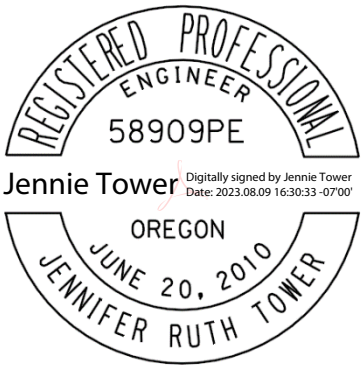
Standard Drawing Report

Date: August 9, 2023

Technical Owner: Traffic – Jennifer Ruth Tower, P.E.

Standard Drawing No. P-434 **Calculation Book No.** n/a

Drawing Title: Pavement Markings Standard Detail Blocks: Lane Lines and Parking



Expires 6/30/24

NOTE: The 2022 update to P-434 included a reorganization of standard detail blocks across P-434, P-435, and P-436 with the following goals: 1) to group together similar types of details on the same standard drawing, 2) to eliminate details that are covered by updated ODOT standard drawings 3) to eliminate or add City specific details.

Original Report Date: October 3, 2017

Background Information, Including Reference Material:

1) Manual on Uniform Traffic Control Devices, 2009 Edition (MUTCD), Chapter 3
2) Standard Highway Signs, 2004 Edition (SHS)
3) PBOT Traffic Design Manual

Assumption Made:

Described in design narrative below.

Design Narrative:

P-434 contains standard longitudinal lines with and without raised pavement markers (RPMs) and parking space markings that are commonly used on City of Portland streets.

All detail blocks meet the MUTCD requirements for color, section 3A.04, “Markings shall be yellow, white, red, or blue.” The MUTCD dimension requirements are discussed for each detail block below. Where dimensions and/or color have not been explicitly stated in the MUTCD, the detail blocks conform to visual representations as shown in the figures of the MUTCD. Each detail block is discussed below in detail.

P-434 does not provide any information to the user of this standard drawing on the proper application of the detail blocks (how they should or can be used). The intent of P-434 is to allow the user to easily specify the details of a marking as shown on the striping plans. The information on proper application of each detail block can be found within the MUTCD, the Oregon Supplement to the MUTCD, the PBOT Traffic Design Manual, or the ODOT Traffic Line Manual, other standard drawings, and/or the Oregon Revised Statutes. Therefore, the user of the standard drawing must be knowledgeable of the above stated documents to ensure that the detail blocks are applied correctly.

WB: 4” White Broken Line

- Classified as a longitudinal pavement marking, broken line. Most commonly used to delineate lanes traveling in the same direction. It indicates that vehicles are permitted to change lanes.
- Meets MUTCD 2009 Edition Section 3A.06, broken lines consist of, “normal line segments separated by gaps.” And, “Broken lines should consist of 10-foot line segments and 30-foot gaps, or dimensions in a similar ratio of line segments to gaps as appropriate for traffic speeds and need for delineation.” The Portland Bureau of Transportation uses a shorter line segment and gap spacing. A meeting in April of 2017 with Lewis Wardrip, City Traffic Engineer, confirmed that the City has used a 9-foot line segment with 15-foot gap since at least 1987 when he began working in the Portland Office of Transportation. Portland roadways generally have lower speed limits and shorter block spacing than typical highway applications that the MUTCD was designed for. Slower speed limits cause drivers to perceive gap and line segment lengths to be larger, and having more line segments per block increases the conspicuity of the lane lines.
- This line is installed centered on the lane line.

YB: 4” Yellow Broken Line:

- Classified as a longitudinal pavement marking, broken line. Used as a passing permitted centerline marking.
- Meets MUTCD 2009 Edition Section 3A.06, broken lines consist of, “normal line segments separated by gaps.” and, “Broken lines should consist of 10-foot line segments and 30-foot gaps, or dimensions in a similar ratio of line segments to gaps as appropriate for traffic speeds and need for delineation.” The Portland Bureau of Transportation uses a shorter line segment and gap spacing. A meeting in April of 2017 with Lewis Wardrip, City Traffic Engineer, confirmed that the City has used a 9-foot line segment with 15-foot gap since at least 1987 when he began working in the Portland Office of Transportation. Portland roadways generally have lower speed limits and shorter block spacing than typical highway applications that the MUTCD was designed for. Slower speed limits cause drivers to

perceive gap and line segment lengths to be larger, and having more line segments per block increases the conspicuity of the lane lines.

