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

INSTRUCTIONAL BULLETIN NO. 06-11

Revisions to English and Metric Design Guidelines Section 4

Effective immediately, Sections 4-716.05 and 4-716.10 on page 4-73, Section 4-716.11 on page 4-74, Section 4-716.20 on pages 4-78 and 4-79, and Section 4-716.30 on page 4-80 of the English and Metric Design Guidelines shall be modified.

Attached are copies of pages 4-73 through 4-80(1) in both the English and Metric Design Guidelines intended to replace these pages in your guidelines.

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

May 19, 2006
JCJ:MA:ma

716-05.07, Painted Pavement Marking (24-inch Barrier Line) - Linear ft
The unit of payment is per linear foot of boundary line (with no diagonal marking used).

Note that the unit of payment for Item No. 716-08.04, Removal of Pavement Marking (Channelization Striping), has been changed from per linear foot to per square yard of striping material removed.

4-716.05 PAVEMENT MARKING GUIDELINES

It is not intended that these guidelines supersede the exercise of good engineering judgment in the development of a good pavement marking plan for a project. Special problem areas may require special treatment, which shall be determined on the Construction Field Review.

The traffic volumes needed in this section of the Design Guidelines may be found in the latest *Traffic Flow Maps* book available from the Traffic Studies Office of the Planning Division.

Generally, centerlines and edgelines shall be placed on all pavements with a minimum total width of 16 feet.

If there are no centerline pavement markings on the existing roadway before the proposed construction or resurfacing project begins, no temporary centerline pavement markings will be required on the roadway during construction. A centerline on the final surface may be required depending on the surface materials.

If surface materials other than hot plant mix asphalt (such as cold mix asphalt, DBST, etc.) are applied, no temporary or permanent centerline markings will be required, since these surface materials would be incapable of retaining the pavement markings.

Designers should refer to the following sections for guidance for temporary and permanent marking materials and for general notes. Additional guidance may also be found in the Standard Drawings and in the current edition of the Manual on Uniform Traffic Control Devices.

4-716.10 POLICY FOR TEMPORARY PAVEMENT MARKINGS

Temporary pavement markings on the intermediate layers of pavement open to traffic will be installed to permanent standards daily with reflective tape or reflectorized paint.

No temporary striping is required on the final surface if preformed plastic or reflectorized paint is the permanent marking material, since these permanent markings are to be installed daily as the final surface paving operations proceed.

If the permanent marking material is thermoplastic, the contractor may elect to mark the final layer of pavement with reflectorized paint to permanent standards daily and wait until the paving operation has been completed before the permanent markings are installed. In this case, the temporary markings for the final layer will not be measured and paid for directly, but the costs are to be included in the price bid for the permanent markings.

4-716.11 TEMPORARY PAVEMENT MARKINGS FOR USE ON PAVEMENT SURFACE OTHER THAN FINAL

1. ON ALL INTERSTATES AND EXPRESSWAYS (Duration of Marking>1 month) (See Notes to Designers Listed Below for Duration of Marking<1month)

A. On Non-Transition Sections:

a. Lane lines – Use 8" painted white dashed lines and white raised pavement markers on 40' spacing.

b. Left edge lines (yellow) – Use 8" painted solid yellow lines and yellow raised pavement markers on 20' spacing.

c. Right edge lines (white) – **Allow as equals:**

(1) Use 8" solid white wet-reflective temporary tape (according to manufacturer's specifications).

(2) Use 8" painted solid white lines with an approved white barrier rail delineator on top of barrier rail on 20' spacing,

Or

Use 8" painted solid white lines only or with white flexible delineators at outside edge of shoulder on 20' spacing when no barrier rail is present.

