N
Recessed Wet-Reflective Polyurea	Y	Y	Y	-	-	-	N	N	N	N
Recessed Wet-Reflective Tape	N	N	N	N	N	N	N	N	N	N

*Epoxy may be applied over existing waterborne paint if the waterborne paint was applied at a wet-film thickness of 9 mils or less, or if the existing waterborne paint has a durability rating of "5" or less.

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**Only one restripe with epoxy.
***If new pavement markings are recessed, existing surface applied markings may not need to be removed as they would be removed incidentally during the cutting of the recessed groove.
****Unknown restriping compatibility is denoted with a dash (-)

Retroreflective Component

Since there are various marking materials approved for use in the state, the Department has developed specifications for several types of retroreflective elements for use with pavement marking materials. Retroreflectivity of dropped or sprayed elements is dependent on the Refraction Index (RI). The RI is a value corresponding to how light is refracted through the element. Optimized RI values concentrate a greater amount of light (from vehicle headlights) on a focal point within the element, then back to the source (the vehicle). Light refraction acts different under dry and wet conditions, causing dry elements to not adequately retroreflect light while submerged in water. Similarly, wet elements (with a different RI from the dry elements) are not designed to retroreflect light in dry conditions. The RI requirements in Pennsylvania are detailed in Section 1103.14 of PennDOT Publication 408, *Construction Specifications*.

For durable pavement markings, a combination of dry and wet elements may need to be installed to provide the desired retroreflectivity of the pavement marking. Combining two or three elements is referred to as a double drop or triple drop installation, respectively. Some potential combinations are as follows:

- Double Drop – Wet reflective element, blend of glass beads (Type E)
- Double Drop – Wet reflective element, large glass bead (Type B)
- Triple Drop – Wet reflective element, small glass beads (Type A), large glass beads (Type B)

Dry Retroreflective Elements – Dry retroreflective elements consist of glass beads of various size. The retroreflectivity of glass beads moderately increases as the beads size increases. However, the primary benefit of larger bead sizes is the retention of retroreflectivity under low to moderate amounts of rain or water on the roadway surface. As glass beads become submerged, light is not retroreflected back to its source, rendering the glass bead ineffective. Larger beads are exposed higher above the pavement surface, decreasing the likelihood of becoming fully submerged during a rainfall event or pooling of water, and subsequently continuing to retroreflect light effectively. It should also be noted that larger beads are more susceptible to cracking or being sheared by roadway maintenance operations (snowplowing), rendering them ineffective. This is typically combatted through the installation of the pavement marking in a recessed surface or using mixed bead sizes.

Glass bead guidelines and requirements specific to each pavement marking type are described in the PennDOT Publication 408 sections as listed in **Exhibit 3-3**. The gradations of the following bead types are included in Section 1103.14 of PennDOT Publication 408, *Construction Specifications*. Each bead type is classified by size; either small, large, or a blend of small to large beads.

1. Type A Beads (Small) – The standard beads specified in AASHTO M-247, Type I, Moisture Resistant which can be used with all marking materials.
2. Type B Beads (Large) – The gradation is much larger than the standard beads (Type A) and was developed for use with durable materials.
3. Type C Beads (Large) – The gradation is similar to the Type B Beads, but they are used primarily with waterborne and polyester pavement marking materials

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4. Type D Beads (Blend) –The gradation is only slightly different from the standard beads (Type A) with a greater percentage of beads in larger sieve sizes. Type D Beads may be used with waterborne paints as an alternative to Type A Beads.
5. Type E Beads (Blend) – The gradation is similar to Type A and Type D beads, but with a larger maximum bead size. This gradation is also referred to as the Utah Blend.

Wet Retroreflective Elements – Wet retroreflective elements are used to compliment dry elements by providing retroreflectivity in wet roadway conditions. Wet elements are intended to be utilized with durable pavement marking applications and should be installed in a recessed groove (to prevent damage from snowplow operations).

Raised Pavement Markers (RPMs) – RPMs are used as positioning guides in conjunction with other longitudinal markings without conveying information to the motorist as to passing or lane use restrictions. Their purpose is to provide delineation during darkness and/or adverse weather conditions that may render other pavement markings ineffective. These markers are available as either one-way or two-way markers depending on the number of reflective faces. There are two basic models of RPMs:

1. Temporary raised pavement markers (TRPMs)
2. Snowplowable raised pavement markers (RPMs)

Retroreflectivity Requirements

FHWA provides standards and guidance in the *MUTCD* Section 3A.05, *Maintaining Minimum Pavement Marking Retroreflectivity,* requiring agencies to establish a method to maintain minimum retroreflectivity for longitudinal pavement markings. The method used to maintain retroreflectivity should be one or more of those described in the FHWA-SA-22-028, *Methods for Maintaining Pavement Marking Retroreflectivity* or developed from an engineering study based on the minimum retroreflectivity levels detailed in the *MUTCD* and **Exhibit 3-5**.

The Department requires minimum values for newly-applied pavement marking materials as specified in PennDOT Publication 408, *Construction Specifications*. The Department maintains longitudinal pavement markings based on expected service life to adequately maintain marking retroreflectivity levels per the *MUTCD*. Waterborne markings are replaced annually and durable surface applied markings every three years. RWPMs are replaced every three years for polyurea and seven years for tape.

Exhibit 3-5 FHWA Minimum Retroreflectivity Standards

MUTCD Section 3A.05 *Maintaining Minimum Pavement Marking Retroreflectivity*	Minimum Posted Speed Limit	Longitudinal Pavement Marking Minimum Retroreflectivity Level**
Standard	≥35	50 mcd/m^2/lux*
Guidance	≥70	100 mcd/m^2/lux*

*The units of pavement marking retroreflectivity are reported in mcd/m^2/lux, which means millicandelas per square meter per lux.
**Retroreflectivity levels for pavement markings are measured at standard 30-meter geometry

Situations exception from the longitudinal pavement marking retroreflectivity requirements detailed in **Exhibit 3-5** are as follows:

A. Markings where ambient illumination assures that the markings are adequately visible;
B. Markings on roadways that have an ADT of less than 6,000 vehicles per day;

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C. Dotted extension lines that extend a longitudinal line through an intersection, major driveway, or interchange area (see Section 3B.08);
D. Curb markings;
E. Parking space markings; and
F. Shared-use path markings.

The following components are major contributors to retroreflectivity degradation:

1. Markings are typically "manufactured" on location under varying temperature and humidity conditions, applied over existing surfaces that may be less than ideal (e.g., rough texture due to surface treatment, oil contaminants, etc.), and traffic sometimes drive on or cross over the markings before they are cured, all of which affect the initial retroreflectivity.
2. The retroreflectivity of some line segments deteriorate much faster than other segments because vehicles frequently run on the lines in heavy weaving areas, around curves, and at intersections. In addition, asphalt roadways sometime bleed and the asphalt material may track onto the pavement markings, causing permanent discoloration and loss of retroreflectivity.
3. Snowplows, sanding, chemicals, anti-skid materials, and tire studs and chains cause markings to deteriorate very quickly during the winter months.
4. If lines wear out during the winter, it may not be practical to replace them for several months.

