APPENDIX T6

HOV Design Guide
For the Northwest Region

I-405, SR520 to SR522 Stage 1
(Kirkland Stage 1)

Final Package Review – 15%

January 25, 2005

INTERSTATE 405 Project Team

Congestion Relief & Bus Rapid Transit Projects

HOV DESIGN GUIDE

FOR THE NORTHWEST REGION

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The HOV Design Guide is developed by the WSDOT Northwest Region HOV Section (Traffic) for use by the HOV facility design and operation offices. The Manual provides guidelines for placement of the HOV signs and pavement markings for freeway, ramp and arterial HOV and Transit facilities.

It is recommended that the user check with the NW Region HOV Section in order to verify the latest revision of the Design Guide or if the situation under consideration is unique and it is not covered in the Guide. Also, location of the HOV signs should be coordinated with other general purpose freeway signs.

Thanks to Traffic Analysis, Signing Design, General Operations and Freeway Operations groups for their comments and input in preparing the HOV Design Guide. Also, Special thanks to Belqies Jalalyar of the HOV group for her contribution.

Every effort has been made to provide correct information. However, please feel free to contact us if you find any discrepancies between this Guide and the MUTCD and WSDOT Design Manual, Standard Plans and Standard Specifications.

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NW Region Traffic MS 120
(206) 440-4456

E-mail: forbisl@wsdot.wa.gov

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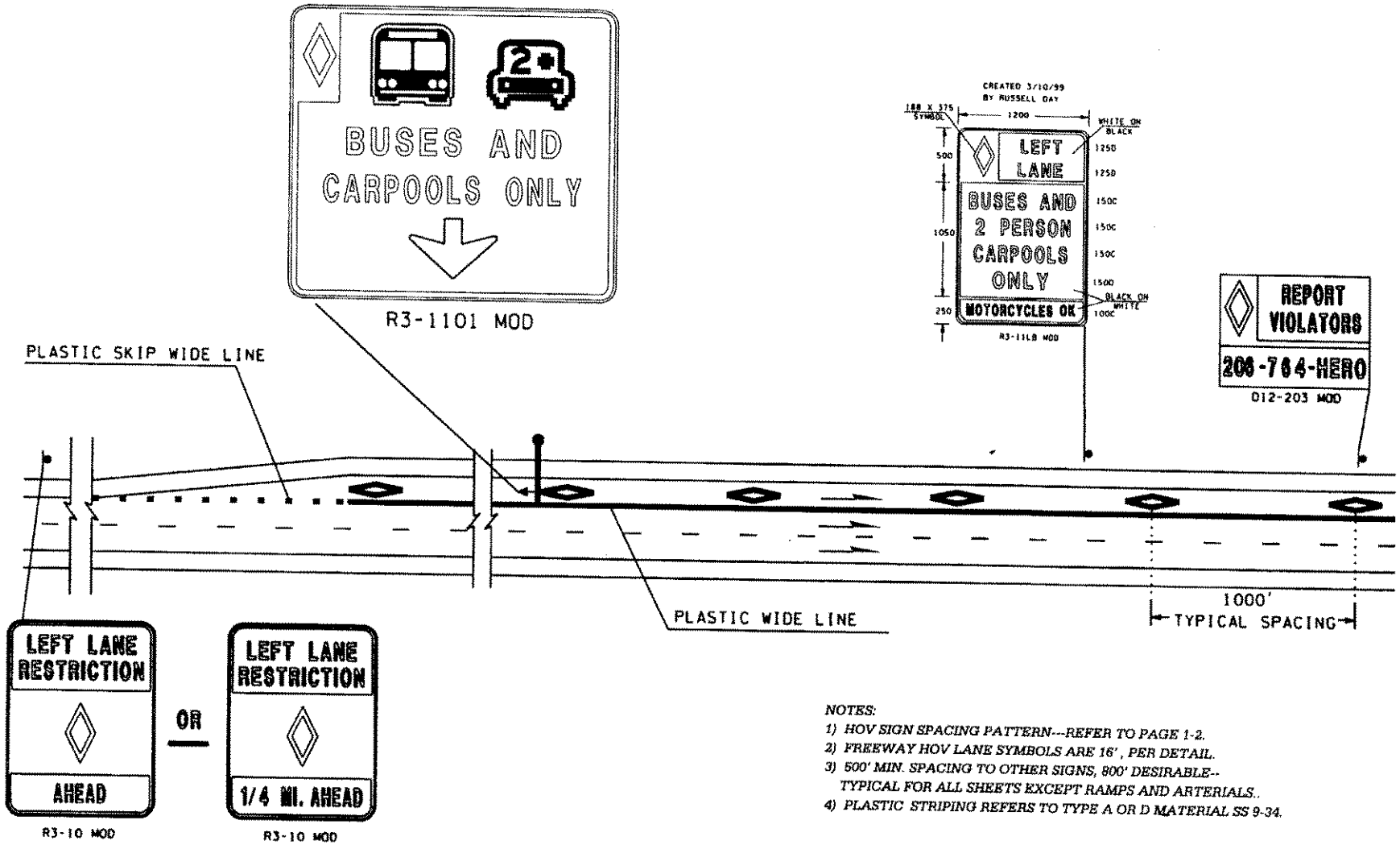
Section 1
Mainline Freeways

TYPICAL FREEWAY LEFT SIDE HOV LANE

(SIGNS AND SCHEMATIC--NOT TO SCALE)

(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

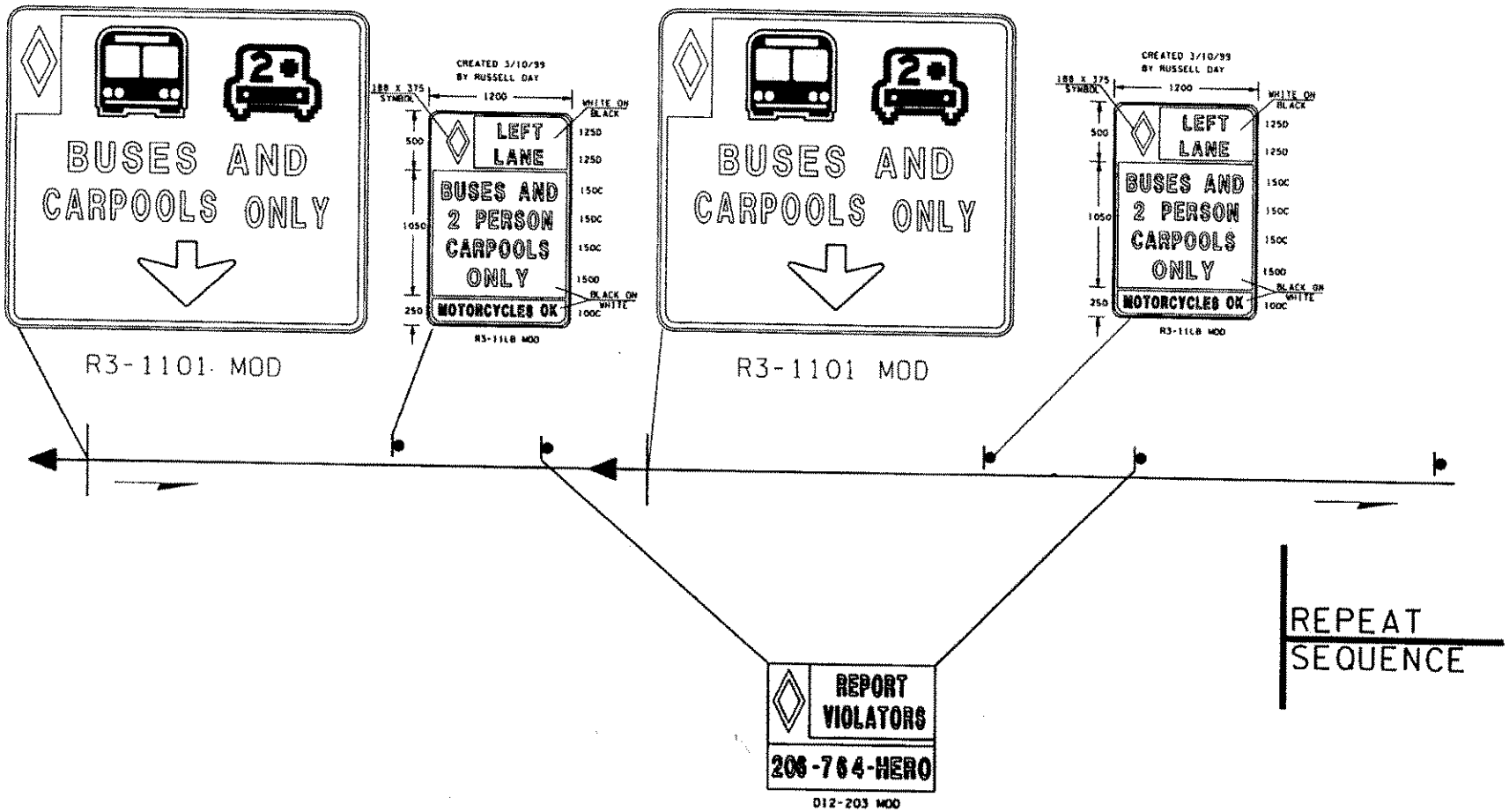
1) *HOV SIGN SPACING PATTERN---REFER TO PAGE 1-2.*
2) *FREEWAY HOV LANE SYMBOLS ARE 16', PER DETAIL.*
3) *500' MIN. SPACING TO OTHER SIGNS, 800' DESIRABLE--TYPICAL FOR ALL SHEETS EXCEPT RAMPS AND ARTERIALS..*
4) *PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL SS 9-34.*

Back to TOC

HOV SIGN SEQUENCE

(SIGNS AND SCHEMATIC--NOT TO SCALE)

(CHECK DIMENSIONS ON SIGN SHEETS)



NOTE:

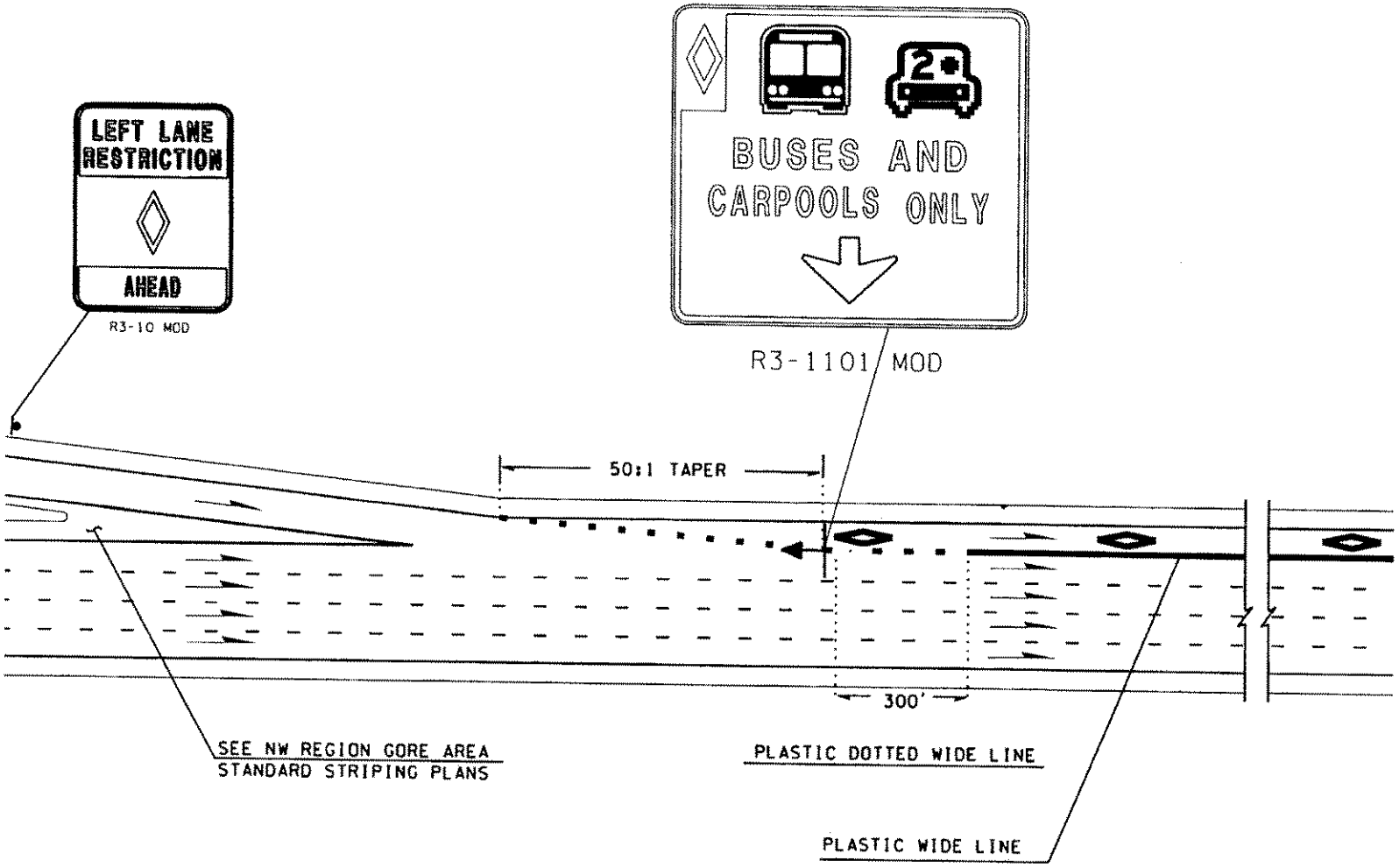
SIGN SPACING TO BE 1 TO 2 MILES

AND MAY VARY DUE TO SPACING AND AVAILABILITY OF EXISTING BRIDGES AND SIGN STRUCTURES.