B. On Transition Sections:

a. Lane lines – Use 8" painted solid white lines and white raised pavement markers on 20' spacing.

b. Left edge lines (yellow) – Use 8" painted solid yellow lines and yellow raised pavement markers on 20' spacing.

c. Right edge lines (white) – Allow as equals:

(1) Use 8" solid white wet-reflective temporary tape (according to manufacturer's specifications)

(2) Use 8" painted solid white lines with an approved white barrier rail delineator on top of barrier rail on 20' spacing,

Or

Use 8" painted solid white lines only or with white flexible delineators at outside edge of shoulder on 20' spacing when no barrier rail is present

NOTES TO DESIGNERS:

(1) For projects where the duration of the temporary pavement markings is less than one month, designers should use six inch (6") painted pavement marking line for lane lines, left edge lines, and right edge lines without raised pavement markers. Barrier rail delineators should be used on portable barrier rail.

(2) Raised pavement markers are to be placed in a single row, not staggered, under all applications.

(3) If Project Engineer has specific recommendations they should be discussed at the Construction Field Review.

FOOTNOTES TO BE ADDED TO THE ESTIMATED QUANTIITES SHEET:

(1) Missing raised pavement markers shall be replaced:
a) at least monthly or b) at the instruction of the engineer.

(2) All raised pavement markers shall be removed before placement of the final pavement surface. The cost of removal shall be included in the price bid for raised pavement markers.

2. STATE ROUTES WITH 4 OR MORE LANES (W/O LIGHTING)

A. Lane Lines – Use white painted dashed lines, 2" wider than prescribed permanent lines, and raised pavement markers on 80' spacing.

B. Edge and center lines – Use solid lines (yellow or white, as appropriate) 2" wider than prescribed permanent lines. Raised pavement markers (yellow or white, as appropriate) may be specified for use on a case-by-case basis, as determined at the Construction Field Review. Raised pavement markers should not be used on right edge line, when used for left edge line spacing shall be 20'.

NOTES TO DESIGNERS:

(1) Raised pavement markers are to be placed in a single row, not staggered, under all applications.

(2) If Project Engineer has specific recommendations they should be discussed at the Construction Field Review.

FOOTNOTES TO BE ADDED TO THE ESTIMATED QUANTITES SHEET:

(1) Missing raised pavement markers shall be replaced:
a) at least monthly or b) at the instruction of the engineer.

(2) All raised pavement markers shall be removed before placement of the final pavement surface. The cost of removal shall be included in the price bid for raised pavement markers.

3. ALL OTHER STATE ROUTES

All Lines – Use regular 4" marking lines. Centerline yellow raised pavement markers may be considered on a case-by-case basis. Discuss need at Construction Field Review.

NOTES TO DESIGNERS:

(1) Raised pavement markers are to be placed in a single row, not staggered, under all applications.

(2) If Project Engineer has specific recommendations they should be discussed at the Construction Field Review.

FOOTNOTES TO BE ADDED TO THE ESTIMATED QUANTITES SHEET:

(1) Missing raised pavement markers shall be replaced:
a) at least monthly or b) at the instruction of the engineer.

(2) All raised pavement markers shall be removed before placement of the final pavement surface. The cost of removal shall be included in the price bid for raised pavement markers.

4-716.13 PAVEMENT MARKING PLANS ON INTERSTATE AND FULL-ACCESS CONTROL ROADWAYS (See 3-330.00)