Application Guidelines and Requirements

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This section details locations where certain pavement marking types are required or should be considered. PennDOT Publication 111, *Traffic Control – Pavement Markings and Signing Standards,* and the *MUTCD* detail the specific placement of the markings listed in this section.

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Longitudinal Markings

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Longitudinal markings, under certain criteria, can be placed in a recessed groove or directly on the pavement surface. RPMs may also be used to supplement the use of longitudinal pavement markings. The Department has established the following guidelines of where and when different types of surface applied, recessed, and RPMs should be used or considered.

Surface Applied Pavement Markings

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With the exception of locations requiring recessed pavement markings, PennDOT Districts may decide where durable pavement markings will be installed in place of standard, non-durable pavement markings. However, it is strongly advised that durable pavement markings installed with glass beads Type B, C, E, or wet reflective elements be installed in a recessed groove.

Recessed Wet-Reflective Pavement Markings (RWRPMs)

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A recessed groove is required for the installation of durable pavement markings with dry and wet retroreflective elements and wet reflective tape for all locations, with the exception of gore areas (where surface applied is acceptable). The recessed groove of these pavement marking types protects the marking from snowplow damage and extends its service life. The Department has established the following installation location guidelines for recessed wet-reflective pavement markings:

Interstate highways

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RWRPMs must be used for the following new pavement marking applications on Pennsylvania's designated Interstate Highway system:

1. New broken white lane lines,
2. New solid white lane lines, when used in place of broken white lane lines. I.e., to discourage lane changes through curves, merge areas, toll gantries, etc.

RWRPMs are not required for white or yellow edge lines. New is defined as all applications in which the lane line pavement markings are being installed for the first time or being replaced-in-kind as part of a pavement rehabilitation, restoration, or reconstruction project. This policy does not apply to the application of temporary broken white lane lines used for the maintenance and protection of traffic.

Install RWRPMs on all bridges that are 200 feet or longer in length when RWRPMs are on the adjacent sections of roadway. RWRPMs are not required on pavement surfaces with a life expectancy less than four years. In either of these cases where RWRPMs are not required, surface-applied durable pavement markings should be installed and maintained together with adjacent edge lines.

Upon local PennDOT Engineering District discretion and direction, RWRPMs may be installed at other locations and in other contexts, including but not limited to the following:

- Other longitudinal pavement markings on interstates, freeways, and expressways.
- Ramp gore area markings on interstates, freeways, and expressways.
- Safety-based locations – Roadways where the frequency of wet, nighttime single vehicle run-off-road crashes exceeds the expected crash frequency of a given location. This includes the non-interstate, freeway, and expressway systems.

Non-interstate highways, freeways, and expressways
Broken lane lines – Consider the installation of RWRPMs at all locations.

Yellow and white edge lines and exit ramp gore area markings – Consider the installation of RWRPMs on a project-by-project basis, dependent on the frequency of wet (wet road cluster), nighttime (illumination-dark cluster) crashes and whether there is overhead lighting at that location. If it has been determined that RWRPMs are not required, install surface applied durable pavement marking with Type A and Type B beads. RPMs may also be installed as an alternative in exit gore areas where RWRPMs are needed upon evaluation and approval from the District.

Safety-based locations
Consider the installation of RWRPMs on National Highway System (NHS) roadways, and on sections of other roadways where the frequency of wet, nighttime single vehicle run-off-road crashes exceeds the expected crash frequency of a given location.

Raised Pavement Markers (RPMs)

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For new construction, Raised Pavement Markers (RPMs) must not be installed together with RWRPM for broken and solid white lane lines (when used in place of broken white lane lines) on the designated Interstate Highway system. Additionally, RPMs must not be reinstalled as part of pavement rehabilitation/restoration/reconstruction projects in lieu of RWRPM or installed with RWRPM. RPMs may still be installed with gore and edge line marking applications if the pavement markings are not RWRPMs.

RPMs can be installed on any conventional roadway with a double yellow centerline where the frequency of wet, nighttime single vehicle run-off-road crashes exceeds the expected crash frequency of a given location. Design and installation details for RPMs are in Pavement Marking Standard TC-8602 and in Section 966 of PennDOT Publication 408, *Construction Specifications*.

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Existing RPMs can remain and be maintained through the end of the service life of the casting. At the end of the service life, the holders must be removed so they do not become a potential hazard. To assist in this evaluation, each District is to consider RPMs acceptable if all of the following apply:

- At least 50 percent of the reflective surface is visible at night.
- At least 90 percent of RPMs are in place and are visible at night.
- On expressways and freeways, at least five RPMs are continuously visible at night using low beams.

Since most damage to RPMs occurs over the winter months, the level of replacements should be determined during the April to May timeframe each year, which generally results in a need to add or replace lenses on a cyclical basis, e.g., every two years.

Black Contrast Markings

Pavement marking materials are difficult to see when applied to cement concrete roadways during various daytime lighting conditions. Therefore, black contrast markings for durable pavement markings are required when installed on cement concrete roadways or bridges exceeding 500 feet in length. For broken lane lines, the black contrast markings are applied immediately after each broken white line, using the same dimensions for both colors.

Longitudinal Pavement Marking Material Selection

Refer to the prequalified pavement marking materials, eligible for use on Department construction projects, in Bulletin 15 and **Exhibit 3-3**. Pavement marking materials for longitudinal pavement marking applications are detailed for surface applied pavement markings and RWRPMs below.

Surface Applied Pavement Markings

Pavement markings detailed in Bulletin 15 and PennDOT Publication 408 can typically be installed on both bituminous (flexible) and concrete (rigid) roadway surfaces.

For durable pavement marking installations, epoxy pavement markings are typically installed on concrete (rigid) roadway surfaces, and hot thermoplastic is typically installed on bituminous (flexible surfaces). However, PennDOT District preferences should be referred to for various pavement marking applications.

Recessed Wet-Reflective Pavement Markings (RWRPMs)

When considering an RWRPM, wet-reflective tape is preferred for new pavement applications and should be considered for use prior to wet-reflective polyurea due to its longer life expectancy, its material durability, and its retroreflectivity performance. If the following roadway and installation conditions are present, wet-reflective polyurea is preferred:

- The road surface is determined to be inadequate due to pavement deterioration, oxidation, and/or differences in pavement joints such as concrete joints.
- The road surface, at the time of marking installation, is more than two (2) years old.
- The road surface has a life expectancy less than five (5) years post marking installation.
- The road surface has a microsurface present greater than one (1) year old.
- The road surface has existing casing depressions from previously installed RPMs at the recessed marking location, creating an uneven groove depth.
- The timing of installation is between September 15 and May 15. If this is the case, surface-applied wet-reflective polyurea may be installed until the following construction season until when recessed wet-reflective tape can be installed. See **Exhibit 3-6** for material installation requirements.