Back to TOC

BEGIN LEFT SIDE HOV LANE AT RAMP

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

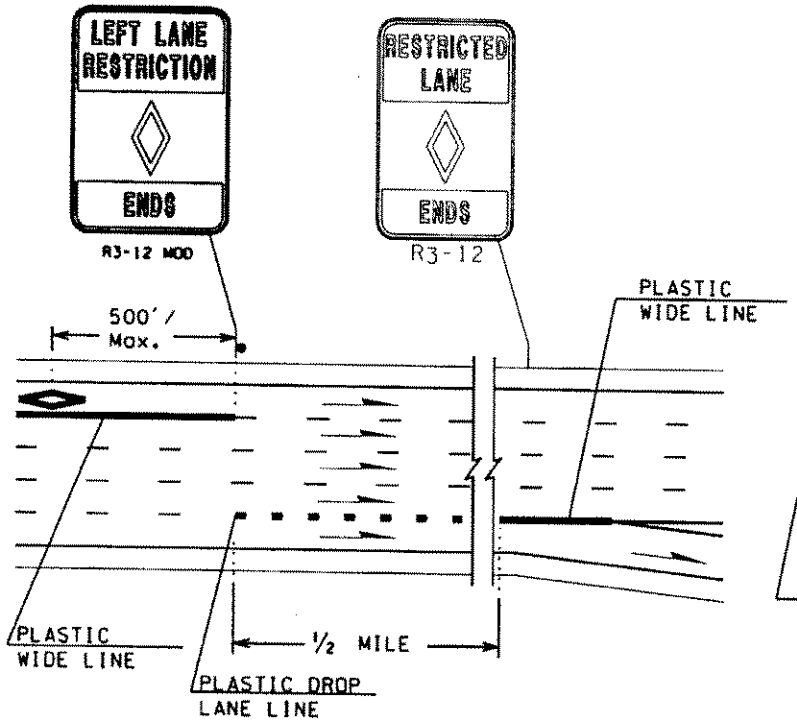
1) PLASTIC WIDE LINE TO BE TYPE A OR D MATERIAL, SS 9-34.
2) HOV LANE SYMBOLS ARE 16' PER DETAIL

Back to TOC

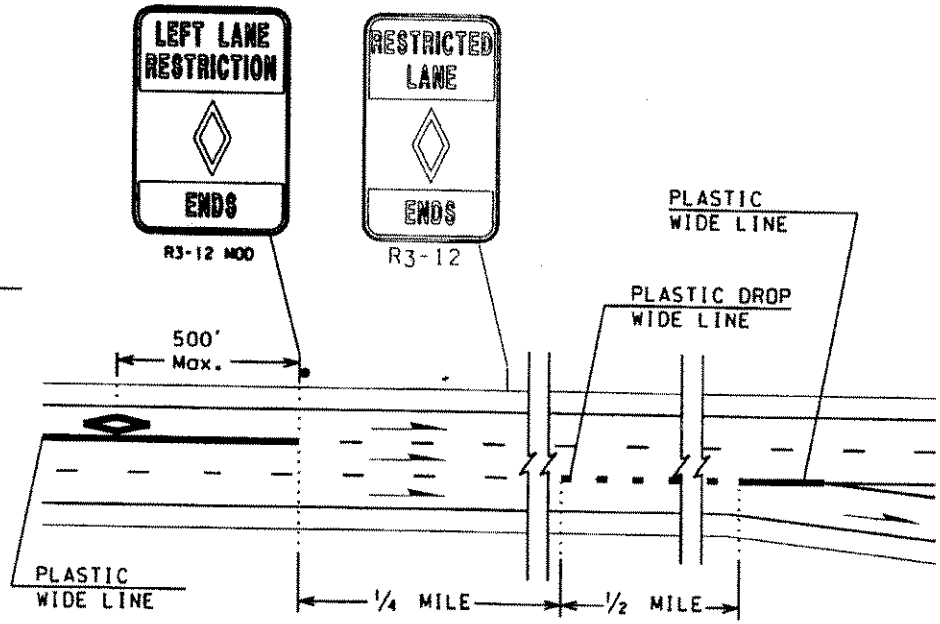
END LEFT SIDE HOV LANE TYPE 1 (PREFERRED)

(SIGNS AND SCHEMATIC- -NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)

MORE THAN 2 GP LANES



2 OR LESS GP LANES

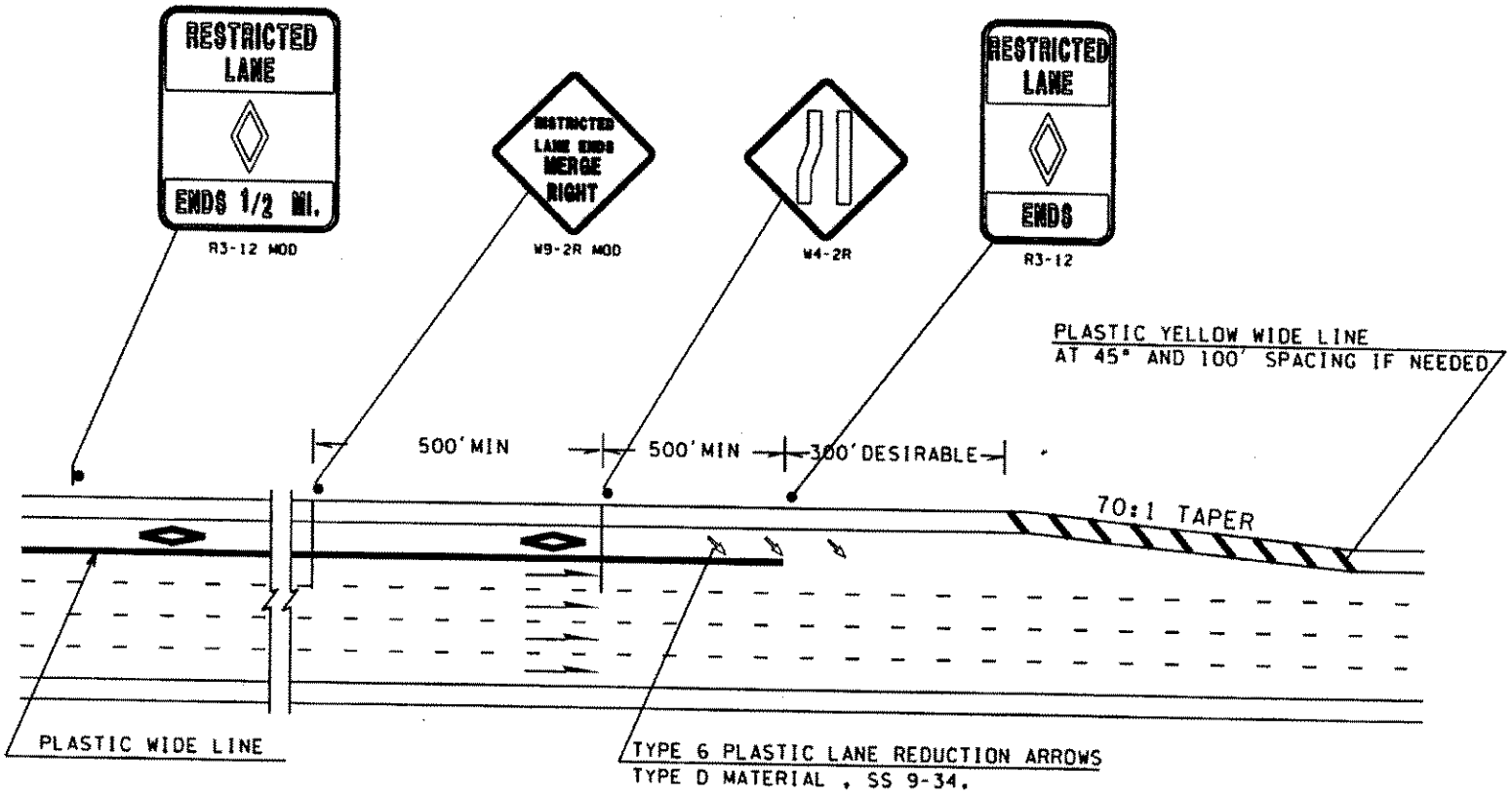


NOTES:

1) SEE STANDARD PLAN H-5a AND H-5d FOR WIDE AND DROP LANE LINE.
2) PASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34.
3) HOV LANE SYMBOLS ARE 16' PER DETAIL
4) FREEWAY SPACING FOR HOV LANE SYMBOLS TO BE 1000'

END LEFT SIDE HOV LANE TYPE 2

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)

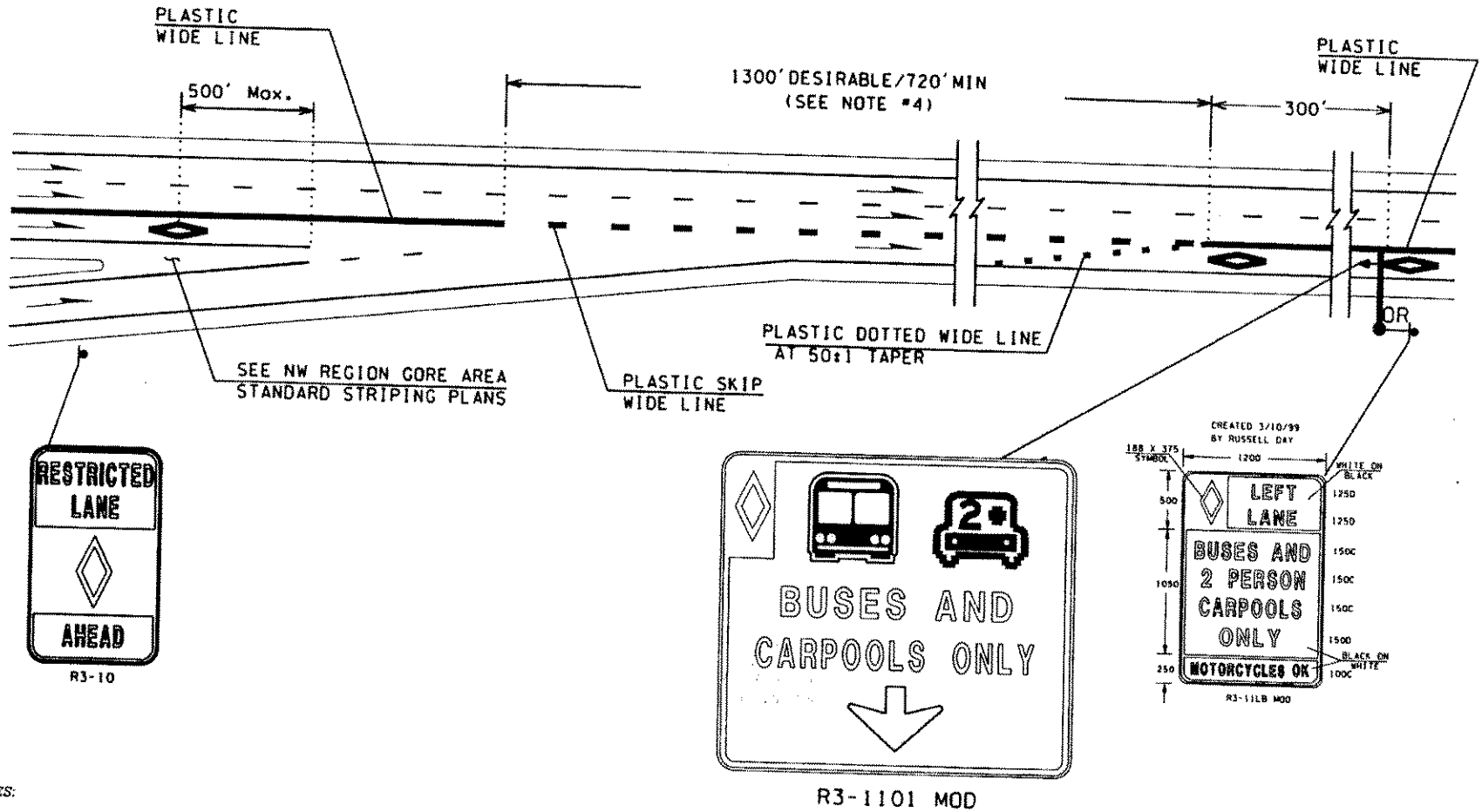


NOTES:

1) PLASTIC LINES REFER TO TYPE A OR D MATERIAL, SS-34
2) HOV LANE SYMBOLS 16'PER DETAIL
3) FREEWAY SPACING FOR HOV LANE SYMBOLS TO BE 1000'
4) ORANGE METALLIC FLAGS TO BE REMOVED AFTER 30-90 DAYS
5) CHECK WITH ASSISTANT TRAFFIC OPERATIONS ENGINEER FOR SPACING OF LANE REDUCTION ARROWS.

