

SECTION 6 SIGNING AND STRIPING

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SECTION 6 SIGNING AND STRIPING

6.1 GENERAL

The Authority has developed the signing and striping design criteria contained herein for the particular needs of the Authority's roadways. They are intended to equal or exceed standards currently being used for limited access highways and should be considered minimum criteria, to be exceeded wherever practical and appropriate. Signing for highways and other limited access roads requires the use of engineering judgment for placement and spacing so that the signs have sufficient visibility to drivers and are in a logical sequence. Striping and other delineation for highways and limited access roads must provide clear and positive delineation and advance notification for decision points. These goals are particularly important given the traffic volumes and particular characteristics of the Authority's facilities.

The design criteria presented in this Section reflect a supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), approved by the Federal Highway Administration (FHWA). All references in this Manual to the MUTCD shall be construed as the latest approved and published edition. Note that the numbering of specific MUTCD Sections referenced in this Manual refers to the numbering in the 2009 edition of the MUTCD. Should there be any contradiction between the MUTCD and the Design Manual or any other publication of the Authority, the Authority's publications shall govern. Unless a particular traffic control device (signing or striping) has been modified by language in this Section, the Engineer should refer to the MUTCD, including published revisions and errata.

This Section generally describes the type of signs used, sign supports for small highway signs, sign layout, panel construction, consideration for sign lighting, pavement striping, delineator layout, design procedures and plan preparation methods. This information applies to all of the Authority's roadways and interchange areas. It is noted that some criteria described herein only apply in specific cases, such as the dualized section of the Turnpike or approaching barrier and ramp toll plazas on the Parkway.

Traffic control devices on roadways not owned or operated by the Authority will be subject to the criteria of the controlling agency. The Authority will determine the locations of permanent trailblazers outside of the immediate mainline or interchange area.

All references in this Section to the Authority's Specifications shall be construed as the most recently published Standard Specifications, with any modifications contained within project-specific Supplementary Specifications.

6.2 SIGNS

The signs to be used on the Authority's roadways are classified as regulatory, warning, directional or informational. Regulatory signs inform the roadway user of traffic laws or regulations, and indicate the applicability of legal requirements that would not otherwise be apparent. Warning signs inform the driver of situations that may violate driver expectancy. The directional and informational signs are to furnish the drivers with clear instructions for orderly progress to their destinations.

The letters “R” and “L” (right and left) are omitted from sign designations in this Section for simplicity. When any sign in the MUTCD or this Section may be used in either a right or left orientation, including the use of arrows or the text “RIGHT” or “LEFT,” the appropriate “R” or “L” suffix should be added to the sign designation to indicate the specified orientation. For example, sign M(NJTA)5-4aL would read “KEEP LEFT” and sign M(NJTA)5-4aR would read “KEEP RIGHT.”

For clarification of design procedures, signs are divided into four categories – standard, NJTA, contract and special. Most regulatory and warning signs are Standard Signs or NJTA Signs, while many guide signs are Contract Signs due to the need for customized messages.

6.2.1 Standard Signs

Standard Signs are those found in the MUTCD and are to be used in accordance with standards set forth in the MUTCD.

6.2.2 NJTA Signs

NJTA Signs are commonly used signs not included in the MUTCD for which the Authority has standardized dimensions and layouts. The specific use of each of the NJTA Signs is detailed in Subsection 6.4. Detailed dimensions and layouts for the NJTA Signs are provided in the SL Standard Drawings and requirements for materials are included in the Authority’s Specifications. The Figures in this Design Manual are for illustrative purposes only.

Most toll plaza signs are also NJTA Signs. Toll plaza signs include all of the signs required at or leading up to Turnpike and Parkway toll plazas to inform traffic of different payment options or to provide additional warning, regulation or guidance. Specific uses and typical placement of signs at and approaching toll plazas are detailed in Subsection 6.4.2.4.

6.2.3 Contract Signs

Contract signs are the fixed-message signs, such as guide signs, that have not been standardized by the Authority and are designed on a location-by-location basis. The messages for contract signs should be concise and coherent. Specific uses of contract signs are detailed in Subsection 6.4. Typical sign panel layouts for contract signs are discussed in Subsection 6.4.2. Design details not covered by the Authority’s Design Manual, Standard Drawings or Specifications are to be found in the MUTCD.

6.2.4 Special Signs

There are three types of special signs used on the Turnpike and Parkway.

6.2.4.1 Variable Speed Limit Signs (VSLS)

Variable Speed Limit Signs (VSLS) are located on all mainline Turnpike roadways. These signs have speed limit messages that are changed to the desired speed from a master control panel at the Statewide Traffic Management Center (STMC). Further details of the VSLS are given in Subsection 6.4.4 and shown on the VM Standard Drawings.

6.2.4.2 Variable Message Signs (VMS)

Variable Message Signs (VMS) are used on all mainline Turnpike and Parkway roadways. These signs can be programmed to disseminate specific information on current roadway conditions, either on the Authority's roadways or on neighboring facilities, information on major events or general safety messages. The programmed messages displayed on the VMS are remotely controlled from the STMC. Each VMS is independent, so messages can be customized to address the particular needs of a specific portion of the roadway. Further details of VMS are given in Subsection 6.4.5 and shown on the Standard Drawings.

6.2.4.3 Hybrid Changeable Message Signs (HCMS)

Hybrid Changeable Message Signs (HCMS) are located wherever northbound and southbound traffic is divided by vehicle classification into the Inner and Outer Roadways (Turnpike) and may also be located at divisions between the Express and Local Roadways (Parkway). Locations may include the gore areas of Interchange and Service Area entrance ramps and any other major decision point so determined by the Authority. Each sign consists of a VMS panel and a rotating drum containing three or four messages. The messages displayed on both the VMS panel and the rotating drum are remotely controlled from the STMC. By utilizing various combinations of messages, traffic may be segregated because of congestion, accidents or construction. Further details are shown on the Standard Drawings. The approximate locations of HCMS are described in Subsection 6.4.6.

6.3 SIGN SUPPORTS

Design guidelines for sign supports for ground mounted signs and sign structures for overhead signs are covered in Section 2 (Structures Design) of this Manual.

6.4 SIGN LOCATION LAYOUT

Based on the definition of Major Interchanges in Section 2E.32 of the MUTCD, all interchanges within the Turnpike toll-ticket system are considered major interchanges for the purposes of sign location layout. Other Turnpike and Parkway interchanges may be considered major, intermediate or minor. Considerations related to Advance Guide Signs are described in Subsection 6.4.3.1 (Mainline Signing) of this Manual.

The Supplemental Sign Policy issued by the Authority, available at the Authority's website at <http://www.state.nj.us/turnpike/documents/NJTA-sign-guide.pdf>, contains requirements and guidelines for applicants who wish to list a destination on a Supplementary Guide sign (MUTCD Section 2E.35), including recreational and cultural interest areas. The most recent published edition of the Supplemental Sign Policy is to be used where referenced throughout this Section.

6.4.1 Standard Signs

The descriptions and applications of signs found in the MUTCD are as stated in the MUTCD. The Authority's policy includes the following modifications to language found in the following Sections of the MUTCD:

MUTCD Section 2A.17: The Authority's policy regarding use of overcrossing structures for sign installation instead of separate sign structures is described in Subsection 6.5 of this Manual.

MUTCD Section 2B.40: When One Way (R6-1) signs are installed to the same post as Do Not Enter (R5-1) and/or Stop (R1-1) signs, the One Way signs are mounted above and perpendicular to the other signs.

MUTCD Section 2B.41: On Authority ramp termini at intersecting crossroads, One Way and No Left/Right Turn signs are placed where shown in MUTCD Figure 2B-18. For these signs only, the asterisk and "Optional" note in Figure 2B-18 are to be disregarded. Note that these signs are to be sized according to the classification of the intersecting crossroad, not the ramp.

MUTCD Section 2B.47: The applicable parking regulations on Authority roadways are "No Stopping or Standing," as opposed to "No Parking." As described in Subsection 6.4.2, the NJDOT R(NJ)7-4 series signs replace the MUTCD R7-4 series signs.

MUTCD Section 2C.14: The figure shown in Exhibit 6-1 in this Manual replaces MUTCD Figure 2C-3 to reflect conditions encountered on the Authority's roadways.

MUTCD Section 2C.55: Distances shown in miles on Distance Ahead and Next Distance plaques (W16-3 series, W7-3aP) may use the fractions $\frac{1}{4}$, $\frac{1}{2}$ or $\frac{3}{4}$ instead of an integer.

MUTCD Section 2D.09: Turnpike and Parkway legends are given preference below Interstate and above United States routes.

MUTCD Section 2D.11: The NJTA County Route (M(NJTA)1-6) sign is used on guide signs instead of the standard County Route (M1-6) sign to provide increased legibility. The County name is removed and numerals are enlarged.

MUTCD Sections 2D.26 to 2D.28: The Authority's Maintenance Department may continue to use available sign stocks of Turnpike and Parkway arrows until they are depleted. All new arrow signs will follow MUTCD specifications,

using a green background and either a white legend (Turnpike) or yellow legend (Parkway).

MUTCD Section 2D.29: Turnpike and Parkway route signs are given preference below Interstate and above United States route signs.

MUTCD Section 2E.34: Use of the “Next Exit” plaque is to be approved by the Authority.

MUTCD Section 2H.02: The only political boundary signs that may be posted on Authority roadways are State and County line signs. Municipal or other local boundaries shall not be posted. The State or County pictograph shall not be displayed.

MUTCD Section 2H.05: On the Turnpike Easterly and Westerly Alignments, D(NJTA)10-4 and D(NJTA)10-4a signs (NJTA Signs) are used instead of MUTCD D10- series signs to show the ‘E’ or ‘W’ letter designation for the roadway. On the Turnpike and Parkway, D(NJTA)10-1a, 2a and 3a signs (NJTA Signs) are used instead of MUTCD D10-a series signs to show tenth-mile intervals.

MUTCD Chapter 2M: Signing for recreational and cultural areas is to follow the Authority’s Supplemental Sign Policy.

6.4.2 NJTA Signs

The various NJTA Signs are shown on the SL Standard Drawings. As hereinafter described, each of these signs has one or more specific locations where it is to be used. The designation prior to each of the following descriptions corresponds to the Sign Designation shown on the Standard Drawings and listed below. Where a sign lists a specific distance, such as MSS-1, W(NJTA)9-2a or W(NJTA)9-6, the distance shall be rounded to the nearest allowable increment:

- 100, 200, 300, 400, 500, 750, 1000, 1500, 2000 feet
- ¼, ½, ¾, 1, 1½, 2 miles
- Other distances require approval by the Authority.