4-716.15 POLICY FOR PERMANENT PAVEMENT MARKINGS

TYPE ROADWAY	ADT	MATERIAL
Asphalt Interstate or Other Similar Freeways and Expressways (See Note No. 1)	75,000 or Over	Preformed Plastic Centerlines, Lane Lines and Edgelines (716-10.15 - 6 inch)
Asphalt Interstate or Other Similar Freeways and Expressways	Under 75,000	Thermoplastic Centerlines, Lane Lines and Edgelines (716-02.10 - 6 inch)
Asphalt Multi-lane Conventional Highways	All ADT's	Thermoplastic Centerlines, Lane Lines and Edgelines (716-02.01)
Asphalt Two-lane	2,000 or Over	Thermoplastic Centerlines, Lane Lines and Edgelines (716-02.01)
Asphalt Two-lane	Under 2,000	Paint Centerlines and Edgelines (716-05.01)
Concrete All Roadways (See Note No. 2)	All ADT's	Preformed Plastic Centerline, Lane Lines and Edgelines (716-10.01 or 716-10.15)
Concrete Grinding	All ADT's	Preformed Plastic Centerline, Lane Lines and Edgelines (716-10.01 or 716-10.15)
Bridge Replacement Project (Non-Freeway)	Over 1,000	Preformed Plastic Centerlines, Lane Lines and Edgelines (716-10.01)
Bridge Replacement Project (Non-Freeway)	Under 1,000	Paint Centerlines and Edgelines (716-05.01)
Intersection Improvement/ Signal Project	Over 1 mile of Pavement Marking Line Length	Asphalt Pavement – Thermoplastic (716-02.01) Concrete Pavement – Preformed Plastic (716-10.01)
Intersection Improvement/ Signal Project	Under 1 mile of Pavement Marking Line Length	Preformed Plastic Centerline, Lane Lines and Edgelines (716-10.01)

1. On Microsurface pavements, thermoplastic shall be used for lane lines and edgelines.

2. Includes all concrete ramps and concrete bridge decks.

NOTE: Centerlines, edgelines and broken white lines on all interstate and non-interstate access control roadways, will now be 6 inches wide. These 6-inch wide lines will be used on all new construction, reconstruction and resurfacing projects. See web site regarding pay items for these 6-inch lines.

http://www.tdot.state.tn.us/Chief_Engineer/assistant_engineer_design/design/RoadItemLists/roaditem_index.htm

NOTE: Intersections within roadway projects shall have all lines marked with the same marking material as that determined in the previous table for the entire project.

NOTE: All specialty markings (legends, arrows, RR crossings, crosswalks, stop lines, crosshatched islands, word messages, etc.) shall be plastic. They shall be paid for under the 716-02.__, 716-03.__, and 716-04.__ series pay items.

NOTE: In the process of preparing plans for construction or resurfacing projects involving roadways that abut connecting ramps, consideration shall be given to striping these ramps. When work is not being done on the entire ramp, this ramp would not normally be re-striped beyond where the work is being done. The roadway designer shall contact the Regional Traffic Engineer to determine the need to re-stripe these ramps in their entirety. Stop bars, turn lane arrows and other pavement instructive markings may be included at the discretion of the Regional Traffic Engineer applying the appropriate standard drawings that shall be included in the plans. The decision to re-stripe shall be made based on the condition of the pavement markings and consideration may be given to compliance with the standards. If this striping is done, the ramps shall be marked using current standards for pavement markings as shown on Standard Drawings T-M-6 and T-M-9 and other appropriate standard drawings and marked up to the connecting roadway. Add the following to the plans:

"Ramps shall be marked up to where they connect to the intersecting roadway."

4-716.20 GENERAL PAVEMENT MARKING NOTES FOR ROADWAY PLANS

Temporary Pavement Marking on Intermediate Layers

"Temporary pavement line markings on intermediate layers of pavement shall be reflective tape or reflectorized paint installed to permanent standards before dark hours. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No**. (1)**."

(1) Item No. 716-05.01, Painted Pavement Marking (4-inch Line) per linear mile
Item No. 716-05.20, Painted Pavement Marking (6-inch Line) per linear mile
Item No. 716-05.02, Painted Pavement Marking (8-inch Barrier Line) per linear mile

"Wide (8-inch) temporary pavement marking line will be measured and paid for under Item No. 716-05.02, Painted Pavement Marking (8-inch Barrier Line)."

Final Pavement Marking

A. If reflectorized paint is used:

"Permanent pavement line markings shall be reflectorized paint installed to permanent standards at the end of each day's work. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716-05.01, Painted Pavement Marking (4" Line)".