RIGHT SIDE HOV LANE ON CONNECTION

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSION ON SIGN SHEETS)



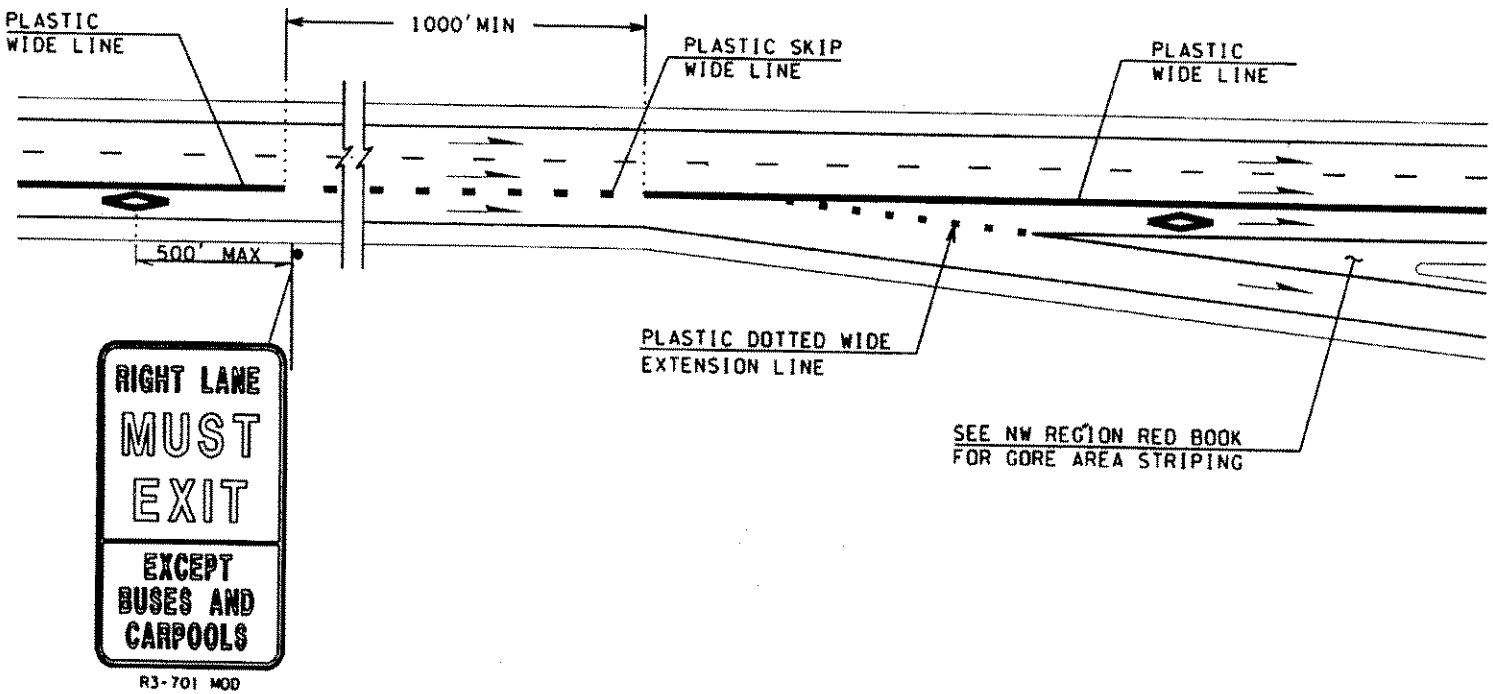
NOTES:

1) FREEWAY SPACING FOR HOV LANE SYMBOLS TO BE 1000'
2) PLASTIC LINES REFERS TO TYPE A OR D MATERIAL, SS 9-34
3) HOV LANE SYMBOLS ARE 16', PER DETAIL
4) THE 720' ARRIVED FROM POST SPEED x LANE WIDTH EG (60 x12=720')

Back to TOC

RIGHT SIDE HOV LANE OFF CONNECTION

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)

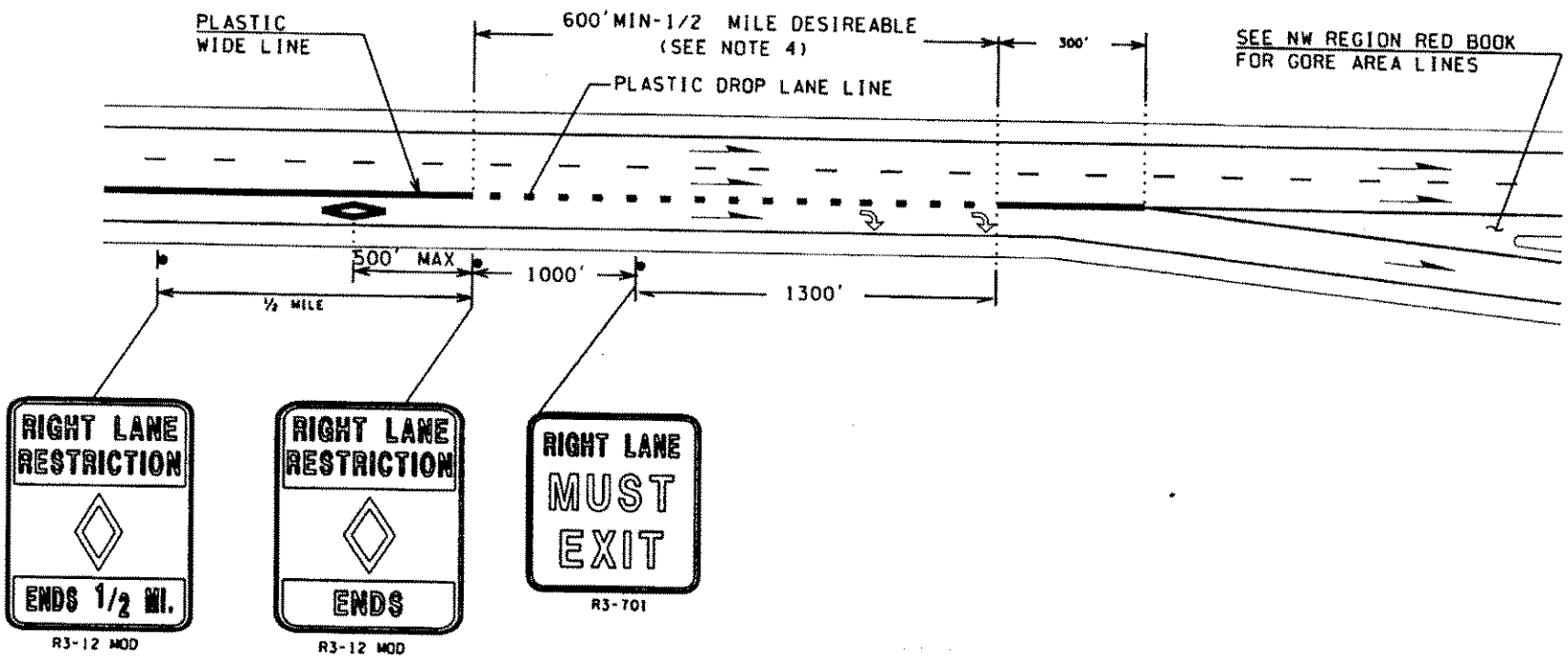


NOTES:

1) FREEWAY SPACING FOR HOV LANE SYMBOLS TO BE 1000'
2) PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34
3) HOV LANE SYMBOLS ARE 16', PER DETAIL

END RIGHT SIDE HOV LANE

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

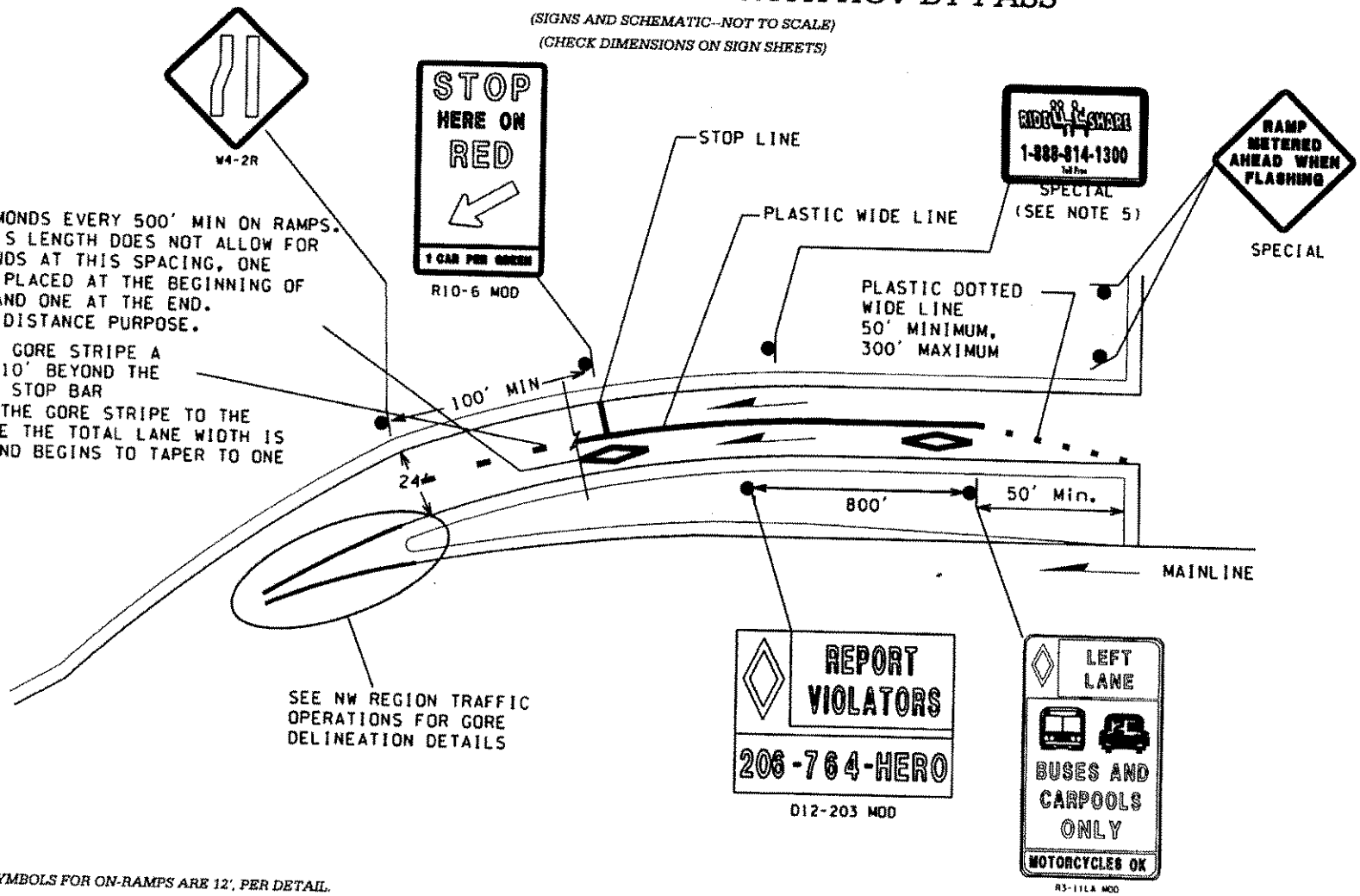
1) FREEWAY SPACING FOR HOV LANE SYMBOLS TO BE 1000'.
2) PLASTIC LINES REFERS TO TYPE A OR D MATERIAL, SS 9-34.
3) HOV LANE SYMBOLS ARE 16', PER DETAIL.
4) ALL THE SPACING MEASUREMENT IS IN NW REGION RED BOOK.