Many of the descriptions may be clarified by reference to the sketches on Exhibit 6-2 through Exhibit 6-7, or to the MUTCD.

Sign Designation/Name	Description of Installation Location(s)
<u>D(NJTA)4-2a / 4-2b</u> Park and Ride Advance Guide Sign	As provided in the MUTCD for Park – Ride Supplemental Guide signs. In addition to the Park – Ride symbol, pictographs may be added to the sign for the type(s) of transit present at the Park and Ride facility.
<u>D(NJTA)10-1</u> Integer Mile Marker, 1 Digit	Replaces D10-1 sign (see MUTCD).

Sign Designation/Name	Description of Installation Location(s)
<u>D(NJTA)10-1a</u> Tenth-Mile Marker, 2 Digits	Replaces D10-1a sign (see MUTCD).
<u>D(NJTA)10-2</u> Integer Mile Marker, 2 Digits	Replaces D10-2 sign (see MUTCD). The first digit may be replaced by a letter for Turnpike roadway ("P" for Pearl Harbor Memorial Turnpike Extension, "N" for Newark Bay – Hudson County Extension).
<u>D(NJTA)10-2a</u> Tenth-Mile Marker, 3 Digits	Replaces D10-2a sign (see MUTCD). The first digit may be replaced by a letter for Turnpike roadway ("P" for Pearl Harbor Memorial Turnpike Extension, "N" for Newark Bay – Hudson County Extension).
<u>D(NJTA)10-3</u> Integer Mile Marker, 3 Digits	Replaces D10-3 sign (see MUTCD).
<u>D(NJTA)10-3a</u> Tenth-Mile Marker, 4 Digits	Replaces D10-3a sign (see MUTCD).
<u>D(NJTA)10-4</u> Integer Mile Marker, 4 Digits	Used in the same manner as D(NJTA)10-3 with an additional letter for roadway, on Turnpike Easterly ("E") and Westerly ("W") alignments.
<u>D(NJTA)10-4a</u> Tenth-Mile Marker, 5 Digits	Used in the same manner as D(NJTA)10-3a with an additional letter for roadway, on Turnpike Easterly ("E") and Westerly ("W") alignments.
<u>D(NJTA)10-5</u> Parkway Reassurance Sign	Mounted above Integer Mile Markers on the Garden State Parkway at Mile 10, 20, 30, etc.
<u>D(NJTA)10-7a</u> Structure Identifier, 1 to 4 Digits	Mounted on all Authority structures with identification numbers of up to 4 digits.
<u>D(NJTA)10-7b</u> Structure Identifier, 5 Digits	Mounted on all Authority structures with identification numbers of 5 digits.
<u>D(NJTA)10-7c</u> Structure Identifier, 6 Digits	Mounted on all Authority structures with identification numbers of 6 digits.
<u>D(NJTA)10-7d</u> Structure Identifier, 7 Digits	Mounted on all Authority structures with identification numbers of 7 digits.
<u>D(NJTA)10-7e</u> Structure Identifier, 8 Digits	Mounted on all Authority structures with identification numbers of 8 digits.
<u>D(NJTA)12-5GSP</u> Parkway Travel Info	Replaces D12-5 sign (see MUTCD) along Parkway.
<u>D(NJTA)12-5aNJT</u> Turnpike Travel Info	Replaces D12-5 sign (see MUTCD) along Turnpike mainline south of Interchange 6.

Sign Designation/Name	Description of Installation Location(s)
<u>D(NJTA)12-5b</u> NJ Turnpike / Interstate Travel Info	Replaces D12-5 sign (see MUTCD) along all Turnpike roadways except the mainline south of Interchange 6. I-78 is used for the Newark Bay – Hudson County Extension and I-95 is used otherwise.
<u>D(NJTA)13-3a</u> Parkway Entrance	On an intersecting roadway at the gore or intersection of a Parkway entrance ramp, except where US Route 9 enters or is co-designated with the Parkway. The Toll (M4-15) sign is erected left-justified above D(NJTA)13-3aR and right-justified above D(NJTA)13-3aL.
<u>D(NJTA)13-3b</u> Parkway and US 9 Entrance	On an intersecting roadway at the gore or intersection of a Parkway entrance ramp where US Route 9 enters or is co-designated with the Parkway (Interchanges 25 to 29, 48 to 50, 80 to 83). The Toll (M4-15) sign is used as described for D(NJTA)13-3a at the Interchange 29 entrance only due to the downstream toll plaza.
<u>D(NJTA)13-3c</u> Turnpike and Interstate Entrance	On an intersecting roadway at the gore or intersection of a Turnpike entrance ramp, along all Turnpike roadways except the mainline south of Interchange 6. I-78 is used for the Newark Bay – Hudson County Extension and I-95 is used otherwise. The Toll (M4-15) sign is erected left-justified above D(NJTA)13-3cR and right-justified above D(NJTA)13-3cL.
<u>D(NJTA)13-3d</u> Turnpike Entrance	On an intersecting roadway at the gore or intersection of a Turnpike entrance ramp along the mainline south of Interchange 6. The Toll (M4-15) sign is erected left-justified above D(NJTA)13-3dR and right-justified above D(NJTA)13-3dL.
<u>E(NJTA)4-2</u> NJTA Supplemental Guide Sign	As provided in the MUTCD for Supplemental Guide Signs. E(NJTA)4-2 signs are only erected with messages and at locations approved by the Authority based on the Authority's Supplemental Sign Policy.
<u>E(NJTA)6-1 series</u> Inside Entry – Diagonal Arrows	Over the theoretical gores of interchange toll plaza inside entries to Turnpike roadways where signs are not directly over the indicated travel lanes. Signs with left arrows are arranged similarly, except on signs with one arrow, the text is placed on the right side of the arrow. Sign configurations, messages and arrows are selected on a location-by-location basis.
<u>E(NJTA)6-2 series</u> Inside Entry – Down Arrows	Over the theoretical gores of interchange toll plaza inside entries to Turnpike roadways where signs are directly over the indicated travel lanes. Sign configurations, messages and arrows are selected on a location-by-location basis.
<u>E(NJTA)6-3 series</u> Authority Pull-Through Signs	Replaces E6-2 series (see MUTCD) on Turnpike and Parkway. May be modified based on engineering judgment to include down arrows over all applicable lanes at complex interchanges.
<u>GS-HAR</u> Urgent Message	Off the right shoulder where determined by the Authority.
<u>I(NJTA)1</u> Traffic Regulations	In the toll plaza area on all interchange entries to the Turnpike, located where it is safe to pull over and read the regulations.
<u>M(NJTA)1-1</u> Parkway Sign	On all Parkway roadways, route sign assemblies and guide signs on intersecting highways.

Sign Designation/Name	Description of Installation Location(s)
<u>M(NJTA)1-2</u> Turnpike Sign	On all Turnpike roadways, route sign assemblies and guide signs on intersecting highways.
<u>M(NJTA)1-6</u> County Route Sign	Used for 500-series county routes incorporated on guide signs only.
<u>M(NJTA)5-4a</u> Keep Right (Left)	On an intersecting roadway in advance of a Turnpike or Parkway entrance when there are intermediate intersections or major driveways.
<u>M(NJTA)5-4b</u> Next Right (Left)	On an intersecting roadway in advance of a Turnpike or Parkway entrance when the entrance is the next turn in that direction.
<u>MSS-1</u> Service Area X Miles	In advance of all exit ramps to service areas by a whole number of miles, determined on a location by location basis.
<u>MSS-2</u> Service Area Next Right	In advance of all exit ramps to service areas by ½ mile, adjusted by up to ¼ mile depending on sight distance and geometric constraints on sign location and visibility. The actual distance may replace the action message of "Next Right/Left" based on field conditions.
<u>MSS-3a</u> Next Service Area	Beneath one or more MSS-1 and/or MSS-2 signs in advance of all service areas except where MSS-3b is used.
<u>MSS-3b</u> Last Service Area	Beneath one or more MSS-1 and/or MSS-2 signs in advance of the last service area on the Turnpike or Parkway in that direction.
<u>MSS-4a</u> Service Area Gore	Replaces D5-2 (see MUTCD), located at exit gore.
<u>MSS-4b</u> Overhead Service Area Gore	Overhead above the deceleration lane at the theoretical exit gore for all exit ramps to service areas.
<u>MSS-5a</u> Freeway Service Sign, Six Logos	In advance of interchanges where the Authority has approved listing up to six service facilities on intersecting or connecting roads.
<u>MSS-5b</u> Freeway Service Sign, Four Logos	Used in the same manner as MSS-5a where there are no more than four service facilities anticipated to be provided at the interchange.
<u>MSS-6a</u> Ramp Service Sign, Six Logos	On interchange exit ramps where the Authority has approved listing up to six service facilities on intersecting or connecting roads.
<u>MSS-6b</u> Ramp Service Sign, Three Logos	Used in the same manner as MSS-6a where there are no more than three service facilities anticipated to be provided at the interchange.
<u>MSS-7a</u> Service Area Parking Regulations	At all Service Area parking facilities, located so as to be visible to all patrons within the facility.
<u>MSS-7b</u> Park-Ride Lot Regulations	At all Authority park and ride facilities, located so as to be visible to all patrons within the facility.