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Recessed black contrast markings must be used for all new installations of recessed wet-reflective tape. The black contrast markings may either be black tape or black polyurea.

To promote consistency for the motorist and enable more efficient maintenance, a consistent type of RWRPM must be applied throughout homogeneous roadway sections of the project (e.g., a structure section, rigid pavement section, or flexible pavement section) until a logical terminus.

Exhibit 3-6 illustrates the installation condition requirements for wet-reflective tape as well as the timeframe for when wet-reflective tape can typically be installed. In addition, a decision-making process flowchart is provided in **Exhibit 3-7** to assist in the determination of which material should be used for a given location.

Exhibit 3-6 RWRPM Installation Condition Requirements

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
				Mid May	Install recessed wet-reflective tape with black contrast markings*			Mid Sept			
Install recessed wet-reflective polyurea					Install recessed wet-reflective polyurea if wet-reflective tape condition requirements* are not met			Install recessed wet-reflective polyurea			

Condition Requirements for Recessed Wet-Reflective Tape
- The condition of the pavement meets the specifications of material.
- The material's strict temperature and moisture condition specifications are met.
- Air Temperature 40° F minimum and rising.
- Surface Temperature 70° F minimum and rising.
- Overnight Air Temperature 40° F minimum.
- No rainfall for 24 hours prior to application.
- Additional requirements set by the manufacturer.

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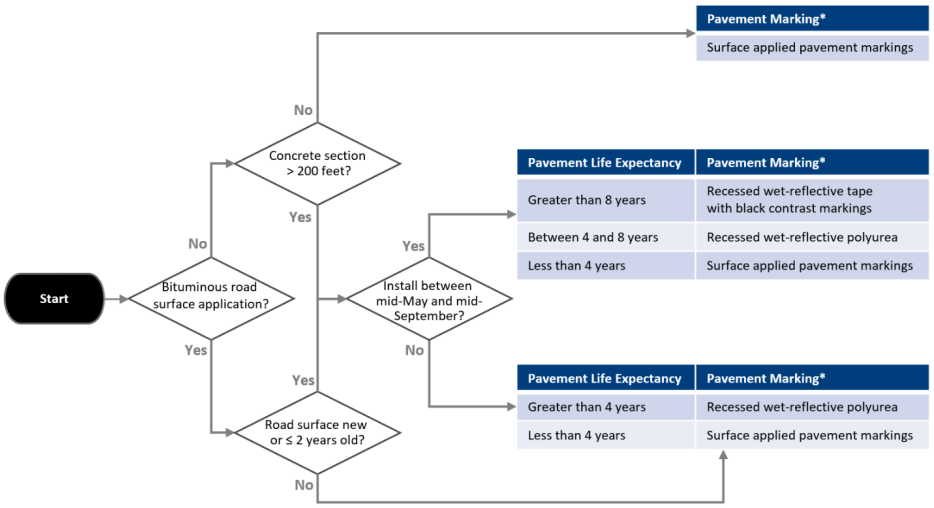
Exhibit 3-7 RWRPM Decision-Making Process Flowchart



Pavement Marking*
Surface applied pavement markings

Pavement Life Expectancy	Pavement Marking*
Greater than 8 years	Recessed wet-reflective tape with black contrast markings
Between 4 and 8 years	Recessed wet-reflective polyurea
Less than 4 years	Surface applied pavement markings

Pavement Life Expectancy	Pavement Marking*
Greater than 4 years	Recessed wet-reflective polyurea
Less than 4 years	Surface applied pavement markings

~~* Epoxy may be applied over existing waterborne paint if the waterborne paint was applied at a wet-film thickness of 9 mils or less, or if the existing waterborne paint has a durability rating of "5" or less.~~

~~** Only one restripe with epoxy.~~

Transverse Markings

Application guidelines and requirements for commonly used transverse markings; Stop and Yield Lines, Crosswalks, and Speed Measurement Markings, are detailed throughout this section. Additional standards and guidance of each application is further detailed within the *MUTCD* and PennDOT Publication 111, *Traffic Control – Pavement Markings and Signing Standards*.

~~Black Contrast Markings~~

~~White epoxy pavement markings are not as white as most other white materials, and because of this, they are frequently difficult to see on Portland cement roadways during some daylight conditions. Therefore, a recommended procedure is to apply black epoxy, flooded with black aggregate to make the white markings stand out. For skip lines, crews can apply a black line immediately after the white skip lines, using the same dimensions for both colors. Another method used in some states, is to place an 8-inch wide line as the background material and then apply the white marking over the black marking.~~

~~Black epoxy should satisfy color chip 37038 of Federal Standard 595B, and have similar quality as the white epoxy pavement markings.~~

~~Minimum Retroreflectivity~~

~~In 1993, Congress directed the U.S. Secretary of Transportation to revise the *MUTCD* to include minimum levels of retroreflectivity for traffic signs and pavement markings. Since then, FHWA has sponsored~~

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extensive research on the retroreflectivity needs of drivers for both signs and pavement markings, but unlike traffic signs, FHWA has not adopted or even officially proposed minimum values for pavement markings.

Recent research indicates that minimum, maintained retroreflectivity values for both white and yellow pavement marking should be between 80 and 100 mcd/m²/lux on high-speed roadways. However, maintaining a minimum retroreflectivity for pavement markings will be difficult for the following reasons:

1. Markings are typically "manufactured" on location under varying temperature and humidity conditions, applied over existing surfaces that may be less than ideal (e.g., rough texture due to surface treatment, oil contaminants, etc.), and traffic sometimes drive on or cross over the markings before they are cured, all of which affect the initial retroreflectivity.

2. The retroreflectivity of some line segments deteriorate much faster than other segments because vehicles frequently run on the lines in heavy weaving areas, around curves, and at intersections. In addition, asphalt roadways sometime bleed and the asphalt material may track onto the pavement markings, causing permanent discoloration and loss of retroreflectivity.

3. Snowplows, sanding, chemicals, anti-skid materials, and tire studs and chains cause markings to deteriorate very quickly during the winter months.

4. If lines wear out during the winter, it may not be practical to replace them for several months.

Therefore, all of the above will be major concerns when FHWA proposes their minimum retroreflectivity recommendations. Currently, the Department does not have any minimum retroreflectivity requirements for its paint program. (The Department has, however, established minimum values for newly applied pavement marking materials in Publication 408.)