Section 2
Ramps

Back to TOC

SINGLE METERED RAMP WITH HOV BY PASS

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



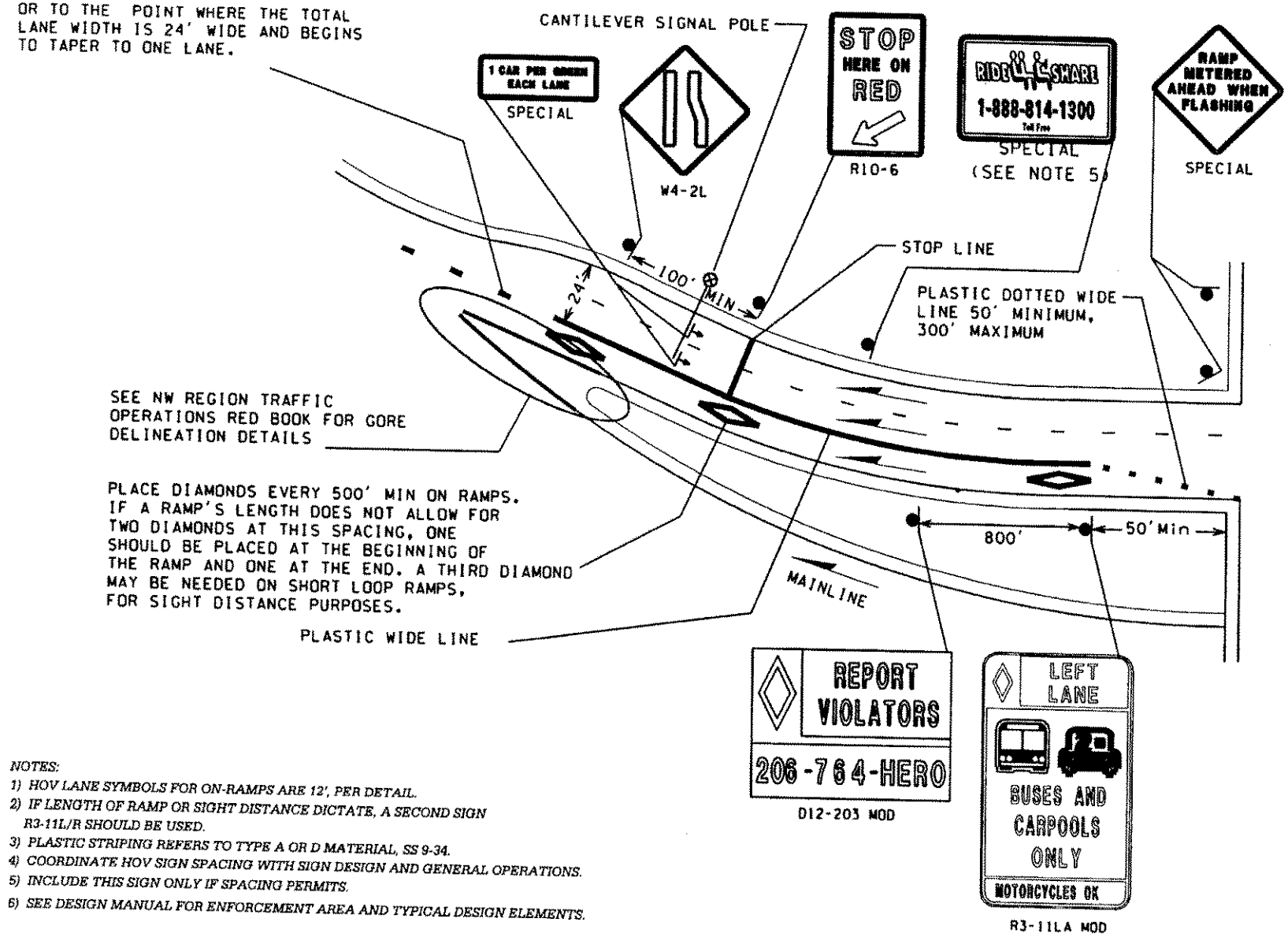
NOTES:

1) *HOV LANE SYMBOLS FOR ON-RAMPS ARE 12', PER DETAIL.*
2) *IF LENGTH OF RAMP OR SIGHT DISTANCE DICTATE, A SECOND SIGN R3-11L/R SHOULD BE USED.*
3) *PLASTIC LINES REFERS TO TYPE A OR D MATERIAL, SS 9-34*
4) *COORDINATE HOV SIGN SPACING WITH SIGN DESIGN AND GENERAL OPERATIONS.*
5) *INCLUDE THIS SIGN ONLY IF SPACING PERMITS*
6) *SEE DESIGN MANUAL FOR ENFORCEMENT AREA AND TYPICAL DESIGN ELEMENTS.*

Back to TOC

DOUBLE METERED RAMP WITH HOV BYPASS

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



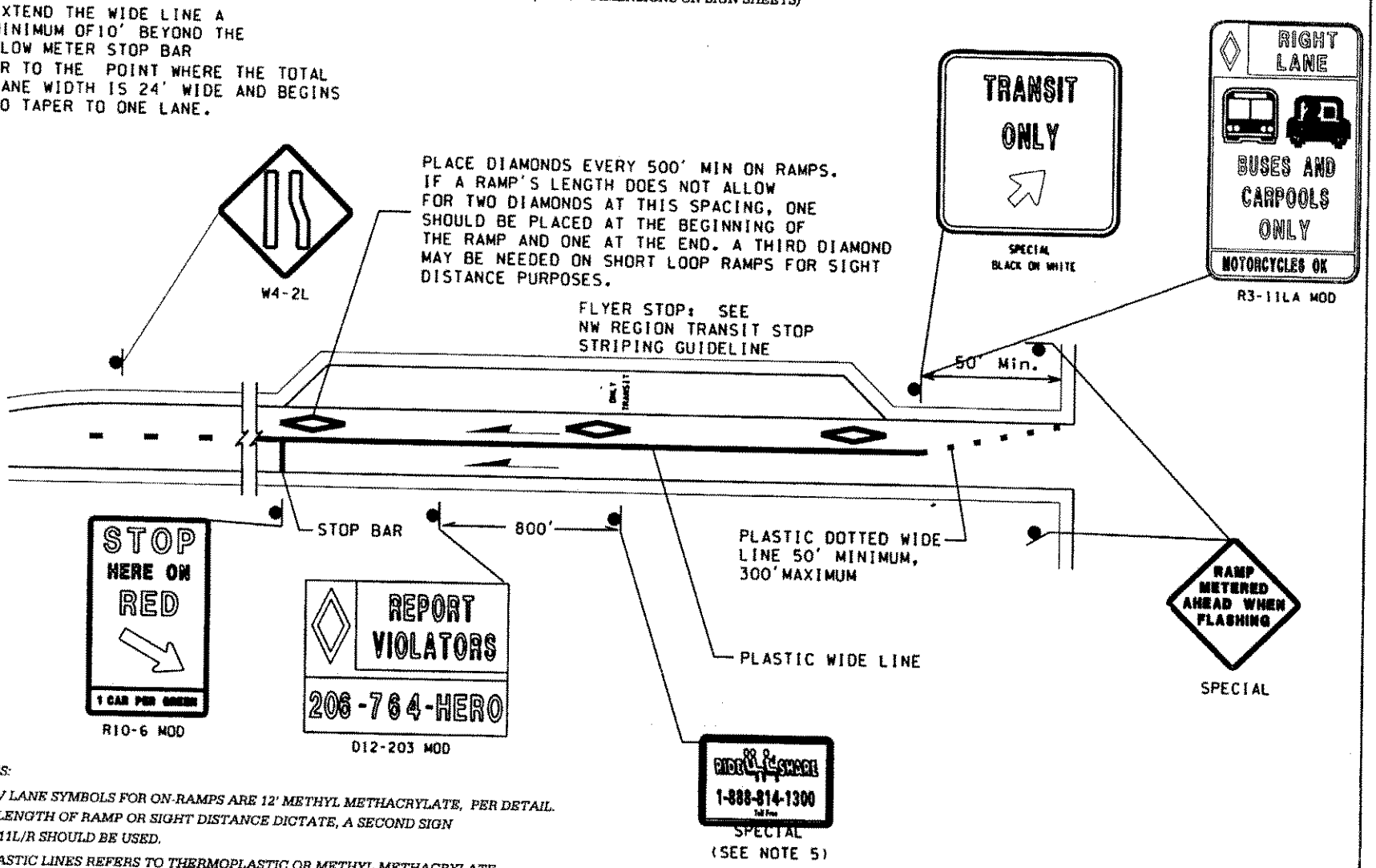
NOTES:

1) *HOV LANE SYMBOLS FOR ON-RAMPS ARE 12', PER DETAIL.*
2) *IF LENGTH OF RAMP OR SIGHT DISTANCE DICTATE, A SECOND SIGN R3-11L/R SHOULD BE USED.*
3) *PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34.*
4) *COORDINATE HOV SIGN SPACING WITH SIGN DESIGN AND GENERAL OPERATIONS.*
5) *INCLUDE THIS SIGN ONLY IF SPACING PERMITS.*
6) *SEE DESIGN MANUAL FOR ENFORCEMENT AREA AND TYPICAL DESIGN ELEMENTS.*

Back to TOC

BUS PULL OUT AND HOV ON RAMP

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



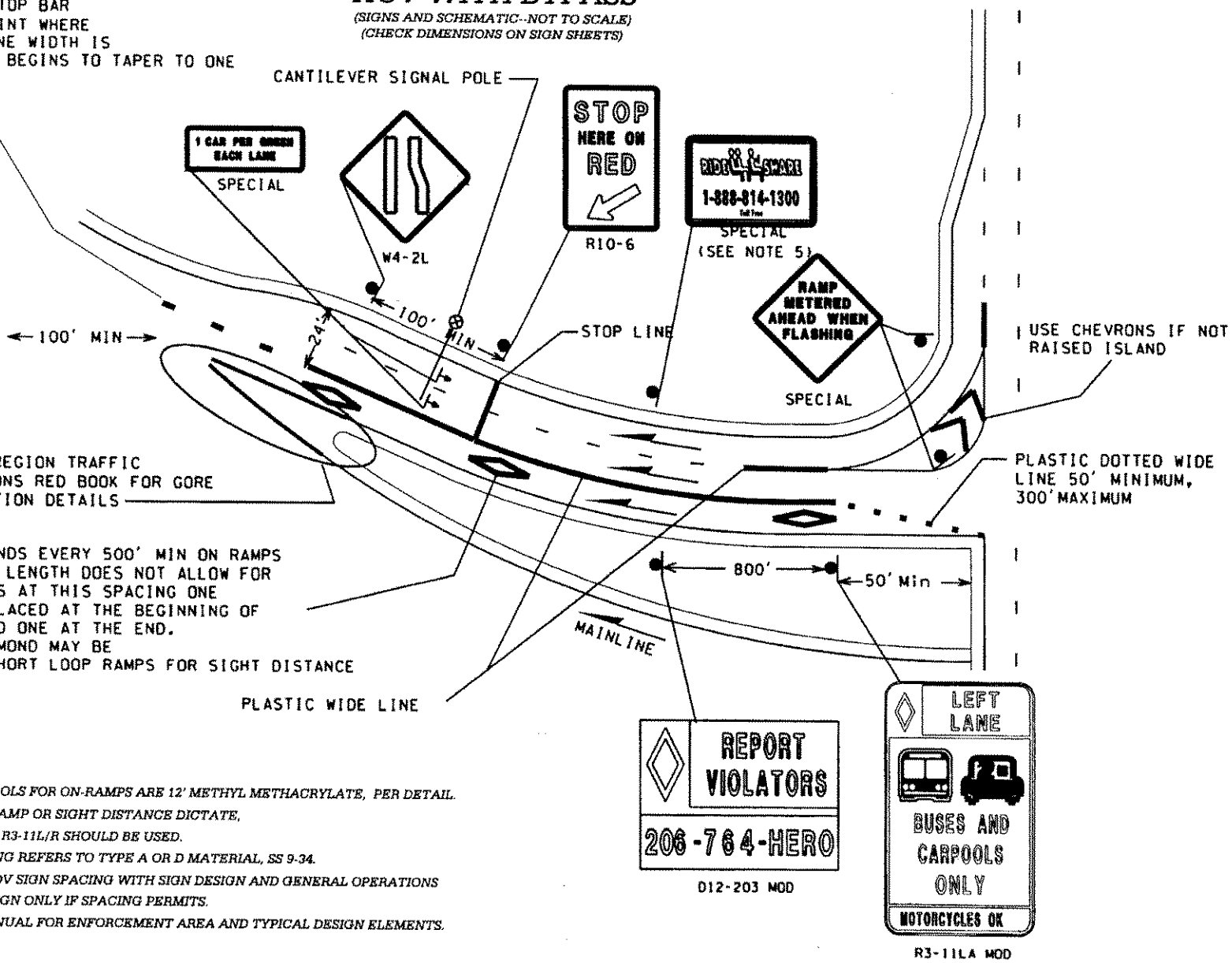
NOTES:

1) *HOV LANE SYMBOLS FOR ON-RAMPS ARE 12' METHYL METHACRYLATE, PER DETAIL.*
2) *IF LENGTH OF RAMP OR SIGHT DISTANCE DICTATE, A SECOND SIGN R3-11L/R SHOULD BE USED.*
3) *PLASTIC LINES REFERS TO THERMOPLASTIC OR METHYL METHACRYLATE*
4) *COORDINATE HOV SIGN SPACING WITH SIGN DESIGN AND GENERAL OPERATIONS.*
5) *INCLUDE THIS SIGN ONLY IF SPACING PERMITS*
6) *SEE DESIGN MANUAL FOR ENFORCEMENT AREA AND TYPICAL DESIGN ELEMENTS.*

Back to TOC

DOUBLE METERED RAMP HOV WITH BYPASS

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

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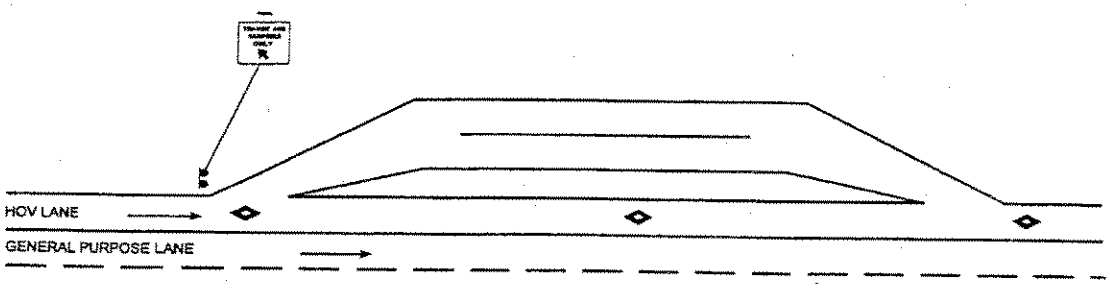
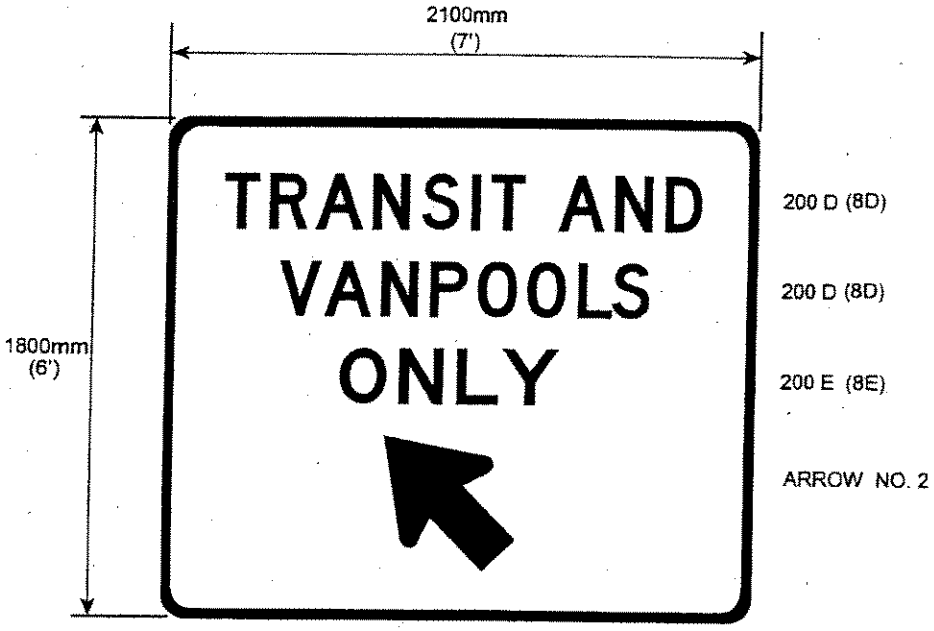
2) *IF LENGTH OF RAMP OR SIGHT DISTANCE DICTATE, A SECOND SIGN R3-11L/R SHOULD BE USED.*
3) *PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34.*
4) *COORDINATE HOV SIGN SPACING WITH SIGN DESIGN AND GENERAL OPERATIONS*
5) *INCLUDE THIS SIGN ONLY IF SPACING PERMITS.*
6) *SEE DESIGN MANUAL FOR ENFORCEMENT AREA AND TYPICAL DESIGN ELEMENTS.*

Section 3
Direct Access (Draft)

Back to TOC



Typical Signing for Flyer Stop

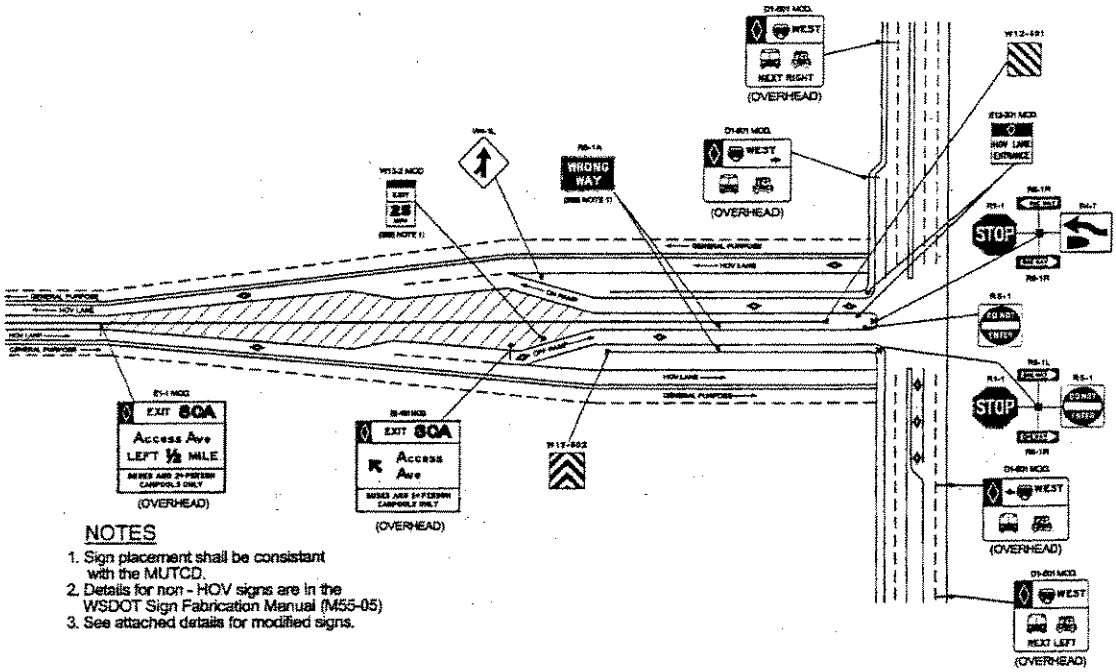


SPECIAL
BLACK ON WHITE

Special Flyer Stop Sign

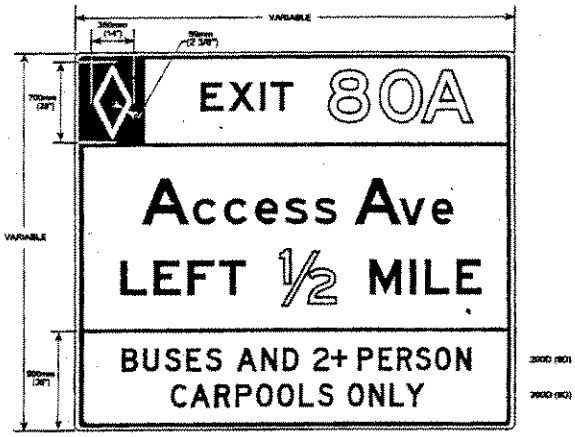
Flyer Stop Signing
Figure 7-2

Back to TOC

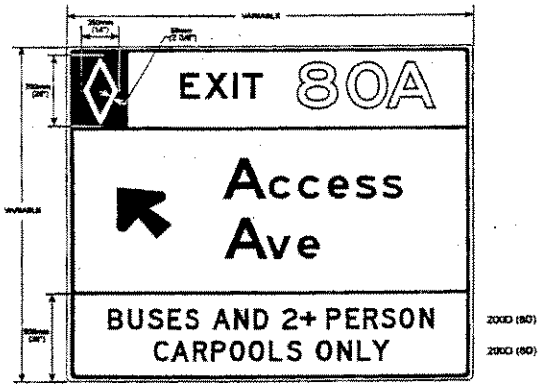


NOTES

1. Sign placement shall be consistant with the MUTCD.
2. Details for non - HOV signs are in the WSDOT Sign Fabrication Manual (M55-05)
3. See attached details for modified signs.



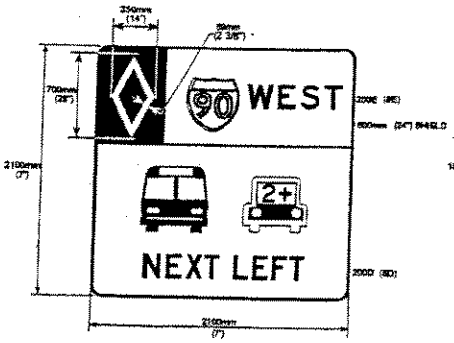
E1-1 MOD.
CODE D
BLACK ON WHITE



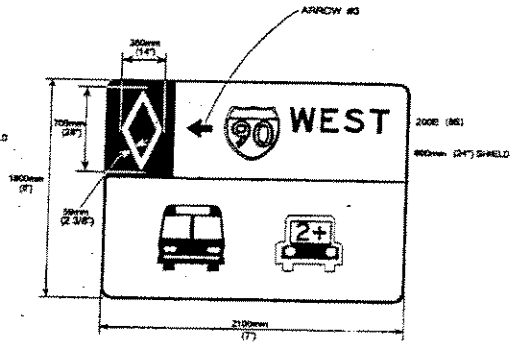
E6-101 MOD.
CODE D
BLACK ON WHITE

HOV Direct Access Signing
Figure 7-3a

Back to TOC



D1-501 MOD.
BLACK ON WHITE



D1-901 MOD.
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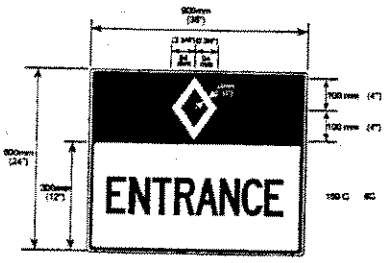
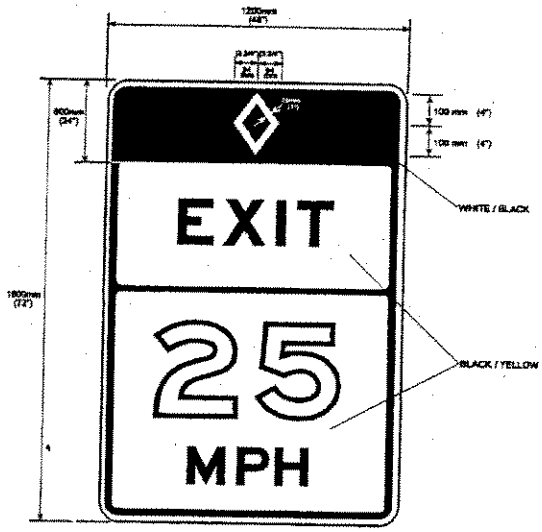