Sign Designation/Name	Description of Installation Location(s)
<u>MSS-7c</u> Permit Parking Only Regulations	At all parking lots within Authority jurisdiction where part or all of the lot is restricted to parking by permit only, so as to be visible to all patrons within the permit-restricted area or lot.
<u>MSS-8aP / 8bP</u> Call #95 / #477	Mounted below R(NJTA)8-7b. MSS-8aP is used on the Turnpike and MSS-8bP is used on the Parkway.
Overcrossing Identification Signs	Mounted on overpasses crossing Authority roadways, located as shown on Standard Drawing SL-27.
<u>R(NJTA)3-10</u> Alt Fuel Preferential Lane Sign	Replaces R3-10a (see MUTCD).
<u>R(NJTA)3-11</u> Shoulder – Cars Only	At the beginning of the ramp segment governed by the applicable regulation and at intervals appropriate to ramp operating speeds and sight distances.
<u>R(NJTA)5-11</u> Official Use Only	At median Z-turns and U-turns, grade separated U-turns, ramps to Authority and State Police facilities, employee parking lots and roadways and other restricted roadways where only vehicles authorized by the Authority and/or NJ State Police are allowed to enter. Must be mounted beneath an appropriate R3- series sign (such as R3-1, R3-2, R3-3, etc.) or similar movement prohibition sign (such as R5-1).
<u>R(NJTA)8-7a</u> Park Disabled Vehicles on Grass	Where a full-width paved shoulder is not available and the immediately adjacent landscaped area is accessible from and at the same grade as the edge of pavement, at the beginning of such an area and at periodic intervals throughout the area as determined by the Authority.
<u>R(NJTA)8-7b</u> Remain with Disabled Vehicle	Along the right shoulder at periodic intervals as determined by the Authority based on roadway geometry, sight distance, locations of other signs and other considerations. MSS-8aP or MSS-8bP is mounted below.
<u>R(NJTA)8-9</u> Authority Employee Parking Only	At the entrances to parking facilities intended for exclusive use by Authority employees and other authorized personnel, such as toll plaza employee parking areas. Also used within otherwise public parking facilities to demarcate areas for exclusive use by authorized personnel.
<u>R(NJTA)9-4a</u> Passengers Prohibited	In toll plaza areas and anywhere else where the Authority has identified an existing or potential concern with pedestrian activity.
<u>R(NJTA)12-7a</u> No Trucks/Buses/Trailers Left Lane	At the beginning of the applicable restriction and at periodic intervals throughout the restriction as determined by the Authority.
<u>R(NJTA)12-7b</u> No Trucks/Buses/Trailers 2 Left Lanes	At the beginning of the applicable restriction and at periodic intervals throughout the restriction as determined by the Authority.
<u>R(NJTA)12-7c</u> No Buses/Trailers 2 Left Lanes	At the beginning of the applicable restriction and at periodic intervals throughout the restriction as determined by the Authority.

Sign Designation/Name	Description of Installation Location(s)
<u>R(NJTA)12-7d</u> No Buses/Trailers Left Lane	At the beginning of the applicable restriction and at periodic intervals throughout the restriction as determined by the Authority.
<u>R(NJTA)12-7e</u> No Trucks or Trailers 2 Left Lanes	At the beginning of the applicable restriction and at periodic intervals throughout the restriction as determined by the Authority.
<u>R(NJTA)12-7f</u> Left Lane Restriction Ahead	In advance of the beginning of the applicable restriction, to be located based on site-specific conditions.
<u>R(NJTA)12-7g</u> End Left Lane Restriction	At the end of the applicable restriction.
<u>Ramp Identifier</u>	Off the right shoulder at the beginning of the indicated ramp.
<u>TPR-1</u> Stop – Get Ticket	Replaces the combination of R1-1 and R3-30P (see MUTCD) at Turnpike toll plaza entries (including barrier toll plazas), mounted flush to the bumper block. Not installed at lanes dedicated to E-ZPass.
<u>TPR-2</u> Stop – Pay Toll	Replaces the combination of R1-1 and R3-29P (see MUTCD) at Turnpike toll plaza exits (including barrier toll plazas), mounted flush to the bumper block. Not installed at lanes dedicated to E-ZPass.
<u>TPR-3a</u> Your Speed (2 lines)	At the entrance to dedicated E-ZPass lanes, mounted beneath VMS that display approach speeds, to augment TPR-4 signing. Choice of TPR-3a or TPR-3b is based on site-specific conditions.
<u>TPR-3b</u> Your Speed (1 line)	At the entrance to dedicated E-ZPass lanes, mounted beneath VMS that display approach speeds, to augment TPR-4 signing. Choice of TPR-3a or TPR-3b is based on site-specific conditions.
<u>TPR-4</u> E-ZPass Toll Speed	Replaces R2-1 (see MUTCD) when mounted on an element of the toll plaza booth or canopy structure or when installed on a ramp in advance of the ramp toll plaza. See MUTCD Section 2F.05, paragraph 8.
<u>TPR-5</u> Car Toll	In advance of Parkway mainline and ramp toll plazas.
<u>TPR-6a</u> Trailers Prohibited	In advance of Parkway mainline and ramp toll plazas with Exact Change lanes north of Interchange 105, where trucks are prohibited.
<u>TPR-6b</u> Trucks-Trailers Prohibited	In advance of Parkway mainline and ramp toll plazas with Exact Change lanes from Interchange 105 south, where trucks are allowed.
<u>TPR-7a</u> E-ZPass Tag Holders Only	In advance of mainline and ramp toll plazas.
<u>TPR-7b</u> E-ZPass Accepted All Lanes	In advance of toll plazas where E-ZPass transactions can be completed in any lane, including lanes designated for other payment modes.

Sign Designation/Name	Description of Installation Location(s)
<u>TPW-1</u> Ramp Divides	Off the right shoulder on the entrance ramps to the northbound (TN) and southbound (TS) roadways along the Dual-Dual section of the Turnpike, at least 800 to 1,200 feet in advance of the ramp splits for the Inner and Outer Roadways.
<u>TPW-2</u> Toll Plaza Advance	At locations with high-speed E-ZPass lanes where not all traffic is required to slow or stop, only where directed by the Authority.
<u>W(NJTA)9-1</u> Right (Left) Lane Ends X Feet	Replaces W9-1 (see MUTCD), for ground-mounted sign locations only.
<u>W(NJTA)9-2</u> Lane Ends Merge	Replaces W9-2 (see MUTCD), over the lane to be dropped.
<u>W(NJTA)9-2a</u> Lane Ends X Feet	Replaces W9-1 (see MUTCD), for overhead-mounted sign locations only.
<u>W(NJTA)9-6</u> Reduce Speed Pay Toll	On Turnpike exit ramps, typically at least 1,000 feet in advance of the toll plaza (subject to site conditions). Typically post-mounted, may only be overhead mounted where directed by the Authority. May also be on Parkway exit ramps based on engineering judgment.
<u>W(NJTA)9-6a</u> Toll Plaza Ahead	On Turnpike entrance ramps, typically 500 to 700 feet in advance of the toll plaza (subject to site conditions). Typically mounted overhead, only where directed by the Authority. May also be on Parkway entrance ramps based on engineering judgment.
<u>W(NJTA)9-7a</u> Exit Only (2 Line)	Replaces W9-7 (see MUTCD).
<u>W(NJTA)9-7b</u> Exit Only (4 Line)	Replaces W9-7 (see MUTCD) for constrained locations only where W(NJTA)9-7a cannot be installed.

6.4.2.1 Integer Mile and Tenth-Mile Markers

On mainline roadways with two or three lanes, Integer Mile and Tenth-Mile Markers (D(NJTA)10-1 to 10-4 and D(NJTA)10-1a to 10-4a) are installed on the right-hand side of the roadway. On roadways with four or more lanes and where determined to be beneficial based on site-specific conditions, these markers are also installed in the median so that the two signs at each integer or decimal mile point are directly across from each other. Integer Mile and Tenth-Mile Markers may also be installed between two same-direction roadways, such as the New Jersey Turnpike Inner and Outer Roadways or Garden State Parkway Express and Local Roadways, such that they are visible to motorists on both roadways.

On the Parkway mainline, the Parkway Reassurance Sign (D(NJTA)10-5) is installed every 10 miles in both directions, beginning at Mile 10. It is mounted above (not replacing) the regular Integer Mile Markers at those locations. The sign includes the roadway direction and the Parkway Sign.

6.4.2.2 Service Area Signs

Service Area Signs are defined as specific service signs that provide road users with business identification and directional information and mileage for service areas. Service Areas require a minimum of three advance exit signs and an exit direction sign. Service Area signs may be located farther in advance (upstream) of the Service Area exit ramp based on site-specific conditions. Proposed new installations more than 2 miles from the service area exit ramp require approval by the Authority.

The Authority enters into contracts to provide products and services to the public at Service Areas. Therefore, any services that are provided at Service Areas, such as gas and food, are only displayed on Service Area advance guide signs. The names or symbols of these services are not included on General Service signs and logos for related businesses are not included on Specific Service signs at interchanges. Refer to the Authority's Supplemental Sign Policy for additional information.

Service Area guide signs (MSS-1 or MSS-2) shall be limited to no more than six logo panels. When there are more than six services provided at a Service Area, the Authority determines which approved products and services within the Service Area are displayed on each advance guide sign. Refer to the Authority's Supplemental Sign Policy for additional information.

Standard Drawing SL-24 lists the Service Areas on the New Jersey Turnpike and Garden State Parkway.

6.4.2.3 General and Specific Service Interchange Signs

The policy for Specific Service Signs (as defined in Chapter 2J of the MUTCD) is included in the Authority's Supplemental Sign Policy. For General Service Signs (as defined in Chapter 2I of the MUTCD), service symbols or text (Gas, Food, etc.) are subject to the same policies as logos on Specific Service Signs. The following design guidelines also apply:

1. In general, Lodging is the only specific service signed on service signs, although the Supplemental Sign Policy permits a limited number of other services to be signed if approved by the Authority.
2. For General Service Signs, the exit number is to be displayed within the sign (MUTCD sign D9-18b).
3. The 24-Hour Pharmacy program described in the MUTCD has not been adopted in New Jersey and will not appear on service signs.
4. The Interstate Oasis program described in the MUTCD has not been adopted by the Authority.
5. The Authority has approved the use of Specific Service signs for alternative fuel locations. Unless alternative fuel is provided, gas services are not signed on Specific Service signs per the

Supplemental Sign Policy. The Authority will provide the approved legend for alternative fuel signing.

6. Similar to General Service signing, Specific Service signing should only be provided at locations where the road user can return to the freeway and continue in the same direction of travel. This guideline is relevant to certain interchanges along the Parkway.

6.4.2.4 Toll Plaza Signs

Road users expect to encounter similar conditions in similar situations, e.g. when approaching toll plazas. Because different toll plazas have different layouts, driver expectations may be violated. The goal of the Authority is to provide consistent signing to support driver expectancy and to encourage drivers to make decisions in advance, reducing the potential for erratic movements.

Diagrammatic Signs: It is the Authority's practice to provide diagrammatic signs in advance of mainline barrier toll plazas where the toll plaza includes Express E-ZPass lanes and there is an option lane configuration as defined in MUTCD Section 2E.20. Diagrammatic signs shall not be used when there is not an option lane. The diagrammatic sign provides notice well in advance of the impending toll plaza to properly channelize traffic. Diagrammatic signs shall be mounted overhead and shall be located two miles and one mile in advance of toll plazas utilizing Express E-ZPass.

Advance Toll Warning Signs: Advance toll warning signs (TPW- series and W(NJTA)9-6 series) provide notice in advance of a downstream mainline or ramp toll plaza. Mainline signs should be placed ¼ mile and ½ mile in advance of the plaza, with additional advance signs at 1 mile and 2 miles if spacing permits and diagrammatic signs are not used. Ramp signs are located as described in Subsection 6.4.2 (NJTA Signs).