Durable Pavement Markings

Waterborne paint is the most common pavement marking material, but it also degrades faster than most other materials. Therefore, highway agencies use the expression "durable pavement marking" to describe those products that typically last much longer. In general, the term encompasses hot thermoplastic, cold-preformed thermoplastic, epoxy, tape, polyester, polyurea, and methyl methacrylate (MMA).

While it may be desirable to use durable pavement markings on all expressways, freeways and NHS highway projects, Districts can decide if durable pavement markings will be used and on which roadways. Each District will fund all durable pavement markings from their normal funding sources.

> Since waterborne paint is generally the most cost-effective pavement marking material, the real question is, "Will the paint line still be in place and the retroreflectivity consistently above the 'minimum' acceptable values when the Department is able to repaint the lines?" If the answer is "yes," then waterborne paint may be the best option.

Pavement Markings in Construction and Resurfacing Projects

Contractors are required to mix all waterborne paints prior to using them. If other types of marking materials are used, the contractor should handle those materials as specified by the manufacturer. The line painting equipment shall be calibrated to apply the pavement marking material at the correct

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~~application rate as required in the specifications and the quality verified by applying the marking materials as test stripes on sample plates prior to installing the actual lines.~~

~~Construction inspectors are to use the "Pavement Markings, Construction Inspector Quality Assurance Review Form" as included in the Chapter 3 Appendix.~~

~~**Raised Pavement Markers**~~

~~Raised Pavement Markers (RPMs) provide important guidance to motorists at night, particularly when the roadway is wet and longitudinal pavement markings lose their effectiveness. Customer service surveys have also indicated that motorists like RPMs.~~

~~Based on research, the only acceptable permanent RPMs for new installations are the snowplowable, low-profile type that installed in a holder and listed in Publication 35. Districts with reflectors in recessed slots may continue to install replacement reflectors for the life of the slots.~~

~~The Department has established the following guidelines:~~

~~1. Install RPMs on the lane lines and within exit ramp gore areas of all Interstate highways, freeways, and expressways. (An exception may occur if the pavement is in poor condition and will not accommodate RPMs, or if the Department plans to resurface the pavement within 4 years.)~~

~~2. As funding is available, install RPMs on high-volume NHS roadways, and on sections of other roadways where there is a higher-than-normal incidence of nighttime run-off-the-road crashes.~~

~~3. Install bridge deck RPMs on all bridges that are 200 feet or longer in length when RPMs are on the adjacent sections of roadway.~~

~~Over the past 15 years, the Department has deployed a significant number of RPMs. Therefore, it is important to manage these devices in an effective and efficient manner such that they continue to provide effective guidance to motorists.~~

~~Design and installation details for RPMs are in Pavement Marking Standard TC-8602 and in Section 966 of Publication 408.~~

~~Acceptability Criteria~~

~~One difficulty in managing these devices is the typical need to rely on a subjective rating system to determine replacement. To assist in this evaluation, each District is to consider RPMs acceptable if all of the following apply:~~

- ~~At least 50 percent of the reflective surface is visible at night.~~
- ~~At least 90 percent of RPMs exist and are visible at night.~~
- ~~On expressways and freeways, at least five RPMs are continuously visible at night using low beams.~~

~~Since most damage to RPMs occurs over the winter months, the level of replacements should be determined during the April to May timeframe each year, which generally results in a need to add or replace lenses on a cyclical basis, e.g., every 2 years.~~

~~RPM Inventory~~

~~Each District should maintain an RPM inventory and management system, and BOO will develop a statewide database that will be the ultimate repository for these files.~~

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~~Legislative Mandate and Annual Reporting~~

~~The Department's annual budget typically has a line item that requires the Department to spend about $4 million for RPMs. Further, the Department is normally required, on an annual basis, to report the expenditures to the House and Senate Transportation Committees.~~

~~To satisfy the legislative mandates, on an on-going annual basis, Districts should annually develop their RPM program as follows:~~

~~1. By late summer, the Deputy Secretary for Highway Administration will advise each District of their funding level for the fiscal year and the appropriate contact person in the Center for Program Development and Management.~~

~~2. Districts should develop a program designed around the funding that they receive. When preparing cost estimates, use current costs for each new unit (holder with reflector) and replacement reflector. Also, include items for the engineering and construction inspection~~

~~3. By February 28, the District's Planning and Programming Engineer/Manager should create a new project in MPMS for their RPM program. The District should forward the newly created MPMS numbers to the appropriate contact person in the Center for Program Development and Management. When creating the project, the Project Class is *"Safety Improvement"* and the Improvement Type is *"Reflective Pavement Markers (HWYRPM)."* These RPM projects are 100 percent federally funded.~~

~~4. By June 15, each District should obligate the approved amount. After that date, Central Office will redistribute any money that is not obligated.~~

Stop and Yield Lines

Section 3B.1~~9~~6 of the *MUTCD* discusses the placement of stop and yield lines. However, some common mistakes are placing the line too far from an intersecting roadway where drivers do not have a clear view of approaching traffic, and locating the stop line directly across from the STOP sign.

In order to better clarify the use and placement of stop lines at stop-controlled intersections, consider the following:

1. Stop signs and stop lines are separate traffic control devices and should be engineered independent of each other. Stop lines are not required to supplement the installation of every stop sign. If it is determined that conditions are such that stop lines are not necessary or are unlikely to enhance the safety of the intersection, eliminate them or do not install them.
2. Use stop lines where it is necessary to provide drivers with additional guidance as to where vehicles should stop, in compliance with the stop sign.
3. If using a stop line in conjunction with a stop sign, the normal position is in-line with the stop sign. However, if the stop sign cannot be located where vehicles are expected to stop (such as at wide-throat intersections), the stop line should be placed at the expected (desired) stopping point. Typically, this is as close to the edge of the intersecting roadway as possible where drivers have the best available sight lines.
4. Exact location of the desired stopping point should be determined in the field taking into account the various site-specific intersection parameters. Place stop lines no more than 30 feet or less than 4 feet from the nearest edge of the intersecting traveled way. When spotting the location of these lines, always consider the fact that a driver's eyes are about 10 feet behind the stop or yield line and at an elevation of 3.5 feet above the road surface.