- Meets MUTCD 2009 Edition Section 3B.01, “The centerline markings…shall be… two-direction passing zone markings consisting of a normal broken yellow line where crossing the centerline markings for passing with care is permitted for traffic traveling in either direction.”
- This line is installed centered on the lane line.

NPR & NPL: no-pass right and no-pass left, 4” yellow lines

- Classified as a longitudinal pavement marking, normal+broken line. Used as a one-direction passing permitted centerline marking.
- Meets MUTCD 2009 Edition Section 3A.06, normal lines are, “4 to 6 inches wide.”
- Meets MUTCD 2009 Edition Section 3A.06, broken lines consist of, “normal line segments separated by gaps.” and, “Broken lines should consist of 10-foot line segments and 30-foot gaps, or dimensions in a similar ratio of line segments to gaps as appropriate for traffic speeds and need for delineation.” The Portland Bureau of Transportation uses a shorter line segment and gap spacing. A meeting in April of 2017 with Lewis Wardrip, City Traffic Engineer, confirmed that the City has used a 9-foot line segment with 15-foot gap since at least 1987 when he began working in the Portland Office of Transportation. Portland roadways generally have lower speed limits and shorter block spacing than typical highway applications that the MUTCD was designed for. Slower speed limits cause drivers to perceive gap and line segment lengths to be larger, and having more line segments per block increases the conspicuity of the lane lines.
- Meets MUTCD 2009 Section 3B.01, “The centerline markings…shall be…one-direction no-passing zone markings consisting of a double yellow line, one of which is a normal broken yellow line and the other is a normal solid yellow line, where crossing the center line is prohibited for traffic traveling adjacent to the solid line.”
- This line is installed with the gap between the two longitudinal markings centered on the lane line.

TWL: Two-Way Left Turn, 4” Yellow Lines

- Classified as a longitudinal pavement marking, normal+broken line. Used for delineating a two-way left-turn lane.
- Meets MUTCD 2009 Edition Section 3A.06, normal lines are, “4 to 6 inches wide.”
- Meets MUTCD 2009 Edition Section 3A.06, broken lines consist of, “normal line segments separated by gaps.” and, “Broken lines should consist of 10-foot line segments and 30-foot gaps, or dimensions in a similar ratio of line segments to gaps as appropriate for traffic speeds and need for delineation.” The Portland Bureau of Transportation uses a shorter line segment and gap spacing. A meeting in April of 2017 with Lewis Wardrip, City Traffic Engineer, confirmed that the City has used a 9-foot line segment with 15-foot gap since at least 1987 when he began working in the Portland Office of Transportation. Portland roadways generally have lower speed limits and shorter block spacing than typical highway applications that the MUTCD was designed for. Slower speed limits cause drivers to perceive gap and line segment lengths to be larger, and having more line segments per block increases the conspicuity of the lane lines.

- Meets MUTCD 2009 Section 3B.03, “If a two-way left-turn lane that is never operated as a reversible lane is used, the lane line pavement markings on each side of the two-way left-turn lane shall consist of a normal broken yellow line and a normal solid yellow line to delineate the edges of a lane that can be used by traffic in either direction as part of a left-turn maneuver. There markings shall be placed with the broken line toward the two-way left-turn lane and the solid line toward the adjacent lane as shown in Figure 3B-7.”
- This line is installed with the gap between the two longitudinal markings centered on the lane line.

Supplementation details:
YB/R-24: Yellow Broken Line Supplementation Reflectors With 4” Yellow Broken Line
YB/R-48: Yellow Broken Line Supplementation Reflectors With 4” Yellow Broken Line
WB/R-24: White Broken Line Supplementation Reflectors with 4” White Broken Line

The details listed above include the addition of RPMs to supplement the YB and WB longitudinal line details previously described. Because the only difference is the addition of RPMs, the use of RPMSs is the focus of the descriptions.

The three details listed above that use RPMs as a supplementation for the longitudinal line meets or exceeds the requirements of the MUTCD 2009 Edition Sections 3B.11 and 3B.13. The N Value (as defined by the MUTCD section 3B.11) for each block is stated below.

- **YB/R-24:** N=24’. RPM spacing of N used. Typical spacing used for majority of applications
- **YB/R-48:** N=24’. RPM spacing of 2N used. The longer spacing may be used on tangent sections based on guidance in ODOT Traffic Line Manual.
- **WB/R-24:** N=24’ RPM spacing of N used.