Toll Regulatory Signs: Standardized toll regulatory signs (TPR- series) are located as described in Subsection 6.4.2 (NJTA Signs). The Lane Designation Sign on the Parkway, showing the types of toll collection present at the plaza, is to be ground mounted and placed approximately 1000 feet from the toll plaza.

Toll Canopy Signs: Toll canopy signs are mounted on the toll plaza above each toll lane with messages that can be changed to indicate the accepted payment method(s) in that lane. The design requirements are provided by the Authority.

6.4.2.5 Lane Reductions and Drops

Lane Reduction: When a lane ends between interchanges, the Parkway typically follows the sign sequence noted in Section 2C.42 of the MUTCD:

1. W9-1 – Right (Left) Lane Ends

2. W9-2 – Lane Ends Merge Left (Right)
3. W4-2 – Lane Ends

The Turnpike follows the sign sequence shown in Exhibit 6-6, which may be used on the Parkway where determined by the Authority:

1. W(NJTA)9-1 – Right (Left) Lane Ends X Feet
2. W(NJTA)9-2 – Lane Ends Merge
3. W4-2 – Lane Ends

Where the required sign spacing cannot be achieved on the Parkway, the W9-2 sign may be eliminated from the sequence. The W9-1 or W(NJTA)9-1 is typically located 1,500 feet in advance of the taper but may be moved based on site-specific conditions. When the W9-1 sign is used on the Parkway, a distance plaque (W16-2 or W16-3 series) should be mounted below the W9-1 to indicate the distance to the lane reduction.

Lane Drop: When a travel lane becomes the exit lane at an interchange, Exhibit 6-7 indicates the specific signs and the required sign spacing. Option lane drops are similar, except signs are modified to reflect that traffic in the rightmost through lane has the option of continuing on the mainline or exiting. When the lane drop is for an auxiliary lane less than 1 mile in length, the 1-mile advance guide sign is omitted. Signing is similar for a left exit except the Left Exit Number Plaque (MUTCD sign E1-5bP) is used.

The Exit Only panels are the E11-1 series found in the MUTCD. The only required sign in addition to the exit guide signs is the W(NJTA)9-7 series (Exit Only) sign.

6.4.2.6 Highway Advisory Radio (GS-HAR) Signs

These signs are designed with two beacons located directly above the sign panel as shown on Standard Drawing SL-26, centered on the sign posts. The sign posts are to extend above the top of the sign so that the beacons can be mounted on the posts. The beacons are activated by the Authority when the radio station(s) listed are broadcasting advisories relevant to drivers reading the sign. A visor is provided above each beacon to maintain visibility by shielding the lens from sunlight. Beacons and associated electrical items are to conform to Sections 606 and 918.24 of the Authority's Specifications and Sections 4L.01 and 4L.03 of the MUTCD. When activated, the beacons are to flash alternately as described in the MUTCD.

6.4.2.7 Use of NJDOT Signs

Certain signs from the New Jersey Department of Transportation (NJDOT) are used on the Turnpike and Parkway to convey regulations of the State of New Jersey:

1. The Fines Doubled (R(NJ)2-7a) sign is posted at the beginning of every 65 mph speed zone.

2. The No Litter (R(NJ)5-12) sign may be posted at Service Areas and other facilities (such as Park and Ride lots) where patrons may exit their vehicles.
3. No Stopping or Standing (R(NJ)7-4 series) signs are posted where parking or standing is prohibited and the Authority determines that signing is warranted to discourage these activities. The R(NJ)7-4L and 7-4R signs are posted at the beginning and end of restrictions, and the R(NJ)7-4X sign is posted within the restriction.
4. The Reserved Parking Penalty (R(NJ)7-8a) sign shall be posted below each Reserved Parking (R(NJ)7-8) sign.

6.4.3 Contract Signs

Contract signs are the fixed-message signs, such as guide signs, that have not been standardized by the Authority and are designed on a location-by-location basis. The timely display of information on contract signs when exiting the limited access facility provides the road user with critical information to make a decision without being confused. Contract signs are generally located as shown in Exhibit 6-2 through Exhibit 6-7, with messages as outlined below.

In order to provide for the proper spacing between signs and to provide consistent information to the motoring public, a standard sequence and spacing is desirable when exiting and entering a limited access facility. Guide signs, including supplemental guide signs, should be located a minimum of 800 feet apart in urban areas to maintain adequate visibility to each sign. In rural areas and wherever practical, this minimum spacing should be exceeded.

No more than two destinations should be included on the guide sign sequence in advance of an exit, with the same destinations and order on all signs in the same direction. When multiple destinations are used for a single exit ramp, the closest destination is listed first. When multiple destinations are used for consecutive exit ramps or for a Collector-Distributor (C-D) roadway with multiple exits, the destination for the first exit reached by traffic is listed first.

Note that on the Garden State Parkway, some interchanges are built as partial interchanges with certain movements missing or added in one or both directions. Therefore, guide signs in opposite directions for the same interchange may include different destinations.

6.4.3.1 Mainline Signing

Advance Guide Signs: Advance Guide Signs give notice well in advance of the exit point. Their purpose is to inform the drivers of navigational information such as the exit number, the mileage to the exit and the major destinations of interest near the interchange. The names of major destinations to be shown on these signs will be provided by the Authority.

Advance Guide Signs are desirably located at 2 miles, 1 mile and $\frac{1}{2}$ mile in advance of the theoretical exit gore. Locations may be adjusted up to $\frac{1}{4}$ mile as necessary based on site-specific field conditions including, but not limited to:

1. Locations of existing sign structures
2. Spacing between interchanges
3. Sight distance to the proposed sign location
4. Locations of mainline barrier toll plazas

All three Advance Guide Signs should be provided, but it may not be possible to provide all three signs in constrained locations on the Parkway. The Authority shall approve omission of an Advance Guide Sign based on engineering judgment or a site-specific engineering study. For interchanges with heavy traffic splits or in areas with closely spaced interchanges, it may be desirable to provide additional Advance Guide Signs (e.g., at both $\frac{1}{2}$ mile and $\frac{1}{4}$ mile in advance). The distance shall be rounded to the nearest $\frac{1}{4}$ mile.

Advance Guide Signs on mainline roadways are located based on the number of roadway lanes:

1. When the roadway has two lanes in one direction, signs are ground mounted unless there is an adjacent same-direction roadway with an overhead sign at the same location.
2. When the roadway has three lanes in one direction, signs shall be placed overhead on a cantilever or span type structure.
3. When the roadway has four or more lanes in one direction, signs shall be placed overhead on a span type structure only.

At the discretion of the Authority, a butterfly type structure may be used in the median where same-direction roadways are adjacent, such as in the Dual-Dual section of the Turnpike or the Express-Local sections of the Turnpike and Parkway.

The layout of Advance Guide Signs on the Turnpike and Parkway shall follow the MUTCD. All Advance Guide Signs shall contain a distance message at the bottom as well as an exit number plaque. The design and application of exit number plaques shall be according to Section 2E.31 of the MUTCD.

Exit Direction Signs: The Exit Direction Sign repeats the information that was shown on the Advance Guide Signs for the next exit, except in place of the mileage, there is a directional arrow. The layout of Exit Direction Signs on the Turnpike and Parkway shall follow the MUTCD, including use of an exit number plaque. This sign is mounted overhead above the deceleration lane(s) at the theoretical exit gore. If there is an overpass close to the theoretical exit gore that may obscure visibility to the Exit Direction Sign, it may be mounted on a sign structure on the near (upstream) side of the overpass.

Pull-Through Signs / Next Exit Supplemental Signs: NJTA Signs in the E(NJTA)6-3 series direct through traffic. The Next Exit supplemental sign, shown in Figure 2E-23 of the MUTCD, informs the driver of the mileage to the next exit. These signs are located on the same sign structure as the Exit Direction Sign and are mounted over the through lanes.

Exit Gore Signs: MUTCD sign E1-5a indicates the exiting point or place of departure from the main roadway. It is ground-mounted within the gore area at the exit.

6.4.3.2 Interchange Signing

Toll Plaza – Entry Signs: NJTA Signs in the E(NJTA)6-1 and E(NJTA)6-2 series are located at the entrance ramp split, directing entering traffic to either the northbound or southbound roadways. These signs are generally located on an overhead sign structure over the theoretical gore (painted nose). The names of major destinations to be shown on these signs will be provided by the Authority.

On the Dual-Dual section of the Turnpike and as directed by the Authority on the Express-Local section of the Parkway, the signs located at the ramp split for the Inner and Outer Roadways are HCMS mounted on overhead sign structures over the theoretical gore (painted nose).

Toll Plaza – Exit Signs: Contract signing for local roads or state highways shall be consistent with the MUTCD. The details for Interstate, U.S., State and County highway route markers and cardinal direction auxiliary signs are to conform to the MUTCD.

6.4.4 Variable Speed Limit Signs (VSLS)

Variable Speed Limit Signs (VSLS) are generally located every two to three miles above each roadway, co-located with Variable Message Signs (VMS). VSLS and VMS locations have been determined by the Authority based on factors including interchange locations, distance between successive interchanges or ramps, sight distance and distance between VSLS / VMS installations. VSLS and VMS inform traffic of the speed limit and of any adverse road conditions upon entering the freeway and in advance of decision points where traffic may leave the freeway.

6.4.5 Variable Message Signs (VMS)

Variable Message Signs (VMS) are typically installed on overhead sign structures, including span, cantilever and butterfly type structures. When directed to investigate the need for VMS on a project by the Authority, the Engineer shall analyze the following factors to determine if VMS are warranted on a project:

1. Intended purpose of the sign – Serve the general traveling public, special event, upcoming construction, etc.

2. Type of information to be displayed – One message to be blanked out, a few select messages needing limited lines, or a wide range of possible messages. This will determine if a character, line or full matrix VMS is necessary.
3. Type of technology to be used – To be coordinated with the Authority, which may affect sign location.
4. Special project-specific considerations.

The Engineer shall submit the recommendation as part of Preliminary Design, for Authority approval, before performing location analysis.