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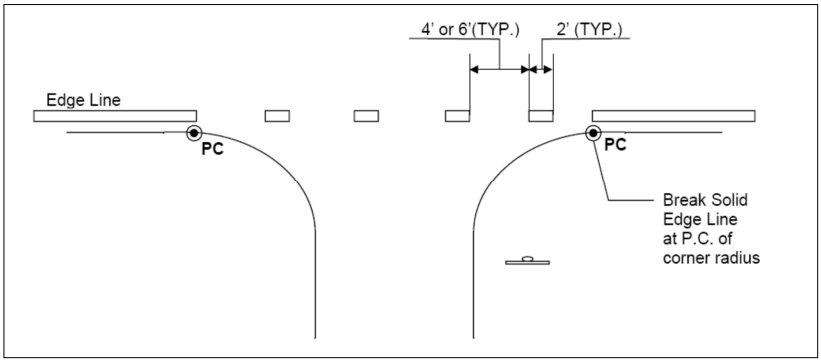
5. Stop lines should not encroach onto the shoulder of the intersecting roadway. If the expected (desired) stop line location is determined to fall within the shoulder area of the intersecting road, adjust the stop line placement accordingly so as not to encroach on the shoulder area.
6. Consider use of a dotted edge line to indicate the edge of the cartway where the intersecting road meets the approach (see Exhibit 3-8~~Exhibit 3-3~~). This will provide the driver with a visual cue of where the intersecting travel lane begins. Districts can also use stop lines in conjunction with these dotted edge lines.

Exhibit 3-~~3~~8 Dotted White Edge Lines



Crosswalks

Research of marked versus unmarked crosswalks at 1,000 locations in 16 states indicates that the risk of a pedestrian-vehicle crash is 3.6 times greater at uncontrolled intersections with marked crosswalk than with an unmarked crosswalk.[1] Therefore, Districts should use discretion when approving marked crosswalks at uncontrolled intersections.

PennDOT Publication 111, *Pavement Markings and Signing Standards*, ~~Drawing~~ TC-8600, Sheet 6~~4~~ of 13~~8~~, shows ~~three~~ four (4)types of crosswalk pavement markings. When crosswalks are used, coordinate with the local authority~~entity~~ to determine the type of crosswalk marking. The minimum width of a crosswalk is 6 feet, as measured between any transverse markings.

Unsignalized mid-block crosswalks should be in accordance with Section ~~6~~11.9. All crosswalks should be at approximately 90 degrees to the roadway. For added visibility, a~~the~~ crosswalk may be marked with High Visibility Crosswalks, denoted as Type B – Longitudinal Bar, Type C – Ladder or Type D – Bar Pair ~~wide white diagonal lines at a 45-degree angle to the crosswalk or with wide white longitudinal lines parallel to traffic~~ in accordance with Pavement Marking Standard TC-8600.

Crosswalks with aesthetic surface treatments are sometimes desired, ~~Local authorities sometimes want to use decorative crosswalks,~~ such as brick pavers and~~,~~ stampings~~, etc~~. Such treatments must conform to Publication 111, *Pavement Markings and Signing Standards*, Publication 35 (Bulletin 15) *Qualified Products for Construction*, as well as *MUTCD* Parts 3C, *Crosswalk Markings* and 3H.03, *Aesthetic Surface Treatments*.

[1] Zegeer, C. V., J. R. Stewart, H. Huang and P. A. Lagerwey. Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines. Report No. FHWA-RD-01-075, Washington DC, FHWA, March 2001.

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Aesthetic surface treatments shall not contain pictographs, illustrations or symbols. See Section 3.1 for the definition of *illustration*. Common aesthetic treatments for transverse crosswalks such as patterns for brick, stone, paver, lattice and grid shall not be considered illustrations. ~~Although not prohibited,~~ Districts ~~need to addres~~should consider risks and benefits of aesthetic surface treatments such funding and maintenance issues prior to installations. ~~Specifications for several types of decorative crosswalks are included in Publication 447, New Product Evaluation for Low Volume Local Roads, available at ftp://ftp.dot.state.pa.us/public/PubsForms/Publications/PUB%20447.pdf.~~

Districts may use yield lines in advance of unsignalized mid-block crosswalk. If used, place the yield lines 20 to 50 feet in advance of the crosswalk and install a Yield Here to Pedestrians (R1-5) sign immediately adjacent to the yield line (see Figure 3B-1~~6~~5 in the *MUTCD*). Yield lines should conform to Pavement Marking Standard TC-8600.

Speed Measurement Markings

To assist the Pennsylvania State Police (PSP) in speed enforcement, Engineering Districts have cooperated with PSP in the application of transverse speed measurement markings for the State Police Aerial Reconnaissance Enforcement (SPARE) program. However, since 2017, the SPARE program has been on hold per PSP request due to the high amount of resources required for speed measurement operations. Engineering Districts should not install new SPARE markings or maintain existing SPARE markings. If an Engineering District is requested by a local PSP barrack to install or maintain SPARE markings, contact the PennDOT HSTOD.

Legends and Symbols

Application guidelines and requirements for accessible parking spaces and pavement word and symbol markings are detailed throughout this section. Additional standards and guidance of each application is further detailed within the *MUTCD* and PennDOT Publication 111, *Traffic Control – Pavement Markings and Signing Standards*.

Accessible Parking Spaces

Section 208 of the Americans with Disabilities Act (ADA), 36 CFR Part 1191 ~~(see http://www.access-board.gov/ada-aba/final.pdf)~~ establishes the following minimum number of required ADA accessible parking spaces, based on the total number of spaces in the parking area (see **Exhibit 3-9**). ~~See **Exhibit 3-4**.~~

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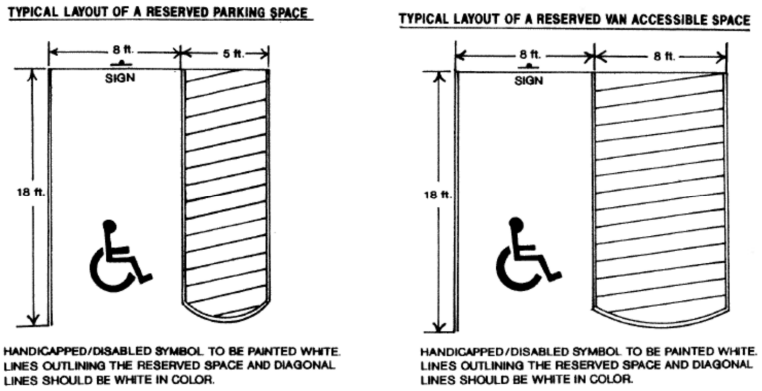
Exhibit 3-~~4~~9 Minimum Accessible Parking Spaces

Total Number of Parking Spaces Provided in Parking Facility	Minimum Number of Required Accessible Parking Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1,000	2 percent of total
1,001 and over	20, plus 1 for each 100, or fraction thereof, over 1,000

It is also important to note, that in accordance with Section 208.2.4 of the Americans with Disabilities Act, for every six ADA accessible spaces or fraction thereof, at least one shall be a van parking space. ~~-~~ Exhibit 3-10~~Exhibit 3-5~~ shows typical layout details for parking spaces.