B. If thermoplastic is used:

"If thermoplastic is used on the final surface, the contractor shall have the option of using reflectorized paint installed to permanent standards at the end of each day's work and then installing the permanent markings after the paving operation is completed. Short, unmarked sections shall not be allowed. The temporary markings for the final surface will not be measured and paid for directly, but the costs are to be included in the price bid for the permanent markings. These markings will be measured and paid for under Item No. **(2)** ."

(2) Item No. 716-02.01, Plastic Pavement Marking (4-inch Line) per linear mile
Item No, 716-02.10, Plastic Pavement Marking (6-inch Line) per linear mile

C. If preformed plastic is used on new concrete:

"Permanent pavement line markings shall be preformed plastic installed to permanent standards prior to opening to traffic. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716-10.01, Preformed Plastic Pavement Marking Line (4" Line)."

D. If preformed plastic is used on new concrete on interstates and expressways:

"Permanent pavement line markings on interstates or other similar expressways and freeways shall be preformed plastic installed to permanent standards prior to opening to traffic. Short unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716-10.05, Preformed Plastic Pavement Marking (6" Line).

E. If preformed plastic is used:

"Permanent pavement line markings shall be preformed plastic installed to permanent standards at the end of each day's work. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716-10.01, Preformed Plastic Pavement Marking Line (4" Line)."

F. If preformed plastic is used interstates and expressways:

"Permanent pavement line markings on interstates or other similar expressways and freeways shall be preformed plastic installed to permanent standards at the end of each day's work. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716-10.05, Preformed Plastic Pavement Marking (6" Line)."

716.25 SPECIALTY PAVEMENT MARKINGS

On projects where plastic specialty pavement items are being used, the following changes will be made:

1. Crosswalk with longitudinal lines as shown on Standard Drawing T-M-4 will use the following pay item:

   716-02.09, Plastic Pavement Marking (Longitudinal Cross-walk) per linear foot.

   The measurement for this marking is identical to that for standard crosswalk, for example, one measurement along the centerline of the crosswalk (perpendicular to curbs).

2. Dotted white line for vehicle double turn path delineation requires an 8-inch stripe. Pay item will be as follows:

   716-02.08, Plastic Pavement Marking (8” Dotted Line) per linear foot.

4-716.30 USE OF REMOVABLE PAVEMENT MARKING LINE

Removable Pavement Marking Line shall be used as temporary marking for directional or separation of traffic during the traffic control phases of construction when these lines are used on a roadway surface that is to remain in place and undisturbed. See Section 4-716.11 for line width.

Painted Pavement Marking Line shall be used as temporary marking for directional or separation of traffic during the traffic control phases of construction when these lines are used on a roadway surface that is to be paved, cold planed or otherwise removed. See Section 4-716.11 for line width. Wet reflective temporary tape (used according to manufacturer's specifications) is allowed as an equal for the right edge line on interstates and expressways.

4-716.35 SNOWPLOWABLE REFLECTIVE PAVEMENT MARKERS

Snowplowable reflective pavement markers shall be included on all future Interstate and full-access controlled projects.

On interstate and full-access control resurfacing projects, the designer shall be responsible for verifying the existence of snowplowable pavement markers and for computing the quantity of these markers for removal. The designer shall also compute the quantity for new snowplowable pavement markers to be installed for these projects.

On projects which the Design Division, Signals, Signing and Lighting Section will be developing the marking and signing plans, the snowplowable reflective markers will also be included in these plans.

4-730.08 REPLACEMENT OF TRAFFIC SIGNAL DETECTION LOOPS

When there are existing traffic signals on a cold planing project, contact shall be made with the City or County to determine the presence and location of detection loops. If loops are present, and there is no way to avoid them in the cold planing process, then add Item Nos. 730-14.02, Saw Slot, and 730-14.03, Loop Wire, to the plans.

The designer will obtain as-built plans from the maintaining agency to utilize for quantity calculations. These plans shall then be forwarded to the Regional Construction Office for submission to the contractor at the Pre-construction Conference.

Also add the following notes:

"The Project Engineer shall notify the local governmental agency responsible for traffic control maintenance at least one day in advance of the cold planing activity at signalized intersections where detector loops are in the pavement. The maintaining agency will then be responsible for disconnecting the loop detectors and making any necessary timing adjustments in the signal controller prior to the construction."