When a VMS is warranted, using the data and information collected above, and approved by the Authority, site selection is now possible. The Engineer shall perform location analysis for each VMS accounting for the guidance provided in Section 2L.06 of the MUTCD as well as the following considerations (at a minimum):

1. The minimum distance on a freeway that a VMS should be placed prior to an access point (such as an Interchange) or other decision point is one mile.
2. VMS on freeways or expressways with speeds of 55 mph or greater should be located on horizontal tangents with a minimum of 1,000 feet of clear sight distance.
3. The ideal vertical grade should be 1% or less, and VMS should not be placed along grades exceeding 4%. An upgrade is preferable to a downgrade.
4. VMS should not compete with other existing signs or interfere with traffic control devices. The Engineer must take inventory of all signs and traffic control devices along a roadway segment to properly place the VMS. On a freeway, the minimum distance between Type I guide signs and a VMS should be 800 feet.
5. Identifying existing power feeders along a roadway segment helps the Engineer understand how difficult it might be to power a potential VMS site. It is desirable to locate the VMS and existing electrical service as close together as possible. All power service locations require approval from the utility company prior to installation. Where existing electrical power is not available in a proposed location, see Section 7 (Lighting and Power Distribution Systems) of this Manual for more information on design.
6. Installation costs should also be considered, taking into account the other factors above.

Coordination with the Authority during the design process, as described in Subsection 6.9, is required to receive approval for VMS location. Section 8 (ITS and Communication Systems) of this Manual will contain further information regarding sign technology, power, and communication systems.

6.4.6 Hybrid Changeable Message Signs (HCMS)

As described in Subsection 6.2.4.3, Hybrid Changeable Message Signs (HCMS) are located on sign structures over the theoretical gore (painted nose) of all

major points of driver decision, where the choice of either alternate would enable the driver to reach the same destination. HCMS may be located at:

1. Entrance ramp splits to Inner and Outer or Express and Local Roadways
2. Service Area entrance ramp splits
3. In advance of any permanent or temporary mainline bifurcation

In the case of a temporary mainline split, HCMS are to be used for two-mile and one-mile advance warning signs as well as at the split itself.

EXHIBIT 6-1 – ADVISORY SPEED SIGNING FOR AN EXIT RAMP (MUTCD FIGURE 2C-3)

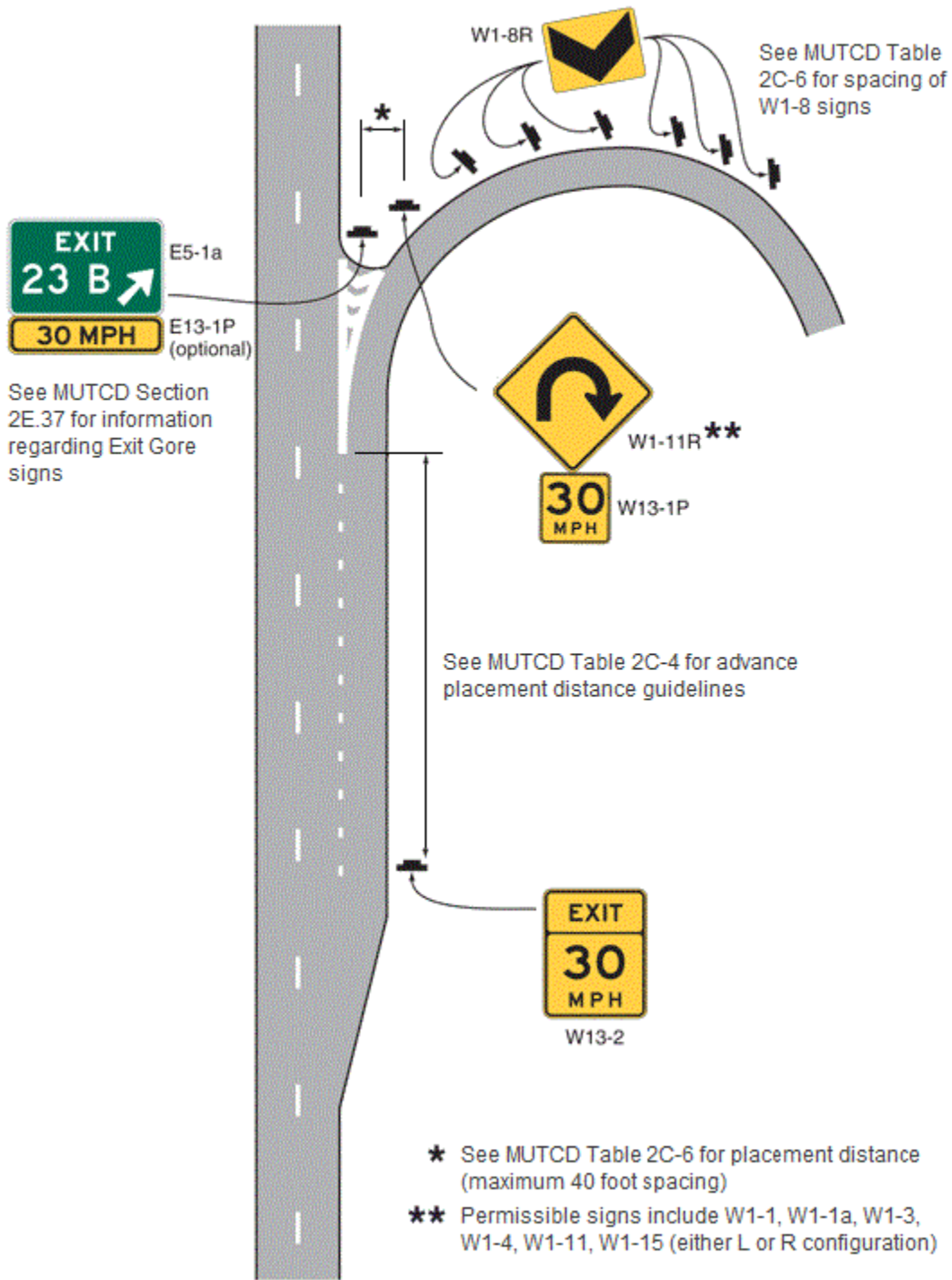
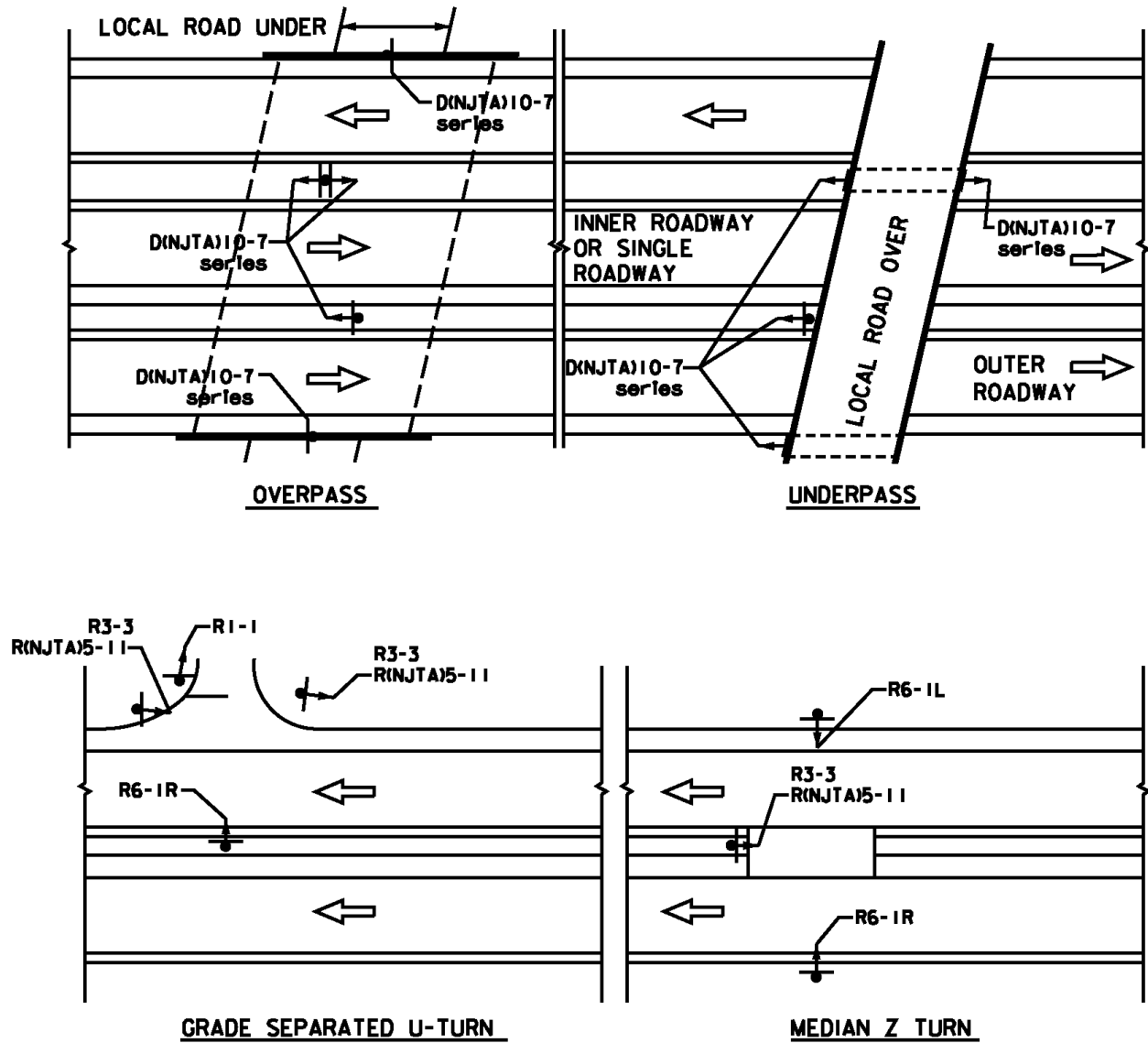
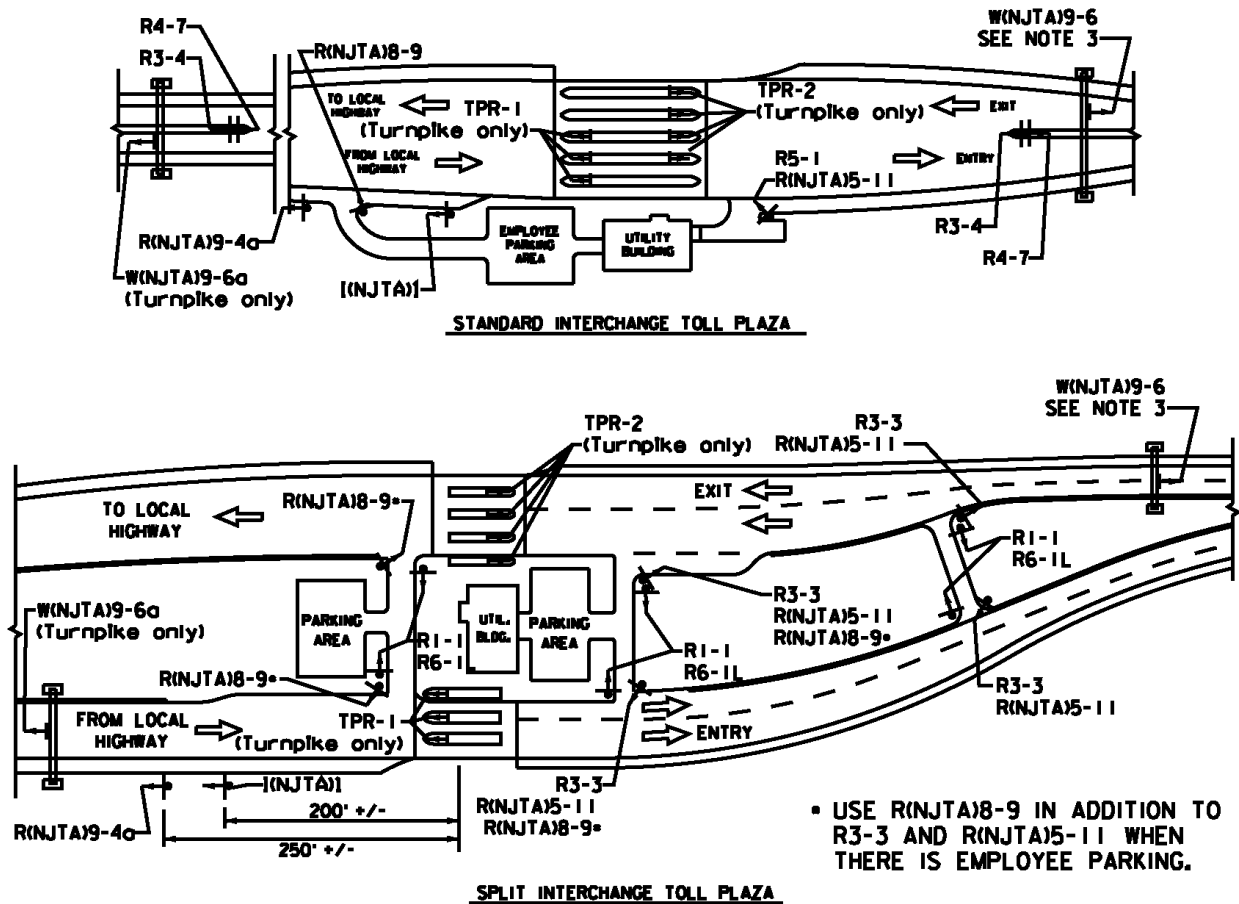