Exhibit 3-~~5~~10 Typical ADA Accessible Parking Space Layouts



A common practice in some commercial parking lots is to paint the entire accessible parking space blue, but painted surfaces may be very slippery when wet. Therefore, as an alternative, the symbol illustrated in Figure 3B-19 of the *MUTCD* (and included as Exhibit 3-11~~Exhibit 3-6~~) may be used.

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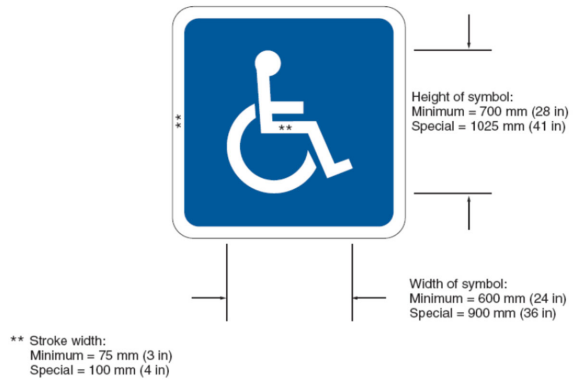
Exhibit 3-~~6~~11 Parking Space Marking with Blue Background



Pavement Word and Symbol Markings

The use of word-type pavement messages, frequently called "horizontal signing," is an effective way to communicate with drivers providing the markings are visible. Therefore, Districts are encouraged to use horizontal signing to supplement traditional regulatory, warning, and directional signs.

Districts may supplement route marker signs with elongated route markers and directional arrows on the pavement. Preformed thermoplastic is the recommended material for words and symbol messages on bituminous surfaces, and either epoxy or tape are the recommended materials on Portland cement surfaces.

Words and symbols shall conform to Figures 3B-14 through 3B-2~~31 , and 3B-25~~ of the *MUTCD*. Of specific importance, Lane-Reduction Arrows shall comply with Figure 3B-14 and 3B-2~~14~~.

The standard height of word messages is 8 feet on all types of roads, except "SCHOOL" is 10 feet high. A maximum of three lines of message may be used, spaced at four to ten times the legend height (i.e., typical spacing of 32 to 80 feet), and should read in the direction of travel.

Design Considerations

All pavement markings must be approved in Bulletin 15 and installed per construction specifications detailed in PennDOT Publication 408, or specifications provided by the Department. RWRPMs must be installed by manufacturer-certified installers as proper installation requires special equipment, technique, and adherence to specific construction tolerances. Additionally, this ensures training has been obtained and it provides a close line of communication between manufacturer and contractor to address intermittent construction issues.

Pavement Surface

Surface Applied Pavement Markings

Non-durable and durable pavement markings can typically be installed in both bituminous (flexible) and concrete (rigid) roadway surfaces. Refer to Bulletin 15, PennDOT Publication 408, and PennDOT Publication 648, for pavement surface design criteria and considerations when considering installation of the markings.

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RWRPMs

RWRPMs may be installed in both bituminous (flexible) and concrete (rigid) roadway surfaces considering the following:

Visible cracks and surface joints: For locations where RWRPMs are replaced-in-kind without alteration of the pavement surface, ensure the pavement condition meets an International Roughness Index (IRI) level of 'good' or higher. RWRPMs should not be installed over visible cracks and longitudinal surface joints. For installations of wet-reflective tape where transverse pavement joints are present, the marking material must be cut per the installation specifications to not cover the joint. Surface-applied durable pavement markings or waterborne paint may be used to fill in the gap across joints.

Concrete: For most concrete locations, recessed tape will be the most suitable RWRPM. For aging concrete, consider spalling, oversized joints, and alignment of concrete slabs when determining a suitable RWRPM. When there is spalling on joints, although it might only be in a few locations, the grinding of the recessed groove may expose other issues in the surface. If there is less than 8 years of life remaining on the concrete section, consider polyurea as it has a shallower groove depth when compared to tape and will have a lesser impact on the concrete surface. Polyurea will also cover any irregularities in the groove due to spalling, as it is a liquid marking. However, if there is frequent spalling, use a surface applied marking.

Microsurface: If a microsurface is present, and mill depth of the recessed groove is greater than the depth of the microsurfacing material, the groove must be cut into the material below the microsurface to allow for a clean bonding surface. If the mill depth of the recessed groove is less than the depth of the microsurfacing material, the groove must be cut to thickness specified in special provisions. The recessed groove must be cut with a diamond cutting tool, assuring clean edges to resist degradation of the microsurface material. Wet-reflective tape is the most suitable marking on new microsurface if installed within the same season. Following the initial installation season, wet-reflective polyurea is the most suitable material until the microsurface is beginning to age. For aging microsurface, where the microsurface is beginning to delaminate from the roadway, avoid the use of wet-reflective polyurea. In this case, surface applied markings should be used.

High Friction Surface Treatments (HFST): When installing RWRPMs on high friction surface treatments (HFST), refer to Publication 408 HFST cure times when planning RWRPM installation.

Epoxy Overlay: RWRPMs should not be installed where an existing epoxy overlay is present to not compromise the integrity of the overlay. RWRPMs may be installed in conjunction with a new epoxy overlay by protecting the area of the recess as the overlay is applied. Refer to Publication 408 Section 1046 – Epoxy Overlay for wearing surface specifications.

Locations with existing markings: For locations with existing recessed markings, remove the existing tape by regrooving per the special provision. When regrooving, the existing groove will deepen to remove the existing markings and create a clean application surface. Although the groove is deepened, pavement degradation over time reduces its depth, better aligning the reapplication groove depth with the installation procedures in the special provision.

For bituminous locations, install polyurea in the existing groove. Refer to the concrete installation notes to determine which marking should be used. For locations where existing surface applied markings are wider than or not in the same location as the proposed recessed groove, the surface applied markings should be removed.

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Locations with a pavement surface that may restrict the use of recessing equipment: Locations with a pavement surface that may restrict the use of recessing equipment require careful consideration. Recessed pavement marking installation generally necessitates a minimum of 1ft of space from the closest part of the marking to a vertical obstruction, such as a barrier, and for traffic to shift 3ft for proper temporary traffic control. Additional factors to consider that may restrict recessing equipment include joints of differing heights, existing RPM castings, and recessed or slotted markers. Where depressions from recessed or slotted markers are present, it is recommended a liquid marking such as polyurea is used as a portion of the new recessed marking groove may be slightly deeper due to the existing RPM depression.

Construction Phasing

Roadway construction schedules must account for the installation requirements for final pavement markings. Considering final wearing courses are often completed toward the end of the paving season, installing certain types of pavement markings, such as RWRPMs, during fall months may be impractical and/or inappropriate given prevailing environmental conditions present at the time. To avoid unsatisfactory installations and to reduce construction costs, it is recommended that a temporary non-recessed durable markings or waterborne paint (that meet installation specifications) be installed in place of RWRPMs until installation requirements can be met (e.g., such as over the winter months for multiyear construction projects or projects that eclipse a construction season).