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716M05.07, Painted Pavement Marking (600 mm Barrier Line) - Linear m.
The unit of payment is per linear meter of boundary line (with no diagonal marking used).

Note that the unit of payment for Item No. 716M08.04, Removal of Pavement Marking (Channelization Striping), has been changed from per linear meter to per square meter of striping material removed.

4-716.05 PAVEMENT MARKING GUIDELINES

It is not intended that these guidelines supersede the exercise of good engineering judgment in the development of a good pavement marking plan for a project. Special problem areas may require special treatment, which shall be determined on the Construction Field Review.

The traffic volumes needed in this section of the Design Guidelines may be found in the latest *Traffic Flow Maps* book available from the Traffic Studies Office of the Planning Division.

Generally, centerlines and edgelines shall be placed on all pavements with a minimum total width of 4.8 meters.

If there are no centerline pavement markings on the existing roadway before the proposed construction or resurfacing project begins, no temporary centerline pavement markings will be required on the roadway during construction. A centerline on the final surface may be required depending on the surface materials.

If surface materials other than hot plant mix asphalt (such as cold mix asphalt, DBST, etc.) are applied, no temporary or permanent centerline markings will be required, since these surface materials would be incapable of retaining the pavement markings.

Designers should refer to the following sections for guidance for temporary and permanent marking materials and for general notes. Additional guidance may also be found in the Standard Drawings and in the current edition of the Manual on Uniform Traffic Control Devices.

4-716.10 POLICY FOR TEMPORARY PAVEMENT MARKINGS

Temporary pavement markings on the intermediate layers of pavement open to traffic will be installed to permanent standards daily with reflective tape or reflectorized paint.

No temporary striping is required on the final surface if preformed plastic or reflectorized paint is the permanent marking material, since these permanent markings are to be installed daily as the final surface paving operations proceed.

If the permanent marking material is thermoplastic, the contractor may elect to mark the final layer of pavement with reflectorized paint to permanent standards daily and wait until the paving operation has been completed before the permanent markings are installed. In this case, the temporary markings for the final layer will not be measured and paid for directly, but the costs are to be included in the price bid for the permanent markings.

4-716.11 TEMPORARY PAVEMENT MARKINGS FOR USE ON PAVEMENT SURFACE OTHER THAN FINAL

1. ON ALL INTERSTATES AND EXPRESSWAYS (Duration of Marking>1 month) (See Notes to Designers Listed Below for Duration of Marking<1month)

A. On Non-Transition Sections:

a. **Lane lines** – Use 200 mm painted white skip lines and white raised pavement markers on 12 m spacing.

b. **Left edge lines** (yellow) – Use 200 mm painted solid yellow lines and yellow raised pavement markers on 6 m spacing.

c. **Right edge lines** (white) – **Allow as equals:**

(1) Use 200 mm solid white wet-reflective temporary tape (according to manufacturer's specifications).

(2) Use 200 mm painted solid white lines with an approved white barrier rail delineator on top of barrier rail on 6 m spacing,

Or

Use 200 mm painted solid white lines only or with white flexible delineators at outside edge of shoulder on 6 m spacing when no barrier rail is present.

B. On Transition Sections:

a. **Lane lines** – Use 200 mm painted solid white lines and white raised pavement markers on 6 m' spacing.

b. **Left edge lines** (yellow) – Use 200 mm painted solid yellow lines and yellow raised pavement markers on 6 m spacing.

c. **Right edge lines** (white) – Allow as equals:

(1) Use 200 mm solid white wet-reflective temporary tape (according to manufacturer's specifications)

(2) Use 200 mm painted solid white lines with an approved white barrier rail delineator on top of barrier rail on 6 m spacing

Or

Use 200 mm painted solid white lines only or with white flexible delineators at outside edge of shoulder on 6 m spacing when no barrier rail is present

NOTES TO DESIGNERS:

(1) For projects where the duration of the temporary pavement markings is less than one month, designers should use 150 mm painted pavement marking line for lane lines, left edge lines, and right edge lines without raised pavement markers. Barrier rail delineators should be used on portable barrier rail.