EXHIBIT 6-2 – SIGN LOCATION PLAN – LOCAL ROAD CROSSINGS AND MEDIAN CROSSINGS



NOTE: For delineator locations, see the DE Standard Drawings.

EXHIBIT 6-3 – SIGN LOCATION PLAN – TOLL PLAZAS AND LOCAL ROADS AT INTERCHANGES



NOTES FOR SIGN LOCATION PLANS (EXHIBITS 6-3 AND 6-4):

1. All overhead sign structures, whether butterfly, cantilever or span type, shall be placed so as to be a minimum of 30' in front of any lighting standard.
2. For delineator locations, see the DE Standard Drawings.
3. W(NJTA)9-6 only to be used when directed by the Authority.
4. Optimize sight distance to Hybrid VMS. Use "Trucks and Buses Keep Right" sign only with approval from the Authority if necessary due to Hybrid VMS location.
5. Optional location, preferably on overhead sign structure, ground mounted if appropriate or necessary.
6. Use R(NJTA)12-7a or 12-7d when there are 3 lanes in the roadway, and use R(NJTA)12-7b, 12-7c or 12-7e when there are 4 lanes in the roadway, depending on applicable restrictions.
7. See Exhibit 6-9 for locating warning signs and chevrons on curved ramps. Where shown, warning signs are posted on the left side of the ramp to which they apply.

EXHIBIT 6-4 – SIGN LOCATION PLAN – TURNPIKE DUAL-DUAL INTERCHANGE RAMPS

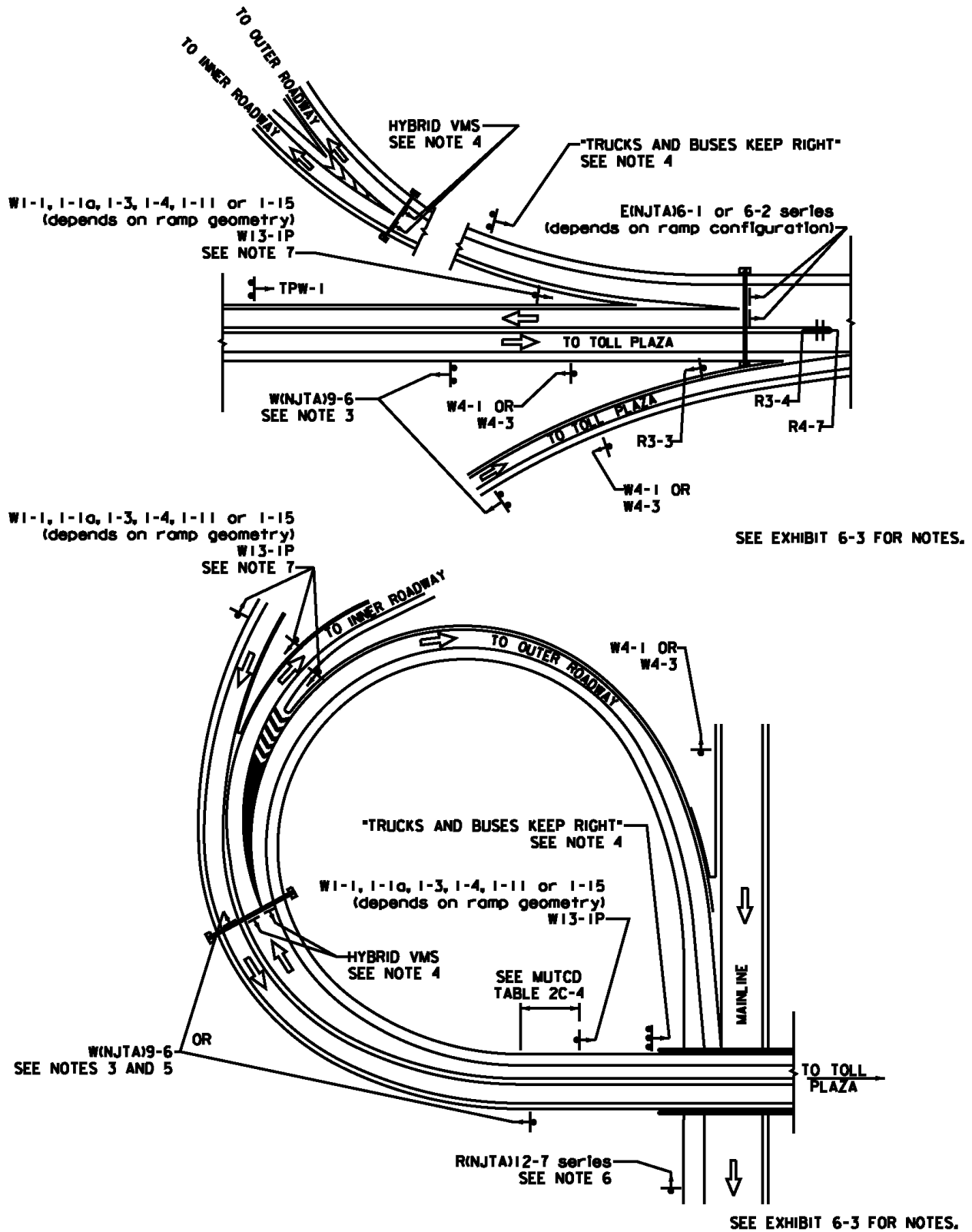
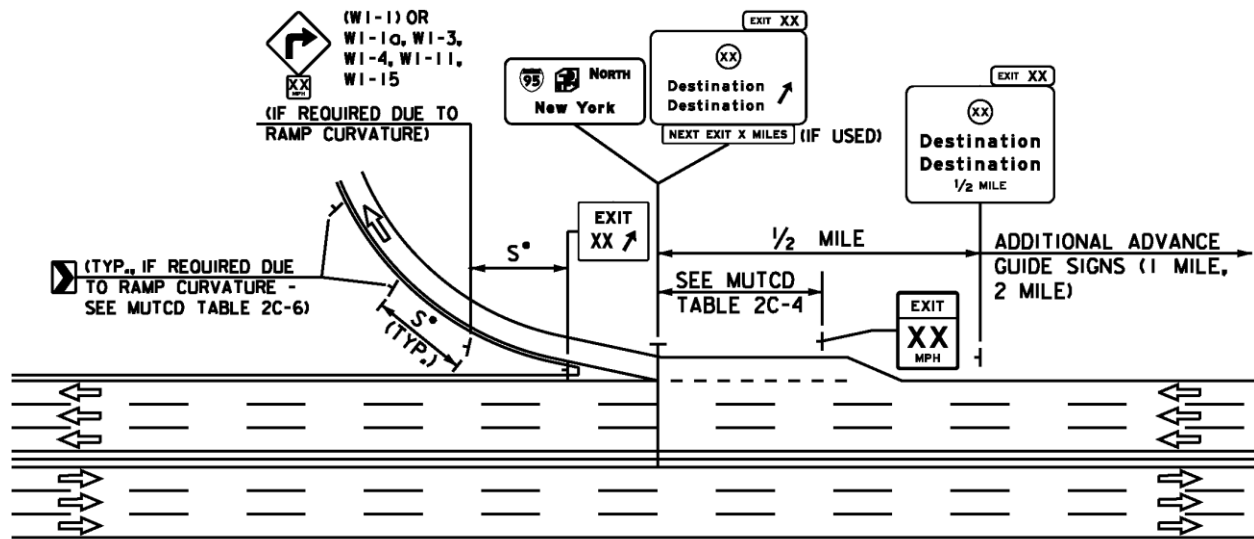
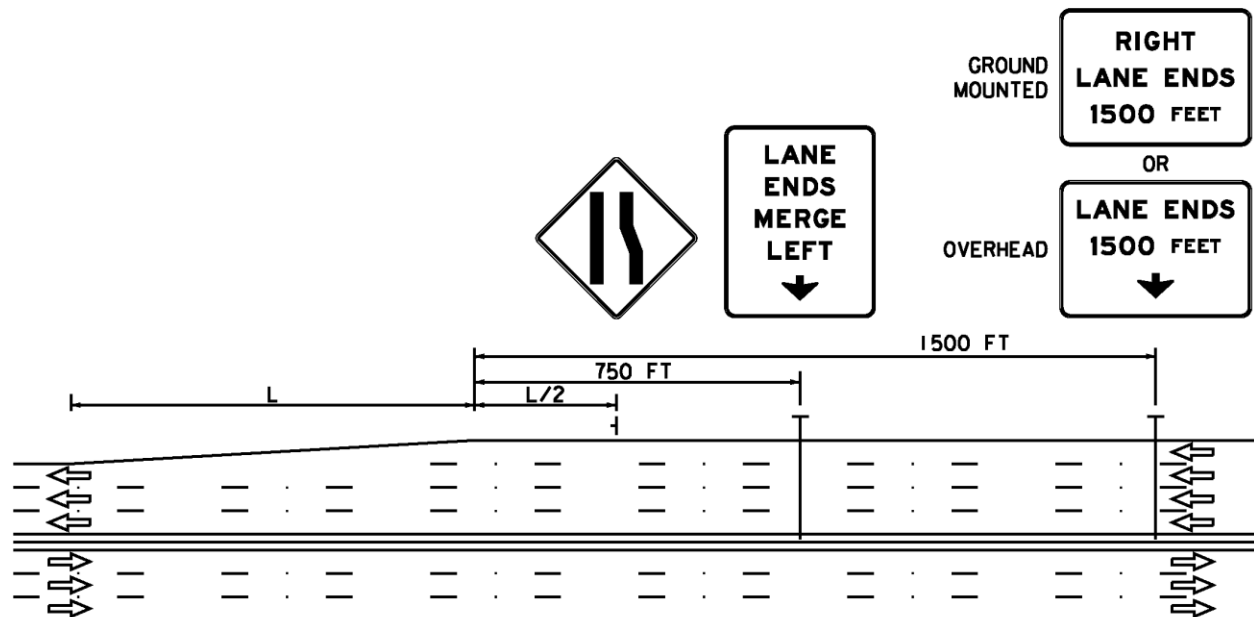