Installation requirements for RWRPMs are detailed in **Exhibit 3-6**. Surface-applied wet-reflective polyurea may be used if installation requirements are met, however surface-applied wet-reflective tape should not be used due to potential winter maintenance interference with the marking.

In this situation, the type of temporary pavement marking should be noted in the Traffic Control Plan (TCP) and the type and context of the marking installations needs to be reflected in the construction phasing narrative. The final RWRPMs must be depicted on the Signing and Pavement Marking Plan (SPMP).

Special provisions for wet-reflective tape and wet-reflective polyurea are available in the PennDOT ECMS Special Provisions Portal.

Pavement Markings in Construction and Resurfacing Projects

~~Pavement Markings in Construction and Resurfacing Projects~~

Contractors are required to mix all waterborne paints prior to using them. If other types of marking materials are used, the contractor should handle those materials as specified by the manufacturer. The line-painting equipment shall be calibrated to apply the pavement marking material at the correct application rate as required in the specifications and the quality verified by applying the marking materials as test stripes on sample plates prior to installing the actual lines.

Construction inspectors are to use the "Pavement Markings, Construction Inspector Quality Assurance Review Form" as included in the Chapter 3 Appendix.

Asset Management

Effective pavement marking asset management is critical to ensure pavement markings are maintained to meet the needs of the roadway users. As detailed in PennDOT Publication 648, the District Maintenance Unit is responsible to maintain essential pavement markings in satisfactory conditions. All pavement markings in the district should be inventoried and classified in accordance with PennDOT Publication 648.

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In addition to proper district inventory and management of pavement markings by the PennDOT District Maintenance Unit, the following RWRPM installation attributes must be documented on a project-by-project bases for all RWRPM applications:

- PennDOT District
- TIP Project ID
- Installation date
- Installation location description
- Begin/End segment/offset
- Pavement marking type [application (e.g. broken white line), material, manufacturer]
- Length of roadway section (feet)
- Number of lanes
- Quantity of RWRPM material (feet)
- Manufacturer warranty letter, if applicable (as email attachment)
- Pavement surface type and expected resurfacing year
- Contractor
- Cost of marking and installation
- Amount of ISC funding used (if applicable)

Upon completion of an RWRPM installation, the local Engineering District must provide the project attributes to the PennDOT Signing and Pavement Markings Unit, who will then upload and maintain project data in a central file.

~~**Speed Measurement Markings**~~

~~To assist the Pennsylvania State Police (PSP) in speed enforcement, Engineering Districts should cooperate with PSP in the application of transverse speed measurement markings for the State Police Aerial Reconnaissance Enforcement (SPARE) program.~~

~~PSP has offered the following general criterion that is important in the selection of SPARE locations:~~

- ~~The site is on a tangent or near tangent section of highway, preferably 0.9 mile in length (minimum 0.6 mile).~~
- ~~Each set of SPARE markings is totally within one judicial jurisdiction.~~
- ~~The SPARE site does not cross under any structures.~~
- ~~Locations exist within several miles downstream where officers can park and wait, and where they can pull offenders over.~~
- ~~Posted speed limit of 55 mph or higher.~~
- ~~Sites are not in Philadelphia or Delaware Counties, the eastern part of Montgomery County, or at any location in close proximity of an airport.~~

~~Procedures regarding the development of new SPARE sites are as follows:~~

1. ~~The local PSP barrack submits their request to their Bureau of Patrol for consideration.~~
2. ~~The Bureau of Patrol forwards recommended requests to affected Engineering District.~~
3. ~~After review, the District denies the request, or approves the request and prepares a layout under the direction of a registered Pennsylvania land surveyor. If the roadway is not a tangent section, survey crews should measure the distances between the markings along the outer edge of the shoulder on the inside of the curve.~~

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4. The District prepares a site drawing that show the markings and the Speed Check Marker (I2-1) signs, and the location of the nearest SR markers and the distance to them. (See the TC-8600 Standard Drawing, Sheet 1 of 11.)

5. The District sends the original site drawing to BOO for processing and certification. BOO then forwards the site drawing and an Attestation Form to the Bureau of Patrol for their final processing and files.

When the State Police request an Engineering District to remark a site, the Engineering District should provide their best estimate of when the work will be complete, and then notify the State Police when the work is physically complete.

3.3 Object Markers

Object Marker Design

Section 23C.7001 and Figure 23C-17-1 of the *MUTCD* allow several types of Object Markers, including markers with three or more yellow retroreflectors that are a minimum of 3 inches in diameter. These circular devices are typically acrylic retroreflectors that are very bright when viewed at an angle normal to the face of the retroreflector, but they have almost no retroreflectivity when viewed at an angle of 30 degrees or more from normal.

Therefore, Districts should not use Object Markers with these circular retroreflectors because the Object Markers frequently are not visible to drivers – for example, when turning at intersections, traveling around sharp turns and curves, or at any location where the markers become misaligned. Exhibit 3-11Exhibit 3-7 shows the recommended Object and End-of-Roadway markers.

Exhibit 3-711 Object and End-of-Roadway Markers

3.4 Delineators

Delineation of Guiderail, Parapets and Barriers

Studies indicate that appropriate delineation provides substantial nighttime guidance and reduces the likelihood of nighttime crashes. Therefore, it is the Departments policy to upgrade delineation to improve guidance for motorists, particularly older drivers.

As a part of this effort, Engineering Districts shall:

1. Incorporate guiderail, parapet and barrier delineation into all PS&E packages.

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2. Establish a program to retrofit and maintain delineation on the National Highway System (NHS) when:
   - The average daily traffic volume (ADT) is 3,000 or greater.
   - Shoulders are 6 feet or less in width.
   - There is evidence of vehicles running off the roadway and hitting fixed objects.

The spacing of these devices on new installations should be as follows:

1. At 75 feet on tangent roadway sections and on horizontal curves with less than 2 degrees of curvature.
2. At 37.5 feet on all 2-degree and sharper horizontal curves and on approaches to structures where the full width shoulder transitions to a narrower width across the structure. In these cases, parapet-mounted delineation should also be at the 37.5-foot spacing.

Guiderail Delineation

For W-beam guiderail, use the Type D guiderail delineator (i.e., polycarbonate, butterfly-shaped models that fit in the web of the guiderail) as shown on Sheet 2 of 4 of TC-8604. For highway maintenance crews, these delineators are ~~currently~~ available on a statewide contract ~~Legacy No. 9905-09~~ using the following SAP material numbers:

SAP Material No.	Description
304918	Guiderail web-mounted, Type D (W/B)
144433	Guiderail web-mounted, Type D (W/R)
144431	Guiderail web-mounted, Type D (W/W)
144432	Guiderail web-mounted, Type D (Y/B)
144430	Guiderail web-mounted, Type D (Y/R)

Other types of delineators such as post-mounted guiderail delineation (e.g., "RailRider") or independently mounted flexible delineator posts are encouraged along strong-post cable guiderail systems and as a continuation of the delineation beyond the limits of the guiderail to provide information regarding continued important alignment features (sharp horizontal curve where the guiderail ends or starts midway in curve).