(2) Raised pavement markers are to be placed in a single row, not staggered, under all applications.

(3) If Project Engineer has specific recommendations they should be discussed at the Construction Field Review.

FOOTNOTES TO BE ADDED TO THE ESTIMATED QUANTITES SHEET:

(1) Missing raised pavement markers shall be replaced:
a) at least monthly or b) at the instruction of the engineer.

(2) All raised pavement markers shall be removed before placement of the final pavement surface. The cost of removal shall be included in the price bid for raised pavement markers.

2. STATE ROUTES WITH 4 OR MORE LANES (Unlit During Construction)

A. Lane Lines – Use white painted skip lines, 50 mm wider than prescribed permanent lines, and raised pavement markers on 24 m' spacing.

B. Edge and center lines – Use solid lines (yellow or white, as appropriate) 50 mm wider than prescribed permanent lines. Raised pavement markers (yellow or white, as appropriate) may be specified for use on a case-by-case basis, as determined at the Construction Field Review. Raised pavement markers should not be used on right edge line, when used for left edge line spacing shall be 6 m.

NOTES TO DESIGNERS:

(1) Raised pavement markers are to be placed in a single row, not staggered, under all applications.

(2) If Project Engineer has specific recommendations they should be discussed at the Construction Field Review.

FOOTNOTES TO BE ADDED TO THE ESTIMATED QUANTITES SHEET:

(1) Missing raised pavement markers shall be replaced:
a) at least monthly or b) at the instruction of the engineer.

(2) All raised pavement markers shall be removed before placement of the final pavement surface. The cost of removal shall be included in the price bid for raised pavement markers.

3. ALL OTHER STATE ROUTES

All Lines – Use regular 100 mm marking lines. Centerline yellow raised pavement markers may be considered on a case-by-case basis. Discuss need at Construction Field Review.

NOTES TO DESIGNERS:

(1) Raised pavement markers are to be placed in a single row, not staggered, under all applications.

(2) If Project Engineer has specific recommendations they should be discussed at the Construction Field Review.

FOOTNOTES TO BE ADDED TO THE ESTIMATED QUANTITES SHEET:

(1) Missing raised pavement markers shall be replaced:
a) at least monthly or b) at the instruction of the engineer.

(2) All raised pavement markers shall be removed before placement of the final pavement surface. The cost of removal shall be included in the price bid for raised pavement markers.

4-716.13 PAVEMENT MARKING PLANS ON INTERSTATE AND FULL-ACCESS CONTROL ROADWAYS (See 3-330.00)

4-716.15 POLICY FOR PERMANENT PAVEMENT MARKINGS

TYPE ROADWAY	ADT	MATERIAL
Asphalt Interstate or Other Similar Freeways and Expressways (See Note No. 1)	75,000 or Over	Preformed Plastic Centerlines, Lane Lines and Edgelines (716M10.15 – 150 mm)
Asphalt Interstate or Other Similar Freeways and Expressways	Under 75,000	Thermoplastic Centerlines, Lane Lines and Edgelines (716M02.10 – 150 mm)
Asphalt Multi-lane Conventional Highways	All ADT's	Thermoplastic Centerlines, Lane Lines and Edgelines (716M02.01)
Asphalt Two-lane	2,000 or Over	Thermoplastic Centerlines, Lane Lines and Edgelines (716M02.01)
Asphalt Two-lane	Under 2,000	Paint Centerlines and Edgelines (716M05.01)
Concrete All Roadways (See Note No. 2)	All ADT's	Preformed Plastic Centerline, Lane Lines and Edgelines (716M10.01 or 716M10.15)
Concrete Grinding	All ADT's	Preformed Plastic Centerline, Lane Lines and Edgelines (716M10.01 or 716M10.15)
Bridge Replacement Project (Non-Freeway)	Over 1,000	Preformed Plastic Centerlines, Lane Lines and Edgelines (716M10.01)
Bridge Replacement Project (Non-Freeway)	Under 1,000	Paint Centerlines and Edgelines (716M05.01)
Intersection Improvement/ Signal Project	Over 1.6 km of Pavement Marking Line Length	Asphalt Pavement – Thermoplastic (716M02.01) Concrete Pavement – Preformed Plastic (716M0.01)
Intersection Improvement/ Signal Project	Under 1.6 km of Pavement Marking Line Length	Preformed Plastic Centerline, Lane Lines and Edgelines (716M10.01)