E12-201 MOD.
BLACK ON WHITE



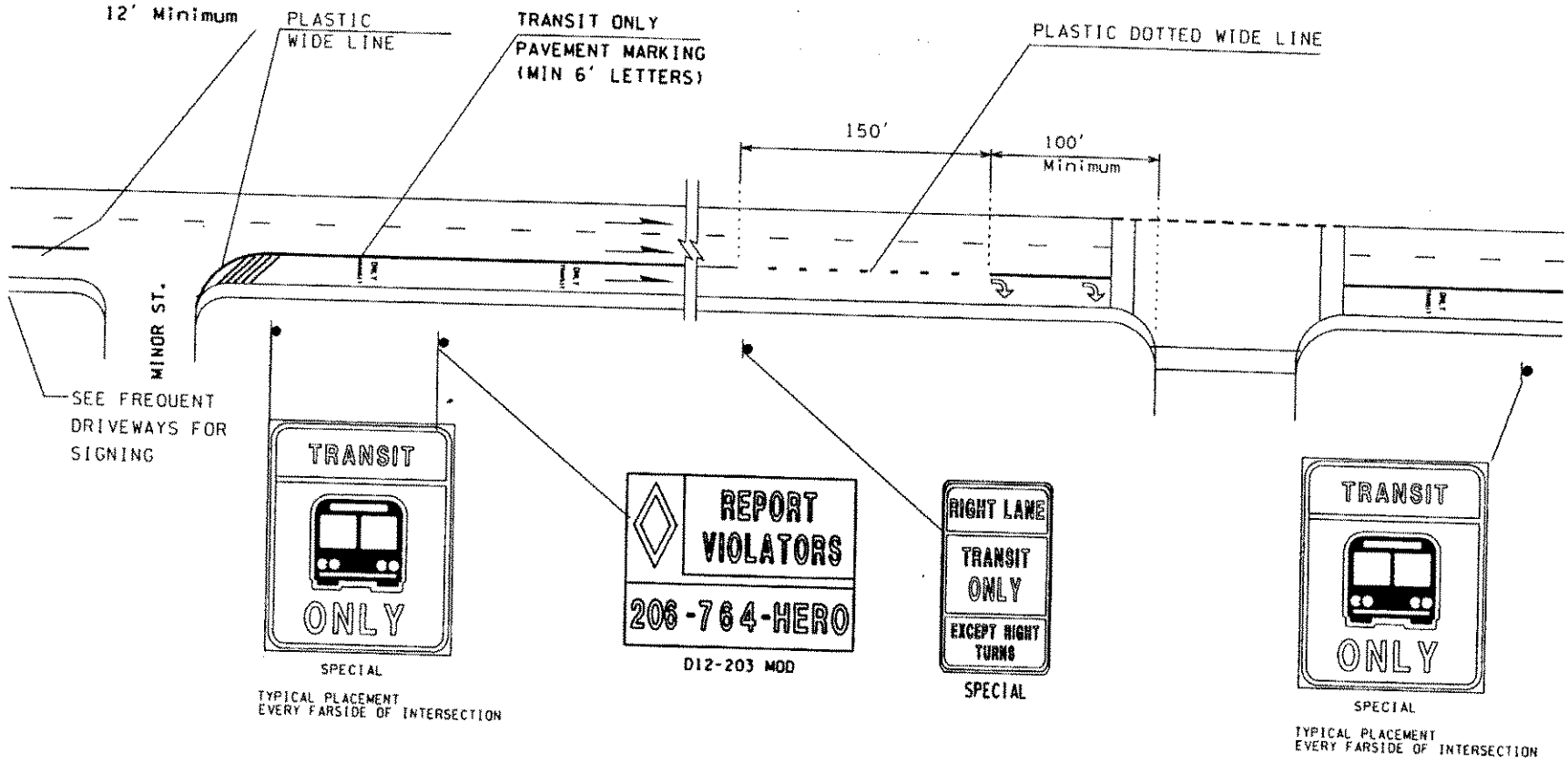
W13-2 MOD

HOV Direct Access Signing (continued)
Figure 7-3b

Section 4
Arterials

TYPICAL ARTERIAL TRANSIT LANE FOR SIGNALIZED INTERSECTION

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)

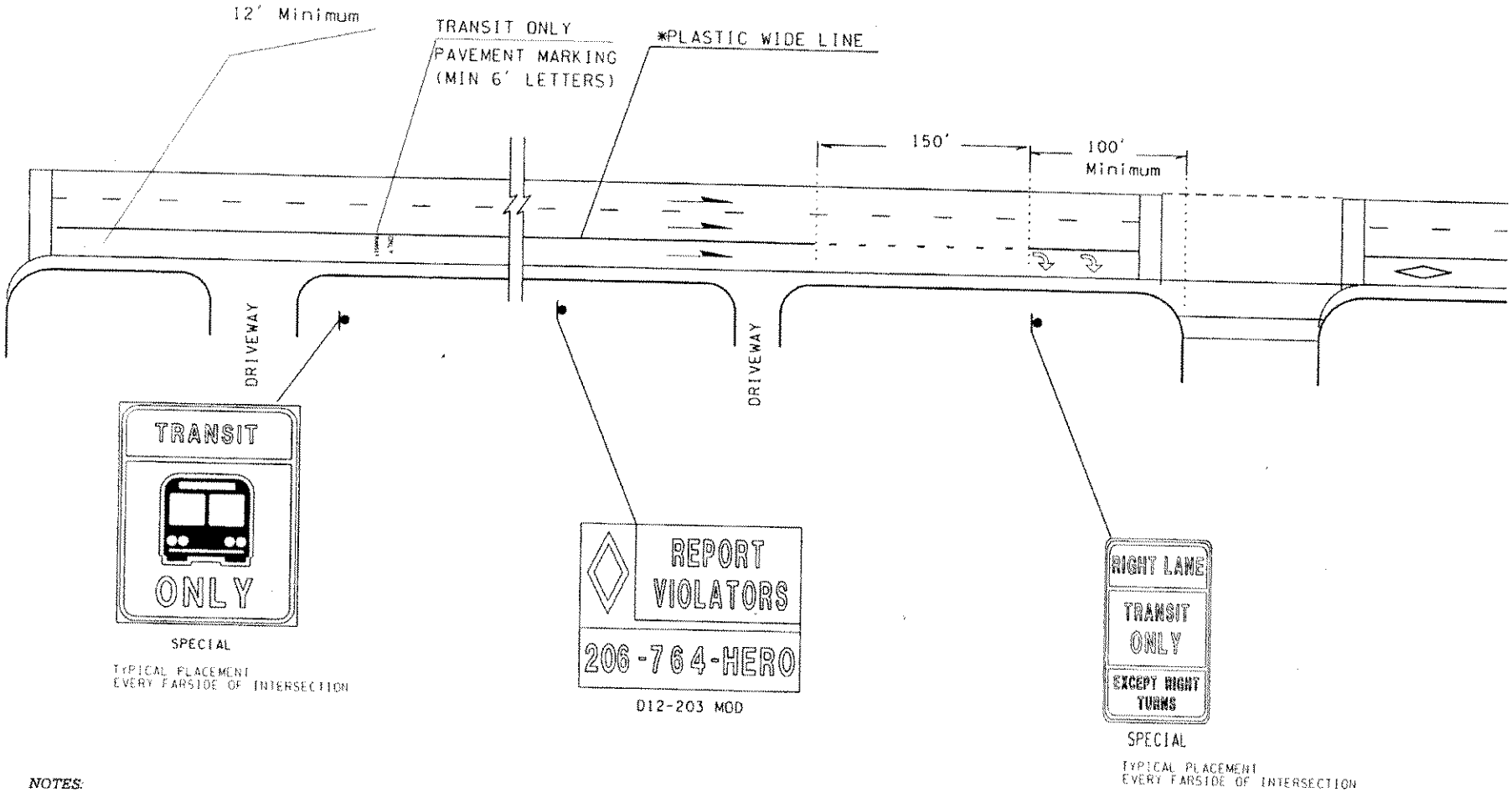


NOTES:

1) ARTERIAL SPACING FOR HOV LANE SYMBOLS TO BE 500'
2) HOV SIGN SPACINGS SHOULD BE COORDINATED WITH ALL OTHER SIGNS AND NOT LESS THAN 500'
3) PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34.
4) ARROWS/CROSSWALK/PER STANDARD PLAN/ADA REQUIREMENTS
5) HOV LANE SYMBOLS ON ARTERIALS ARE 12', PER DETAIL

TYPICAL ARTERIAL TRANSIT LANE WITH FREQUENT DRIVEWAYS

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

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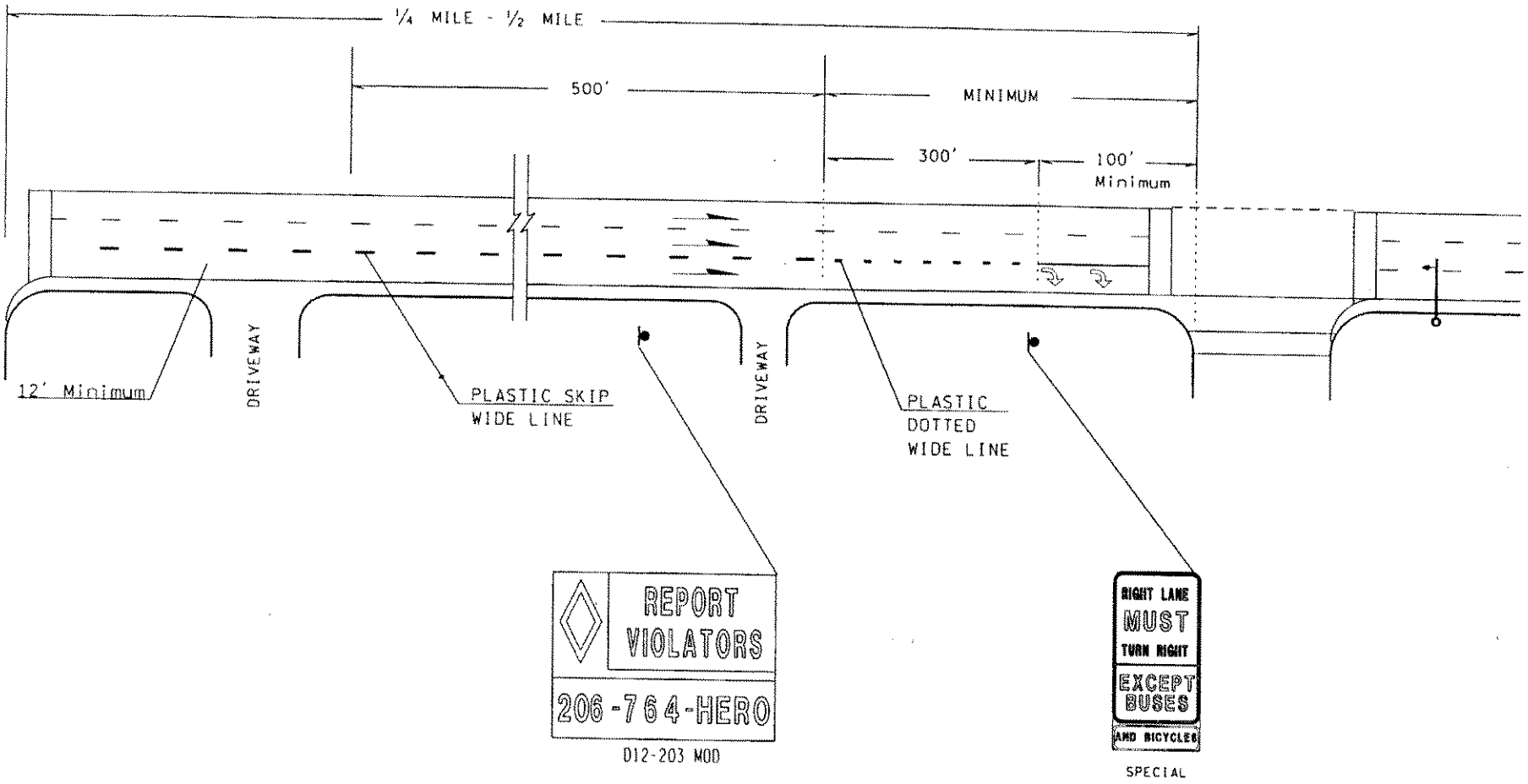
2) HOV SIGN SPACINGS SHOULD BE COORDINATED WITH ALL OTHER SIGNS AND NOT LESS THAN 500'
3) PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34.
4) ARROWS/CROSSWALK/PER STANDARD PLAN/ADA REQUIREMENTS
5) HOV LANE SYMBOLS ARE 12', PER DETAIL.