Delineation of Parapets and Barriers

Install barrier-mounted delineator on all types of median barrier and single-face barrier using the spacing indicated above. Install both side-mount and top-mount delineation as illustrated on Sheet 2 of 4 of TC-8604 for the traffic side of each barrier.

3.5 Islands and Median Barriers

Mountable Curbs and Resurfacing

Some older arterials have mountable curb medians separating traffic. Although these mountable curbs have a minimal effect on averting head-on collisions resulting from out-of-control vehicles, they do have a significant safety benefit in restricting turning movements either from the mainline or from adjacent

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driveways. As these arterials age and require overlays, the overlays compromise safety by allowing drivers to begin making left turns.

Therefore, the District should assess the project needs prior to resurfacing. Specifically, the District needs to answer the following question for all resurfacing projects involving mountable curbs: *"Will the removal of the mountable curb result in a substantive increase in left-turn movements?"*

1. If the answer is "no" and there is minimal or no potential for developing turning movements in the future, the project may eliminate the mountable curb. However, the District should review the potential for placing a positive standard median barrier to prevent head-on crashes. If this is not possible or appropriate, the District may replace the mountable curb with standard pavement markings.
2. If the answer is "yes," the first priority is to consider replacing the mountable curb with a positive standard median barrier to prevent head-on crashes and restrict left turn movements. This is particularly important if the operating speeds are in excess of 40 mph. Give special attention to addressing sight distance concerns at existing breaks in the median. If the District cannot adequately address these sight distance concerns, replace the mountable curb in kind, per the Roadway Construction Standards (RC-65M).
3. The District should document the above study assessment in the project file.

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3.6 Chapter 3 Appendix

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PAVEMENT MARKINGS - CONSTRUCTION INSPECTOR QUALITY ASSURANCE REVIEW FORM

DISTRICT_____ COUNTY_____ PROJECT_____

TRAFFIC ROUTE_____ STATE ROUTE_____ SEGMENT_____ OFFSET_____

APPLICATION CONTRACTOR_____ PRIME_____ SUB_____

DATE:_____ TIME:_____ WEATHER:_____

PAVEMENT TEMPERATURE_____ AMBIENT TEMPERATURE_____ % RELATIVE HUMIDITY_____

TYPE OF MARKING: Long Lines _____ Arrow _____ Legend _____ Other_____

MATERIAL: Paint _____, Epoxy _____, Thermoplastic: Hot_____ or Preformed _____

Cold Plastic: Inlaid_____ or Surface Applied_____, Other_____

MANUFACTURER:_____ MANUFACTURED DATE:_____

PRODUCT NAME or FORMULA:_____ MATERIAL CERTIFICATION PROVIDED? Y / N _____

COMPLETE THE FOLLOWING APPROPRIATE SECTIONS:

A. TRUCK MOUNTED AND SELF-PROPELLED MACHINE OPERATION (LONG LINES)

1. Is the marking being applied in accordance with the manufacturer's specifications? Yes_____ No _____
2. Is the roadway surface clean and dry? Yes_____ No_____
3. Is a primer being used prior to the application? Yes_____ No_____ N/A_____
4. Are the pavement, ambient temperature and percentage of relative humidity being monitored and documented at least three times a day? Yes_____ No_____
5. Was paint mixed before using? Yes_____ No_____
6. Are center line guns adjusted to provide a 6-inch space between lines? (+ ½ inch) Yes_____ No_____ N/A_____
7. Are lane lines 4 inches to the right of the pavement joint or seam? (+ ½ inch) Yes_____ No_____ N/A_____
8. Are edge lines 4 inches from the edge of the pavement? (+ ½ inch) Yes_____ No_____ N/A_____
9. What is the application speed? _____MPH

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PAINT/BINDER AND BEAD GUNS									
	Left Outside			Left Inside			Right		
	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A
10. Are the edges of the lines clean and sharp?									
11. Are the lines being applied uniformly?									
12. Are glass beads evenly distributed over entire line?									
13. Are glass beads properly embedded (60-70%)?									
14. What is the width, in inches, of the traffic lines being applied?									
15. What is the length of the skip line pattern (Cycle should be 40')?									
16. What is the length of the skip line (10')?									
17. What is the binder temperature at the guns?									
18. What is the measured application rate of glass beads?			# / Gal.			# / Gal			# / Gal
19. What is the quantity of binder used and length of lines applied? (Quantity of paint should be in compliance with the following charts.)			Gal. Ft.			Gal. Ft.			Gal. Ft.

4" WIDE LINES (15 MILS)		4" WIDE LINES (12 MILS)		NOTES
100 ft.	0.312 gals.	100 ft.	0.249 gals.	1) Skip line uses 75% less paint than a solid line.
500 ft.	1.559 gals.	500 ft.	1.247 gals.	
1000 ft.	3.117 gals.	1000 ft.	2.494 gals.	2) Six inch wide lines use 50% more paint than 4 inch wide lines.
2500 ft.	7.794 gals.	2500 ft.	6.236 gals.	
5280 ft.	16.460 gals.	5250 ft.	13.170 gals.	3) Eight inch wide lines use 100% more paint than 4 inch wide lines.

To determine gallons for a 4 inch line 15 mils thick, divide feet of line by 320.7776

To determine gallons for a 4 inch line 12 mils thick, divide feet of line by 400.9112

To determine gallons of paint for legends and symbols at 15 mil thickness, divide square feet of markings by 106.93

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B.MANUAL OR WALK BEHIND OPERATION (ARROWS, LEGENDS, ETC.)

1. Type of application: Hand Gun_____ Machine _____
2. Is the marking properly centered in the lane? Yes_____ No_____
3. Are the edges clean and sharp? Yes_____ No_____
4. Does the marking have uniform paint coverage? Yes _____ No_____
   (Paint should be sufficiently heavy to allow for 60-70% glass bead embedment.)

5. Type of glass bead applications: Hand_____Gravity Fed _____Pressure Fed _____ __N/A_____
6. Are glass beads evenly distributed over the marking? Yes_____ No_____
7. Are glass beads properly embedded (60-70%)? Yes _____ No_____

C.RETROREFLECTIVITY MEASUREMENTS OF APPLIED PAVEMENT MARKINGS

1. Did contractor follow PTM 431? Yes_____ No_____
2. Did markings meet retroreflectivity requirements? Yes_____ No_____

Remarks:

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Inspector

FID#_____

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