1. On Microsurface pavements, thermoplastic shall be used for lane lines and edgelines.
2. Includes all concrete ramps and concrete bridge decks.

NOTE: Centerlines, edgelines and broken white lines on all interstate and non-interstate access control roadways, will now be 150 mm wide. These 150 mm wide lines will be used on all new construction, reconstruction and resurfacing projects. See web site regarding pay items for these 150 mm lines.

http://www.tdot.state.tn.us/Chief_Engineer/assistant_engineer_design/design/RoadItemLists/roaditem_index.htm

NOTE: Intersections within roadway projects shall have all lines marked with the same marking material as that determined in the previous table for the entire project.

NOTE: All specialty markings (legends, arrows, RR crossings, crosswalks, stop lines, crosshatched islands, word messages, etc.) shall be plastic. They shall be paid for under the 716M02.__, 716M03.__, and 716M04.__ series pay items.

NOTE: In the process of preparing plans for construction or resurfacing projects involving roadways that abut connecting ramps, consideration shall be given to striping these ramps. When work is not being done on the entire ramp, this ramp would not normally be re-striped beyond where the work is being done. The roadway designer shall contact the Regional Traffic Engineer to determine the need to re-stripe these ramps in their entirety. Stop bars, turn lane arrows and other pavement instructive markings may be included at the discretion of the Regional Traffic Engineer applying the appropriate standard drawings that shall be included in the plans. The decision to re-stripe shall be made based on the condition of the pavement markings and consideration may be given to compliance with the standards. If this striping is done, the ramps shall be marked using current standards for pavement markings as shown on Standard Drawings TM-M-6 and TM-M-9 and other appropriate standard drawings and marked up to the connecting roadway. Add the following to the plans:

"Ramps shall be marked up to where they connect to the intersecting roadway."

4-716.20 GENERAL PAVEMENT MARKING NOTES FOR ROADWAY PLANS

Temporary Pavement Marking on Intermediate Layers

"Temporary pavement line markings on intermediate layers of pavement shall be reflective tape or reflectorized paint installed to permanent standards before dark hours. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No**. (1)**."

(1) Item No. 716M05.01, Painted Pavement Marking (100 mm Line) per linear mile
Item No. 716M05.20, Painted Pavement Marking (150 mm Line) per linear mile
Item No. 716M05.02, Painted Pavement Marking (200 mm Barrier Line) per linear mile

"Wide (200 mm) temporary pavement marking line will be measured and paid for under Item No. 716M05.02, Painted Pavement Marking (200 mm Barrier Line)."

Final Pavement Marking

A. If reflectorized paint is used:

"Permanent pavement line markings shall be reflectorized paint installed to permanent standards at the end of each day's work. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716M05.01, Painted Pavement Marking (100 mm)".

B. If thermoplastic is used:

"If thermoplastic is used on the final surface, the contractor shall have the option of using reflectorized paint installed to permanent standards at the end of each day's work and then installing the permanent markings after the paving operation is completed. Short, unmarked sections shall not be allowed. The temporary markings for the final surface will not be measured and paid for directly, but the costs are to be included in the price bid for the permanent markings. These markings will be measured and paid for under Item No. **(2)** ."