Positioning Guide details:
NPL/R-24: No-Pass Left Positioning Guide Reflectors with 4” Yellow Lines,
NPR/R-24: No-Pass Right Positioning Guide Reflectors with 4” Yellow Lines
TWL/R-24: Two Way Left Turn Positioning Guide Reflectors With 4” Yellow Lines

The details listed above include the addition of RPMs to supplement the NPL, NPR, and TWL longitudinal line details previously described. Because the only difference is the addition of RPMs, the use of RPMSs is the focus of the descriptions.

The three details listed above that use RPMs as a positioning guide for the longitudinal line meets or exceeds the requirements of the MUTCD sections 3B.11 and 3B.12. The N value (as defined by the MUTCD section 3B.11) for each block is stated below.

- **NPL/R-24 & NPR/R-24:** N=24’. RPM spacing of N used. Typical spacing used for majority of applications.
- **TWL/R-24:** N=24’. RPM spacing of N used.

WDD: Two 4” White Dotted Lines

- Classified as a longitudinal pavement marking, normal+dotted line. Typically installed across minor intersections in conjunction with the installation of a double solid white line on a multi-lane approach to a marked (unsignalized) crosswalk.
- Meets MUTCD 2009 Edition Section 3A.06, normal lines are, “4 to 6 inches wide.”
- Meets MUTCD 2009 Edition Section 3A.06, dotted lines consist of, “noticeable shorter line segments separated by shorter gaps than used for a broken line. The width of a dotted line extension shall be at least the same as the width of the line it extends.” and, “A dotted line for line extensions within an intersection or taper area should consist of 2-foot line segments and 2- to 6-foot gaps.”
- This line is installed with the gap between the two longitudinal markings centered on the lane line.

YDD: Two 4” Yellow Dotted Lines

- Classified as a longitudinal pavement marking, normal+dotted line. Typically used to extend double solid yellow lines through an intersection where there is a horizontal shift in centerline alignment.
- Meets MUTCD 2009 Edition Section 3A.06, normal lines are, “4 to 6 inches wide.”
- Meets MUTCD 2009 Edition Section 3A.06, dotted lines consist of, “noticeable shorter line segments separated by shorter gaps than used for a broken line. The width of a dotted line extension shall be at least the same as the width of the line it extends.” and, “A dotted line for line extensions within an intersection or taper area should consist of 2-foot line segments and 2- to 6-foot gaps.”
- This line is installed with the gap between the two longitudinal markings centered on the lane line.

P-W: On Street Parking Detail (White)

- Classified as transverse pavement markings. Used to delineate the limits of on-street parking spaces.
- Meets MUTCD 2009 Edition Section 3B.19, “Parking space markings shall be white.”
- The dimensions shown P-W match MUTCD 2009 Edition Figure 3B-21 which illustrates the use of 4-inch wide by 12-inch-long lines to delineate the limits of on-street parking spaces.

P-Y: On Street Parking-Loading Detail (Yellow)

- Classified as transverse pavement markings. Used to delineate the limits of on-street loading spaces for commercial vehicles.
- Does not meet MUTCD 2009 Edition Section 3B.19, “Parking space markings shall be white.”
  The Portland Bureau of Transportation uses yellow markings for greater conspicuity of on-street loading spaces for commercial vehicles in areas where on-street parking is heavily used.
  A meeting in April of 2017 with Lewis Wardrip, City Traffic Engineer, confirmed that the City has used yellow markings for loading spaces since at least 1987 when he began working in the Portland Office of Transportation. Only one loading space is typically installed per block on City streets and there are no known issues with using yellow in these limited locations instead of white markings.
- The dimensions shown in P-Y meet MUTCD 2009 Edition Figure 3B-21 which illustrates the use of 4-inch wide by 12-inch-long lines to delineate the limits of on-street parking spaces.

PS: Parking Symbol (White)

- Classified as transverse pavement markings. Used to identify legal on-street parking spaces where parking is not in a traditional curbside location such as along a parking-buffered bike lane.
- Meets MUTCD 2009 Edition Section 3B.20, “Word, symbol, and arrow markings shall be white, except as otherwise provided in this Section.” And “Letters and numerals should be 6 feet or more in height.”
- The Portland Bureau of Transportation began using the PS markings in 2011 as part of the design of the NE Cully Boulevard parking protected cycle track project and has since used in in several other locations with no known issues.

The following is a list of the revisions that were made for the September 9, 2022 drawing:

1) Relocated details **ISL/R-2**, **CE-CNR/R-2**, **TWL-ISL/R-2**, and **CE-MB/R-2** to standard drawing P-435.
2) Added unique descriptor language “Lane Lines and Parking” to the title to identify the types of details represented.
3) Changed “Reference Markers” to “Details” in the legend.
4) Updated dimensioning styles on the details for consistency.