TYPICAL ARTERIAL TRANSIT LANE WITH FREQUENT DRIVEWAYS

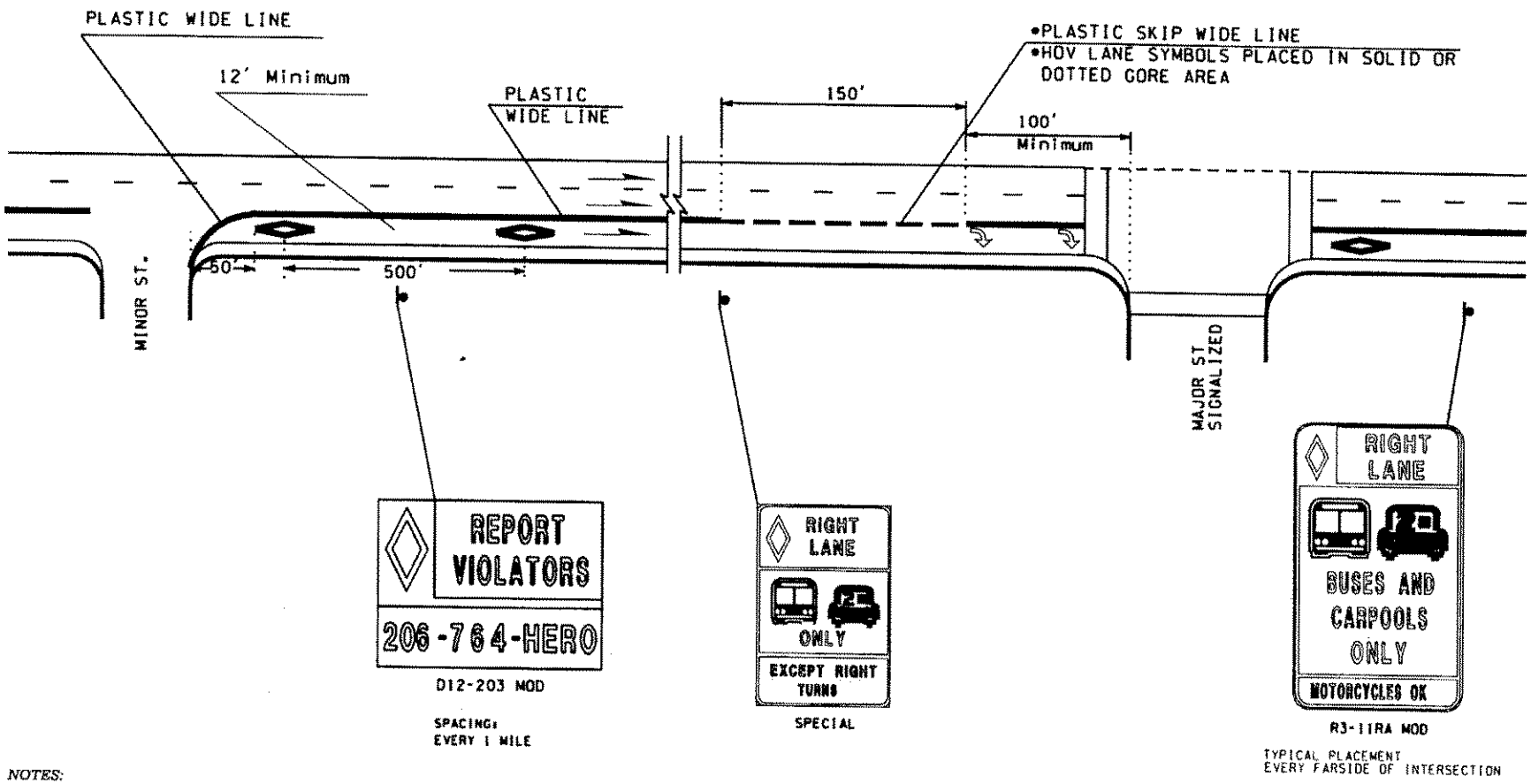
(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:
1) ARTERIAL SPACING FOR HOV LANE SYMBOLS TO BE 500'
2) HOV SIGN SPACINGS SHOULD BE COORDINATED WITH ALL OTHER SIGNS AND NOT LESS THAN 500'
3) PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34.
4) ARROWS/CROSSWALK/PER STANDARD PLAN/ADA REQUIREMENTS

TYPICAL ARTERIAL HOV LANE FOR SIGNALIZED INTERSECTION

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

1) ARTERIAL SPACING FOR HOV LANE SYMBOLS TO BE 500'

2) HOV SIGN SPACINGS SHOULD BE COORDINATED WITH ALL OTHER SIGNS AND NOT LESS THAN 500'

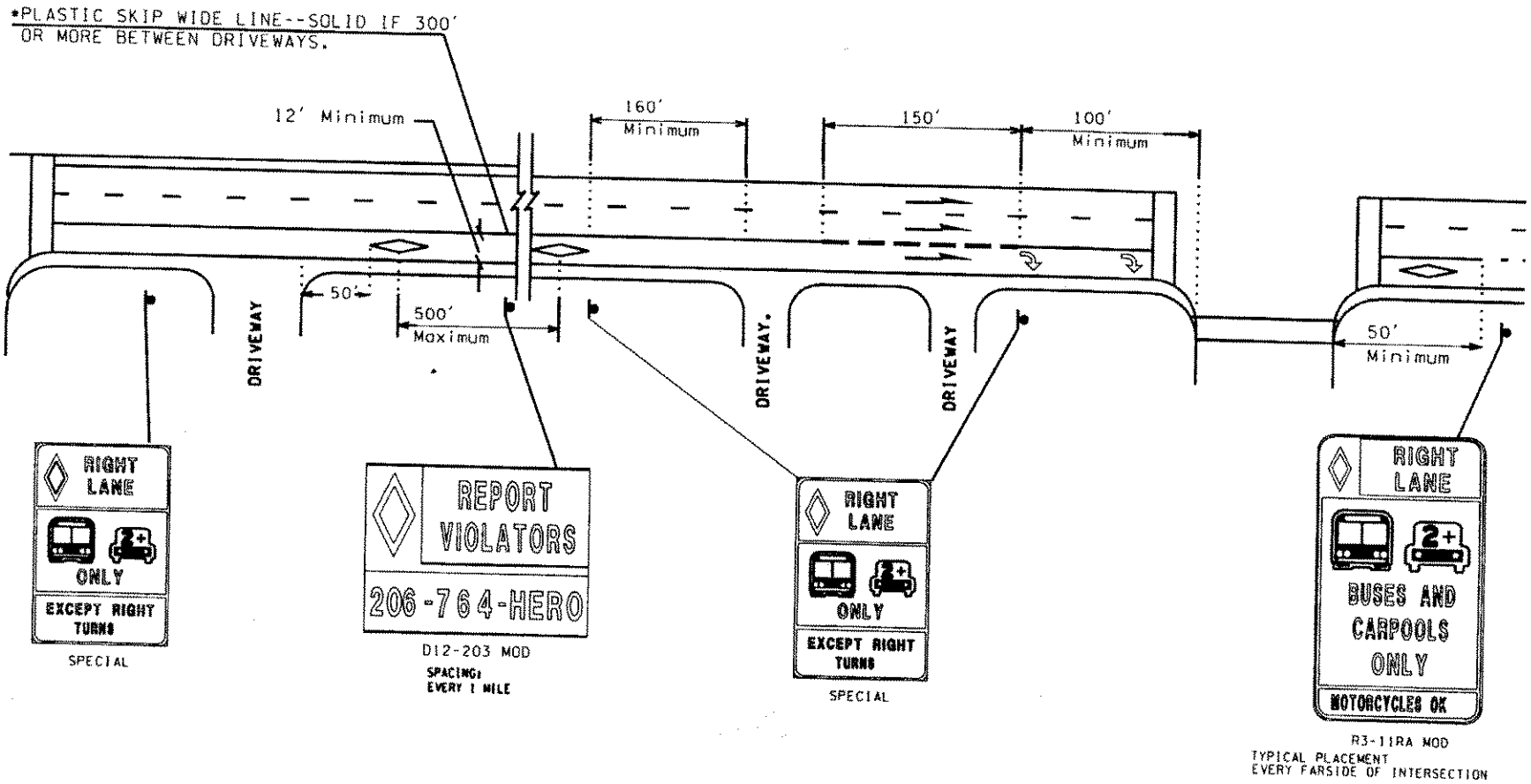
3) PLASTIC LINES REFER TO TYPE A OR D MATERIAL, SS 9-34.

4) ARROWS/CROSSWALK/ PER STANDARD PLAN/ADA REQUIREMENTS

5) HOV LANE SYMBOLS ARE 12', PER DETAIL

TYPICAL ARTERIAL HOV LANE WITH FREQUENT DRIVEWAYS

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

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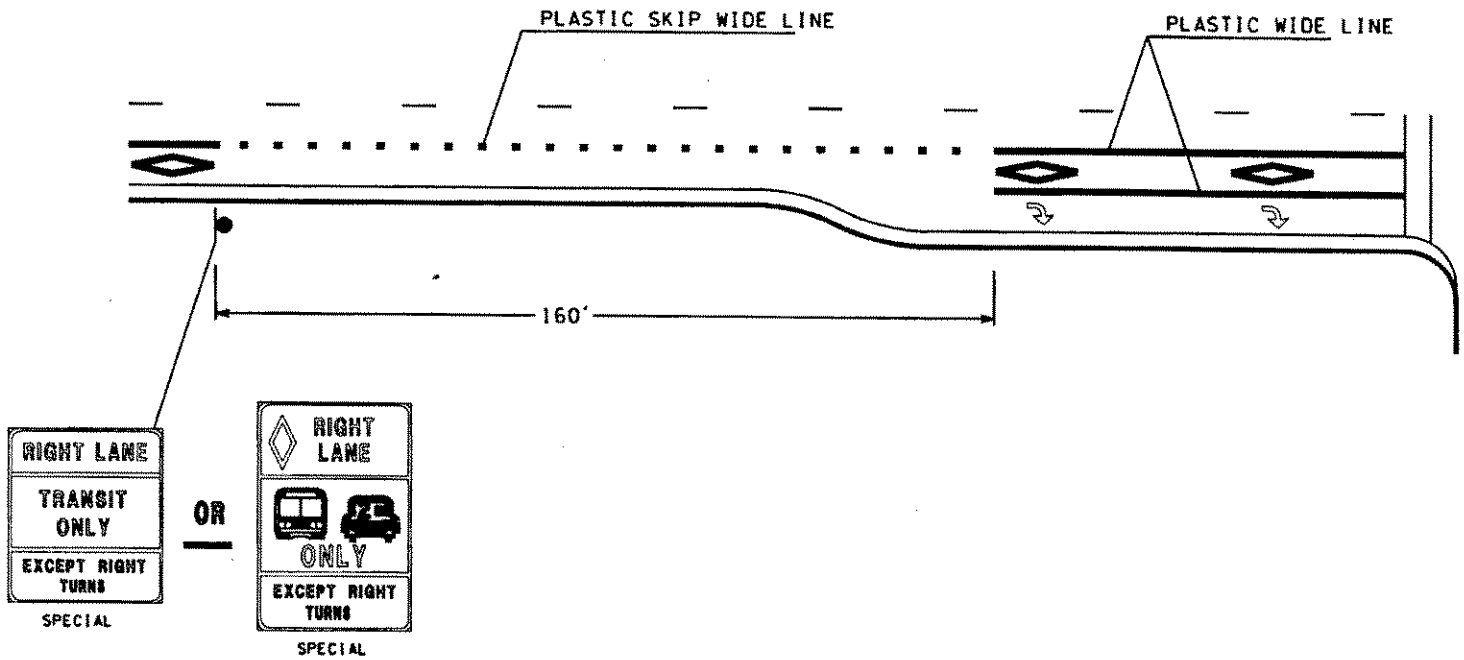
2) HOV SIGN SPACINGS SHOULD BE COORDINATED WITH ALL OTHER SIGNS AND NOT LESS THAN 500'
3) PLASTIC LINES REFERS TO TYPE A OR D MATERIAL, SS 9-34.
4) ARROWS/CROSSWALK/PER STANDARD PLAN/ADA REQUIREMENETS
5) HOV LANE SYMBOLS ARE 12', PER DETAIL

RIGHT TURN LANE/POCKET AT INTERSECTIONS WITH HIGH RIGHT TURNING VOLUME

(SIGNS AND SCHEMATIC--NOT TO SCALE)

(CHECK DIMENSION ON SIGN SHEETS)



NOTES:

1) ARTERIAL SPACING FOR HOV LANE SYMBOLS TO BE 500'

2) HOV SIGN SPACINGS SHOULD BE COORDINATED WITH ALL OTHER SIGNS AND NOT LESS THAN 500'

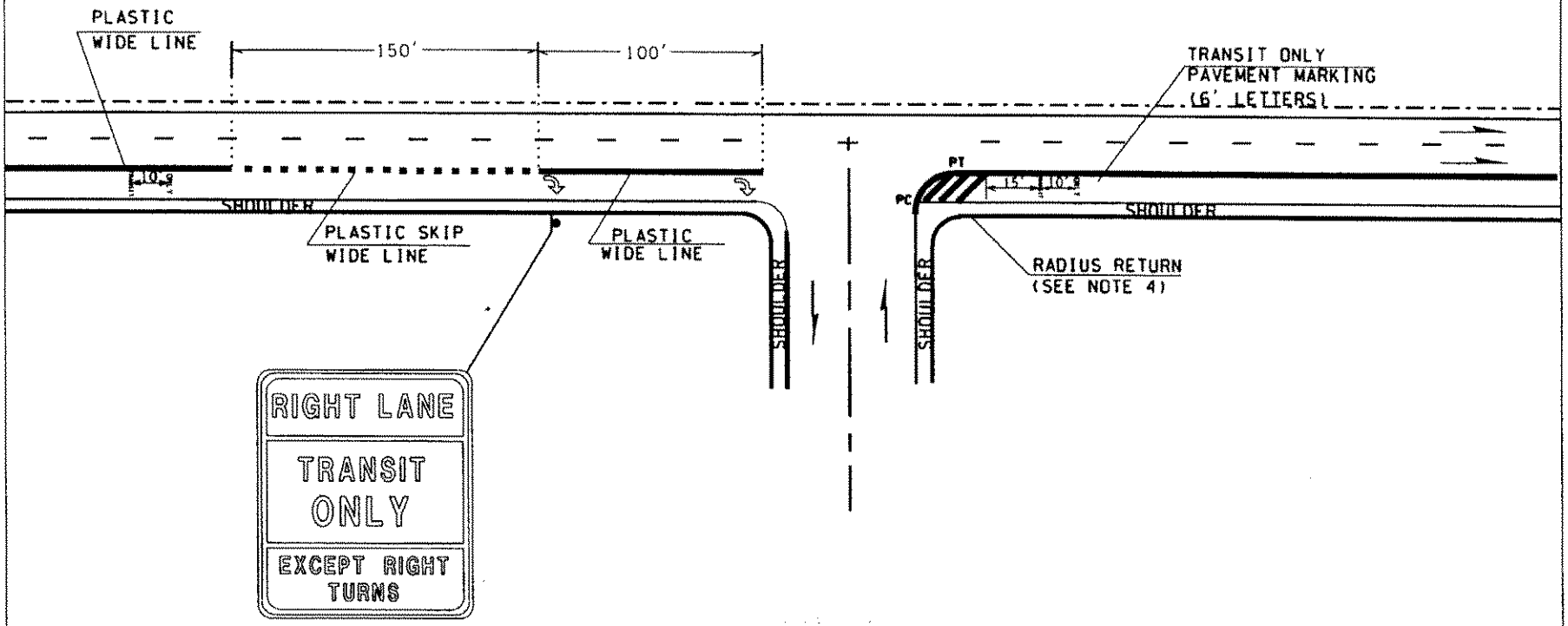
3) PLASTIC STRIPING REFERS TO TYPE A OR D MATERIAL, SS 9-34.