(2) Item No. 716M02.01, Plastic Pavement Marking (100 mm Line) per linear mile
Item No, 716M02.10, Plastic Pavement Marking (150 mm Line) per linear mile

C. If preformed plastic is used on new concrete:

"Permanent pavement line markings shall be preformed plastic installed to permanent standards prior to opening to traffic. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716M10.01, Preformed Plastic Pavement Marking Line (100 mm Line)."

D. If preformed plastic is used on new concrete on interstates and expressways:

"Permanent pavement line markings on interstates or other similar expressways and freeways shall be preformed plastic installed to permanent standards prior to opening to traffic. Short unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716M10.05, Preformed Plastic Pavement Marking (150 mm Line).

E. If preformed plastic is used:

"Permanent pavement line markings shall be preformed plastic installed to permanent standards at the end of each day's work. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716M10.01, Preformed Plastic Pavement Marking Line (100 mm Line)."

F. If preformed plastic is used interstates and expressways:

"Permanent pavement line markings on interstates or other similar expressways and freeways shall be preformed plastic installed to permanent standards at the end of each day's work. Short, unmarked sections shall not be allowed. These markings will be measured and paid for under Item No. 716M10.05, Preformed Plastic Pavement Marking (150 mm Line)."

Metric **Revised: 5/19/06**

716.25 SPECIALTY PAVEMENT MARKINGS

On projects where plastic specialty pavement items are being used, the following changes will be made:

1. Crosswalk with longitudinal lines as shown on Standard Drawing TM-M-4 will use the following pay item:

   716M02.09, Plastic Pavement Marking (Longitudinal Cross-walk) per linear meter.

   The measurement for this marking is identical to that for standard crosswalk, for example, one measurement along the centerline of the crosswalk (perpendicular to curbs).

2. Dotted white line for vehicle double turn path delineation requires an 200 mm stripe. Pay item will be as follows:

   716M02.08, Plastic Pavement Marking (200 mm Dotted Line) per linear meter.

4-716.30 USE OF REMOVABLE PAVEMENT MARKING LINE

Removable Pavement Marking Line shall be used as temporary marking for directional or separation of traffic during the traffic control phases of construction when these lines are used on a roadway surface that is to remain in place and undisturbed. See Section 4-716.11 for line width.

Painted Pavement Marking Line shall be used as temporary marking for directional or separation of traffic during the traffic control phases of construction when these lines are used on a roadway surface that is to be paved, cold planed or otherwise removed. See Section 4-716.11 for line width. Wet reflective temporary tape (used according to manufacturer's specifications) is allowed as an equal for the right edge line on interstates and expressways.

4-716.35 SNOWPLOWABLE REFLECTIVE PAVEMENT MARKERS

Snowplowable reflective pavement markers shall be included on all future Interstate and full-access controlled projects.

On interstate and full-access control resurfacing projects, the designer shall be responsible for verifying the existence of snowplowable pavement markers and for computing the quantity of these markers for removal. The designer shall also compute the quantity for new snowplowable pavement markers to be installed for these projects.

On projects which the Design Division, Signals, Signing and Lighting Section will be developing the marking and signing plans, the snowplowable reflective markers will also be included in these plans.

4-730.08 REPLACEMENT OF TRAFFIC SIGNAL DETECTION LOOPS

When there are existing traffic signals on a cold planing project, contact shall be made with the City or County to determine the presence and location of detection loops. If loops are present, and there is no way to avoid them in the cold planing process, then add Item Nos. 730M14.02, Saw Slot, and 730M14.03, Loop Wire, to the plans.

The designer will obtain as-built plans from the maintaining agency to utilize for quantity calculations. These plans shall then be forwarded to the Regional Construction Office for submission to the contractor at the Pre-construction Conference.

Also add the following notes:

"The Project Engineer shall notify the local governmental agency responsible for traffic control maintenance at least one day in advance of the cold planing activity at signalized intersections where detector loops are in the pavement. The maintaining agency will then be responsible for disconnecting the loop detectors and making any necessary timing adjustments in the signal controller prior to the construction."

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