EXHIBIT 6-5 – SIGN LOCATION PLAN – EXIT RAMP



*NOTE: S IS DETERMINED ACCORDING TO MUTCD TABLE 2C-6.

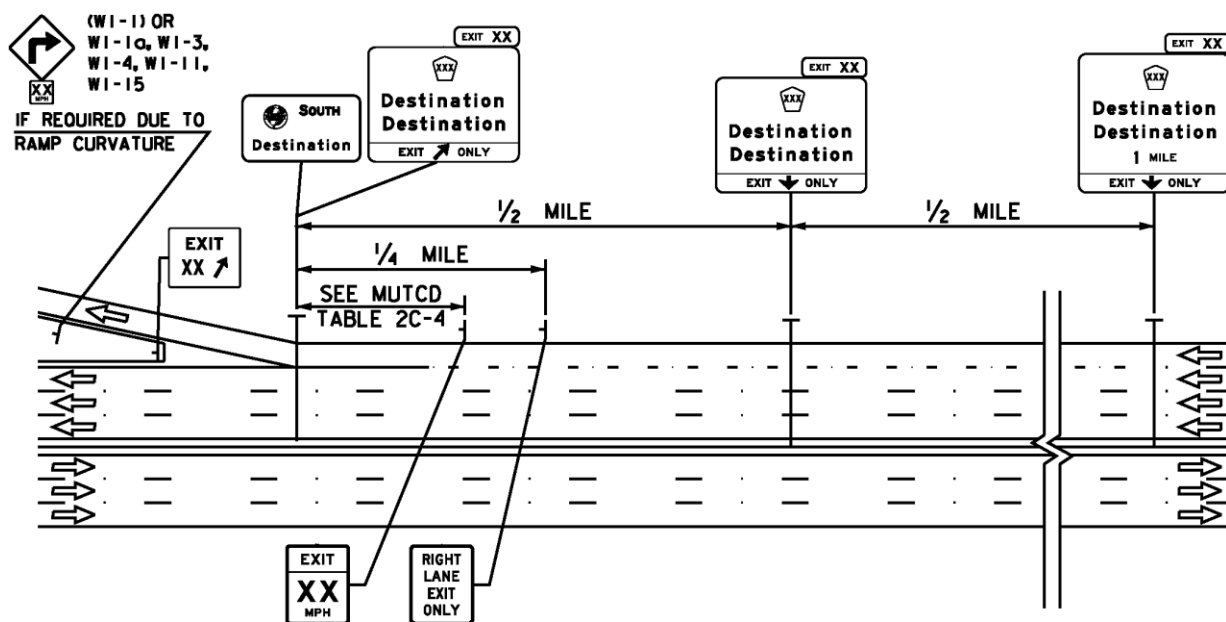
EXHIBIT 6-6 – LANE REDUCTION SIGNING



L = TAPER LENGTH

TURNPIKE - SEE SECTION 1A, EXHIBIT 1A-38 (LANE DROP CONFIGURATION)
 PARKWAY - SEE SECTION 1B, EXHIBIT 1B-10 (MINIMUM TAPER LENGTH WHEN REDUCING ROADWAY WIDTH). ALSO SEE SECTION 6.4.2.5 FOR USE OF MUTCD SECTION 2C.42 SIGN SEQUENCE.

EXHIBIT 6-7 – LANE DROP SIGNING



NOTE: SEE MUTCD SECTION 2E.24 FOR GUIDANCE ON INCLUDING THE DISTANCE MESSAGE ON "EXIT ONLY" SIGNING.

6.5 PANELS

Wherever feasible, overhead signs should be supported on separate sign supports and not on overcrossing structures. If necessary, the use of an overcrossing structure for supporting an overhead sign is considered on a site-specific basis, based on an engineering review of structural loading, costs and available options in consultation with Authority representatives.

Design guidelines for sign hangers are covered in Section 2 (Structures Design) of this Manual.

6.5.1 Sign Text – Alphabet and Sign Layout

6.5.1.1 Standard Alphabets

All message characters for the guide signs and the standard signs on this project are to conform to the shapes of the standard upper case and lower case alphabets shown in the most recent edition of the FHWA *Standard Highway Signs and Markings* that accompanies the MUTCD. Sign lettering shall be in upper case letters of the type approved by FHWA, except that lower case lettering with initial upper case shall be used for destination names and as otherwise required by the MUTCD.

Letter heights for the various lines of copy on signs other than those classified as NJTA signs are to follow Table 2E-2 of the MUTCD. In general, the criterion used for determining sign visibility is that the sign can be seen from 30 feet away per 1 inch of letter height. This criterion

should be considered when placing overhead sign panels where the line of sight to that panel may be obstructed by some object (e.g. a structure over the mainline) between the observer and the sign.

Word lengths can be computed manually using the letter spacing tables found in the FHWA *Standard Highway Signs and Markings*, but computers can greatly simplify the process. Several companies offer software capable of graphically laying out sign faces, including standard lettering, and producing scale drawings. However, the computer output should be manually verified to ensure the proper word lengths and spacings are used.

6.5.1.2 Spacing and Margins

The requirements and guidelines presented in this section are based on a combination of requirements and guidelines in the MUTCD and accepted industry practice in sign design and layout.

Interline spacing should be approximately $\frac{3}{4}$ of the average of the upper case letter heights in adjacent lines. Spacing between a route marker and the line of text below should be equal to $\frac{3}{4}$ the height of the numeral in the route marker. The same spacing should be followed for an upward sloping (Type A or B) arrow.

Spacing to the inside edge of the left and right borders should be no less than the height of the largest letter on the sign and shall be adjusted so that the overall sign panel width will be a multiple of 6 inches. Spacing to the inside edge of the top and bottom borders should be approximately equal to the average of the letter and/or numeral height of the adjacent line of text. When a down arrow is part of the last line of text, spacing to the bottom border should be equal to the average of the arrow and letter height. If an arrow is the only item in the last line, spacing shall be measured from the lowest point of the arrow and shall be the same as the spacing at the top of the sign.

Each line of copy should be centered within the sign borders. When an arrow appears on the side of the panel, all text should be centered on the longest line of text, offset by the arrow. The route markers above the text remain centered within the sign borders and are not centered on the longest line of text.

If two or more route markers are in the same line of text they shall be optically centered on the sign. The horizontal spacing between route markers should be no less than the width of the largest route marker and 24 inches minimum.

Flat aluminum sheets have a standard dimension of 4 feet by 8 feet. It is helpful to adjust sign height or width by 6 inches to avoid trimming or splicing.

6.5.1.3 Border Type and Size

The MUTCD states that all signs must have a border of the same color as the legend, at or just inside the edge. General rules:

1. Dark border on light background (negative contrast) = border will be inset
2. Light border on dark background (positive contrast) = border flush with edge of panel
3. Border width should not exceed stroke width of the major lettering of the sign
4. Inset shall equal border width or $\frac{1}{8}$ inch less than border width

Border widths for guide signs should follow the guidance given in MUTCD Section 2E.16. For other signs, border widths should follow the guidance given in MUTCD Section 2A.14.

Borders flush with the edge of panel should be at least $\frac{3}{4}$ inch in width. When borders are made with encapsulated lens reflective sheeting, cutting widths of less than $\frac{3}{4}$ of an inch damages too many of the sheeting cells, causing premature darkening of the borders.

6.5.1.4 Corner Radii

The MUTCD states that the corners of all borders shall be rounded, except for STOP signs. General rules:

1. On large signs, corner radius is approximately $\frac{1}{8}$ of the minimum dimension of the sign panel
2. On small signs (50 square feet max.), corner radius should not exceed the height of the major copy of the sign
3. Corner radius should not exceed 12 inches on any sign
4. A corner radius larger than 3 inches shall be rounded to a 3-inch increment
5. The corner radius applies to the outside of the border plus the inset (if any)

Where practical, the corners of the signs shall be rounded as well. Rounded sign panels are more easily handled, less likely to be bent before installation and less likely to cause injuries while being handled.

6.5.1.5 Arrows and Route Markers

The standard arrows to be used on guide sign panels are as shown in the MUTCD. Interstate and U.S. route markers shall conform to the MUTCD. Turnpike and Parkway markers are sized equivalently to other route markers on the same sign panel. The construction drawings shall give both overall marker and lettering sizes, and refer to the MUTCD and SL Standard Drawings for details.

The statewide system of “500-series” County Routes in New Jersey (numbered between 501 and 585) shall be signed by number on guide signs. The Authority does not sign for other county routes.

6.5.2 Mounting Heights and Clearances

The vertical mounting heights and lateral clearances required for ground-mounted sign panels are as described in Section 2 of this Manual.

6.6 CONSIDERATION FOR SIGN PANEL LIGHTING

Requirements for lighting associated with the illumination of sign panels are discussed in Section 7 (Lighting and Power Distribution Systems) of this Manual. Details, if applicable, are found on the E Standard Drawings.

6.7 STRIPING

Striping of Authority roadways is to be done in accordance with the PM Standard Drawings. For mainline striping, the Authority uses 10-foot stripes with 30-foot gaps on the Parkway and 25-foot stripes with 25-foot gaps on the Turnpike. Further details relating to striping materials are found in the Authority’s Specifications.

Open-road tolling lanes and toll plaza lanes that segregate traffic based on payment method are not considered preferential lanes (as defined in Chapter 3D of the MUTCD). A single white solid line is used between open-road tolling lanes, extending through the entire toll collection area, to encourage traffic to stay in the same lane.

6.8 DELINEATORS

6.8.1 Delineator Spacing

On Authority roadways, delineators are spaced halfway between and in line with integer mile and tenth-mile markers (approximately 264 feet from consecutive signs) on mainline tangent sections. In the absence of mile markers, delineators are spaced at every $\frac{1}{20}$ mile (264 feet). Some adjustment of this spacing may be necessary in order to meet the milepost identification of bridges along the Turnpike and Parkway or to accommodate structure locations.

Delineator spacing (S) on curves with radii 1,000 feet or less is given in Table 3F-1 of the MUTCD. On ramp tangents and curves with radii greater than 1,000 feet, the spacing between delineators is 100 feet. On mainline curves with radii greater than 1,000 feet, the delineator spacing (S) is calculated based on the curve radius (R) using the formula presented in Table 3F-1:

$$S = 3\sqrt{R - 50}$$

In advance of or beyond a mainline or ramp curve, and proceeding away from the end of the curve, the spacing of the first delineator should be 2S, the second should be 3S, and the third should be 6S, not to exceed the spacings given above.

Delineation for U-turn roadways and median crossover roadways begins 25 feet from the mainline. Delineator spacing follows the spacing for ramps given above.

6.8.2 Guide Rail Delineation

Where guide rail is located within 7 feet of the edge of pavement, delineators may be mounted either to the guide rail posts or on separate posts immediately behind the guide rail, maintaining a minimum vertical clearance of 4 feet to the near edge of the travel lanes. Mounting details are included in the DE Standard Drawings. Delineators are not to be mounted on the face of the guide rail. Where delineators are mounted on separate posts, the posts are to be in line with and driven into the same impervious surface as the guide rail posts, and the required location may be shifted as necessary to avoid the guide rail posts.

When guide rail is located 7 feet or more from the edge of pavement, delineators are to be located along the edge of pavement instead of along the line of the guide rail. This avoids the visual clutter and potential confusion of having two parallel series of delineators in proximity or of having the delineators too far from the edge of roadway.

6.8.3 Types of Delineators

The various types of delineators are shown in the DE Standard Drawings. There are three colors of delineators:

1. W – White (Crystal)
2. Y – Yellow (Amber)
3. R – Red

The three delineator colors are to be used as described in the MUTCD and in the additional cases described below:

1. White delineators are used along both sides of grade-separated and at-grade U-turn roadways.
2. White delineators are used between same-direction parallel roadways that are separated by less than 8 feet between edges of pavement. When the separation between edges of pavement is 8 feet or greater, yellow delineators are used on the left of each roadway and white delineators are used on the right.
3. Along bridges or walls, red delineators are used at the approach ends and yellow delineators are used at the trailing ends where snow plow operations might deposit snow on a lower roadway. These delineators may be located on the left, right or both sides of the roadway.

Note that when Chevron Alignment (W1-8) signs are used, delineators are not installed along the roadside. If guide rail or barrier is present, delineators may be still installed along the guide rail or barrier according to the Authority's Specifications and Subsection 6.8.2 of this Manual.

In addition to the normal delineator shape, there are three types of special delineators used on Authority roadways. The types and applications of these special delineators are as shown on the DE Standard Drawings. The delineator color is in accordance with the MUTCD based on its location.

6.9 DESIGN PROCEDURES

The format for plan submission for contracts containing signing, delineation and pavement marking plans generally conforms to Section 3 (Submission Requirements) of the Procedures Manual. Following is a description of the requirements of the various plan submissions.

1. Preliminary Design: A preliminary layout at either 1"=100' or 1"=200' scale should show the tentative location of all major signs, the type of mounting and the proposed sign text. The layout should also show proposed locations of VLS, VMS and HCMS. Mileposts and any other signing considered critical at this preliminary stage should likewise be shown. Delineation and pavement markings are not required at this phase. Warrant analysis for VMS shall be included if necessary.
2. Phase "A" Submission: If no preliminary design was submitted, the Phase "A" submission shall be as outlined under Preliminary Design. The Phase "A" submission includes a complete layout of striping and preliminary feasibility of VMS locations.
3. Phase "B" Submission: The Phase "B" submission should be presented in final plan format and the preliminary signing layout must be approved prior to the Phase "B" submission. As a minimum, the Phase "B" submission must include the following:
 - a. Complete layout of all signing with sign structure elevations showing roadway lane widths and striping (including temporary signing, if required)
 - b. All sign messages sized and panels detailed (sign text data sheet and sign tabulation)
 - c. Striping in gore areas
 - d. Delineator layout
 - e. Power service location noted
 - f. Preliminary Engineer's Estimate
 - g. Overhead sign foundation details (soil bearing, pile, etc.)
 - h. Plans of approved VMS locations
4. Phase "C" Submission: The Phase "C" submission should be 95 percent complete, including construction details, specifications and an Engineer's Estimate. Quantity calculations should also be submitted.
5. Phase "D" Submission: To include final plans, specifications and estimate.

6.10 PLAN PREPARATION

6.10.1 General

The details of plan preparation for contracts containing signing, delineation, and pavement striping shall conform with Section 6A (Roadway Plan Preparation) of the Procedures Manual.

6.10.2 Contract Plan Format

Signing plans shall appear in the following order, within the overall contract plan format as outlined in Section 6A of the Procedures Manual:

1. Signing Plans
2. Sign Text Data Sheet
3. Sign Panel Tabulation
4. Sign Post Tabulation
5. Hybrid Changeable Message Sign Text Sheet (if applicable)
6. Sign Panel Layouts
7. Temporary Guide Signs
8. Design Data
9. Sign Structure Elevations

Plans shall be numbered consecutively.

6.10.3 Contract Plan Content

The following is a brief description of the information to be shown on the finalized signing plans within the contract drawings.

1. Signing Plans
 - a. 1"=30' or 50' scale plans showing proposed roadways as screened – these plans are preferably screened copies of the pavement plans
 - b. Screened base, which should show all drainage and guide rail
 - c. Standard title box showing "Signing Plan - X -"
 - d. Match Lines by "Signing Plan" number
 - e. Complete signing layout with symbols for sign numbers and mounting type as shown on the legend
 - f. Delineator layout with appropriate callouts
 - g. Pavement stripes with appropriate callouts
2. Sign Text Data Sheet – This sheet should give in tabulation form the following information (see Sign Post Data Form in Section 2):
 - a. Contract sign number
 - b. Number required
 - c. Legend (sign message)
 - d. Sign Panel, showing:
 - (1) Size – width and height
 - (2) Copy – color and finish
 - (3) Background – color and finish

- (4) Stringers – number and size
 - e. Post Supports, showing:
 - (1) Number
 - (2) Material
 - (3) Size
 - f. Remarks
- 3. Sign Panel Tabulation – This information may be included in a separate tabulation on the last Sign Text Data Sheet. For each sign panel pay item, the tabulation should include (see Sign Post Data Form in Section 2):
 - a. NJTA Sign Number
 - b. Contract Sign Number
 - c. Number Required
 - d. Total Area
 - e. Remarks
- 4. Sign Post Tabulation – Should be included with the Sign Panel Tabulation. The tabulation should include (see Sign Post Data Form in Section 2):
 - a. NJTA Sign Number
 - b. Contract Sign Number
 - c. Number of Signs Required
 - d. Number of Signs Requiring Posts
 - e. Number of Posts per Sign
 - f. Total Length of Various Sign Post Pay Items
 - g. Remarks
- 5. Hybrid Changeable Message Sign Text Sheet – A tabulation showing messages for each drum face of an HCMS. This sheet is omitted if there are no HCMS.
- 6. Sign Panel Layouts – These sheets give a detailed layout of each sign shown on the sign text data sheet including sign size, message size spacing and arrow location.
- 7. Temporary Guide Signs – This sheet would show details for all temporary guide signs, if required. See Section 9 of this Manual for other temporary signs used in traffic control during construction.
- 8. Design Data – This sheet would include detailed design data such as sign foundation dimensions and reinforcing bar requirements, pile layouts and dimensions for span, cantilever and butterfly type structures (see Exhibit 6-8).
- 9. Sign Structure Elevations – This sheet would show elevation views of all sign structures including all dimensions required for the structure and the panels located thereon (see Section 2, Exhibits 2-404 through 2-412).

The Signing Plans should include some method by which the Contractor can determine post heights for fabrication, such as reference drawings of cross sections or grading plans (see Sign Post Data Form in Section 2).

EXHIBIT 6-8 – STRUCTURES DATA FORMS

TYPICAL SIGN FOUNDATION DATA FORM *

SIGN STRUCTURE NO.	DIMENSIONS							REINFORCING BARS (Total for each footing)							PILES **		
	A	B	C	D	E	F	G	Bars A	Bars B	Bars C	Bars D	Bars E	Bars F	Bars G	No.	Batter	Act. Length
Each Ftg.								***									

- * See Standard Drawings for location of dimensions and reinforcing bars.
- ** When piles are required, a pile plan showing their placement should be included in plans.
- *** Give either the size and number of bars or the size and spacing of bars.

TYPICAL OVERHEAD SIGN STRUCTURE DATA FORMS

CANTILEVER TYPES *

SIGN STRUCTURE NO.	LOCATION	STRUCTURE TYPE		COLUMN HEIGHT	SPAN LENGTH	PANELS	
		Cant.	Bfly.			No.	Length

* See Standard Drawings for details.

SPAN TYPES **

SIGN STRUCTURE NO.	LOCATION	END FRAME HEIGHT	SPAN LENGTH	SPAN SECTION ARRANGEMENT		
				Left	Center	Right

** See Standard Drawings for details.