4) ARROWS/CROSSWALK/PER STANDARD PLAN/ADA REQUIREMENTS

5) HOV LANE SYMBOLS ON ARTERIAL ARE 12', PER DETAIL.

TYPICAL TRANSIT ONLY LANE FOR UNSIGNALIZED INTERSECTION

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)

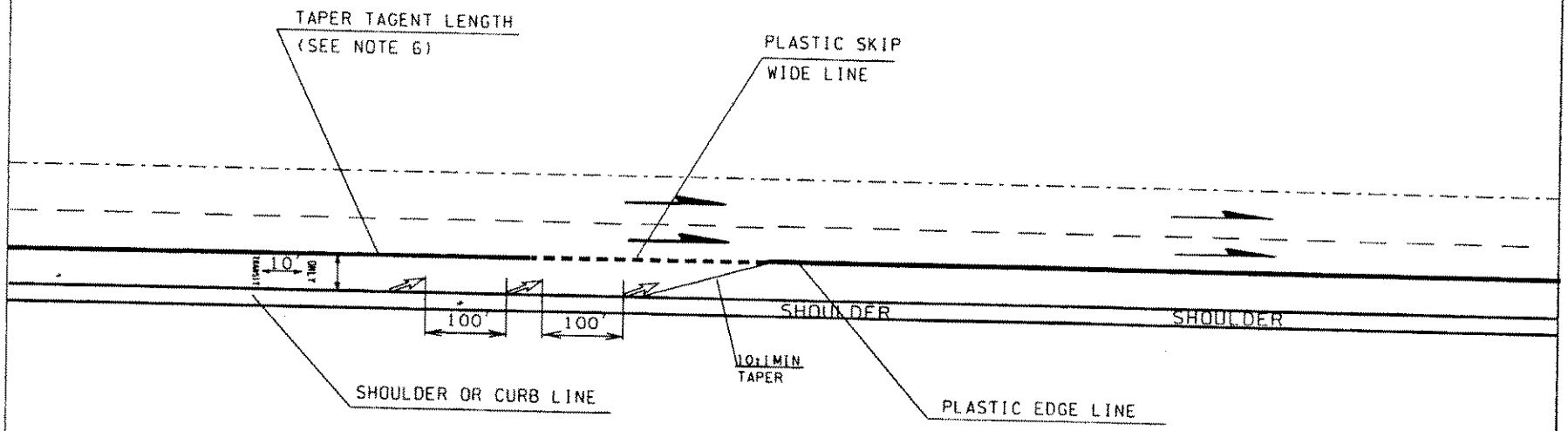


NOTES:

1) *PLASTIC LINES REFERS TO THERMOPLASTIC OR METHACRYLATE.*
2) *LONG-LINE TRANSIT LINES DONE IN TYPE A MATERIAL; ALL PAVEMENT MARKINGS DONE IN TYPE D MATERIAL, SS 9-34.*
3) *NO HOV LANE SYMBOLS USED WHERE THE RESTRICTED LANE IS A "TRANSIT ONLY" LANE.*
4) *8" WHITE DIAGONAL DASH LINES 45 DEGREE ANGLE; 3 LINES PER RADIUS RETURN AREA.*

TRANSIT ONLY LANE REDUCTION

(SIGNS AND SCHEMATIC--NOT TO SCALE)
(CHECK DIMENSIONS ON SIGN SHEETS)



NOTES:

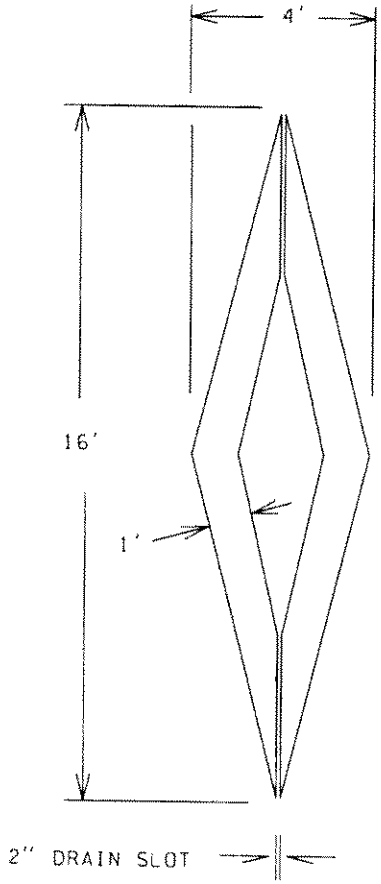
1) *PLASTIC LINES REFER TO TYPE A OR D MATERIAL, SS 9-34.*
2) *LONG-LINE TRANSIT LANE LINES DONE IN TYPE A MATERIAL; ALL PAVEMENT MARKINGS DONE IN TYPE D MATERIAL, SS 9-34.*
3) *NO HOV LANE SYMBOLS USED WHERE THE RESTRICTED LANE IS A "TRANSIT ONLY" LANE.*
4) *8" WHITE DIAGONAL DASH LINES 45 DEGREE ANGLE; 3 LINES PER RADIUS RETURN AREA.*
6) *DIAGONAL ARROWS LAYOUT PER RED BOOK*
6) *DESIREABLE TAPER TAGENT LENGTH W x POSTED SPEED EG (12FT x 45 = 540FT MIN 150FT)*

Section 5
Pavement Markings

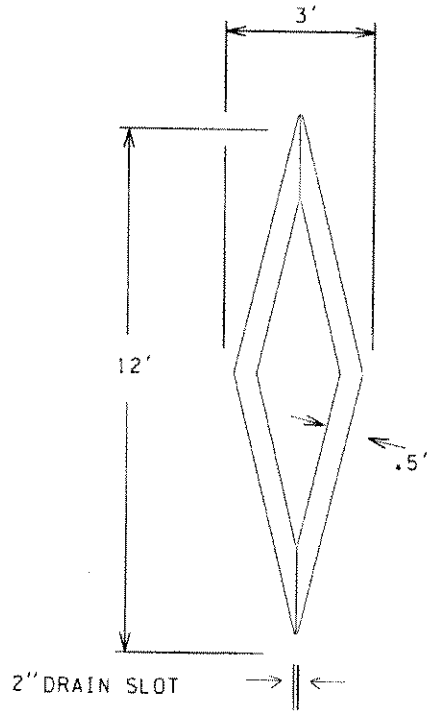
HOV Lane Symbols

(STANDARD APPLICATIONS)

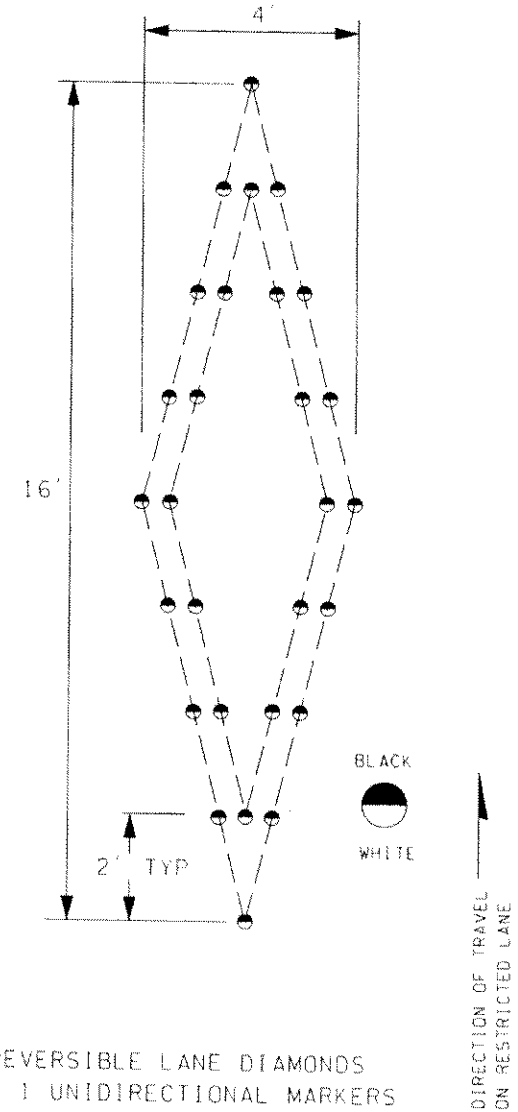
Back to TOC



FREEWAYS
PLASTIC HOV LANE SYMBOL
TYPE 1



ARTERIALS AND RAMPS
PLASTIC HOV LANE
SYMBOL TYPE 2

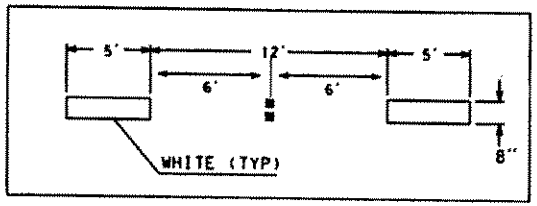


REVERSIBLE LANE DIAMONDS
TYP 1 UNIDIRECTIONAL MARKERS

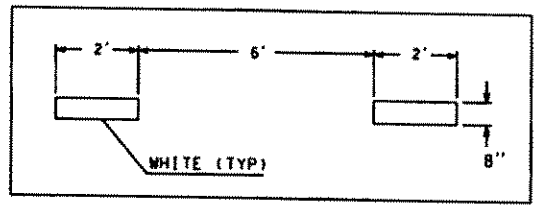
TYPE D MATERIAL SS 9-34

HOV STRIPE DETAILS

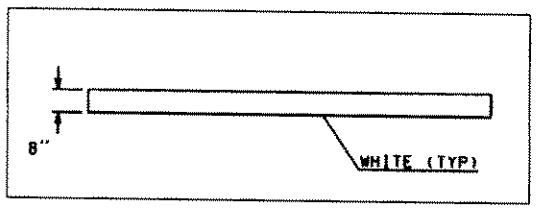
(SCHEMATIC--NOT TO SCALE)



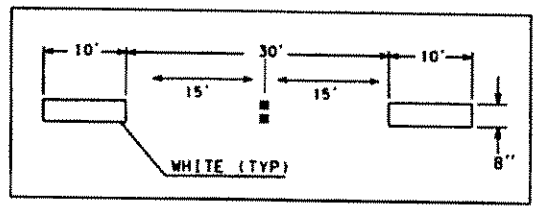
• DROP LANE LINE DETAIL



DOTTED WIDE LINE DETAIL

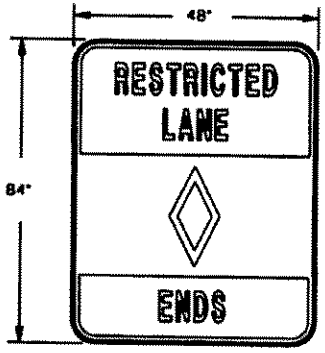


WIDE LINE DETAIL

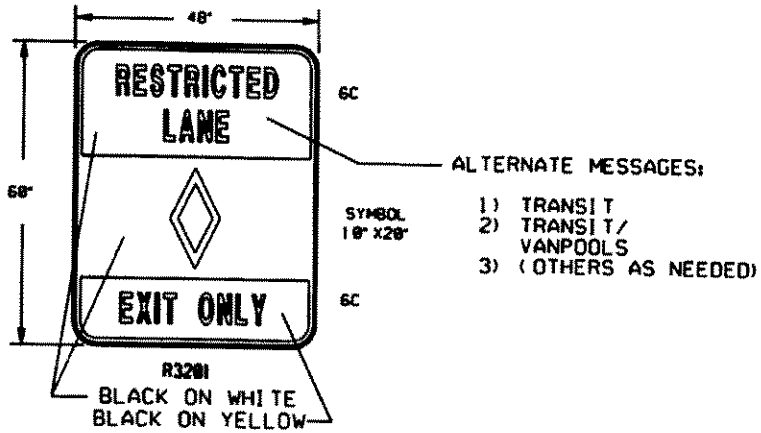


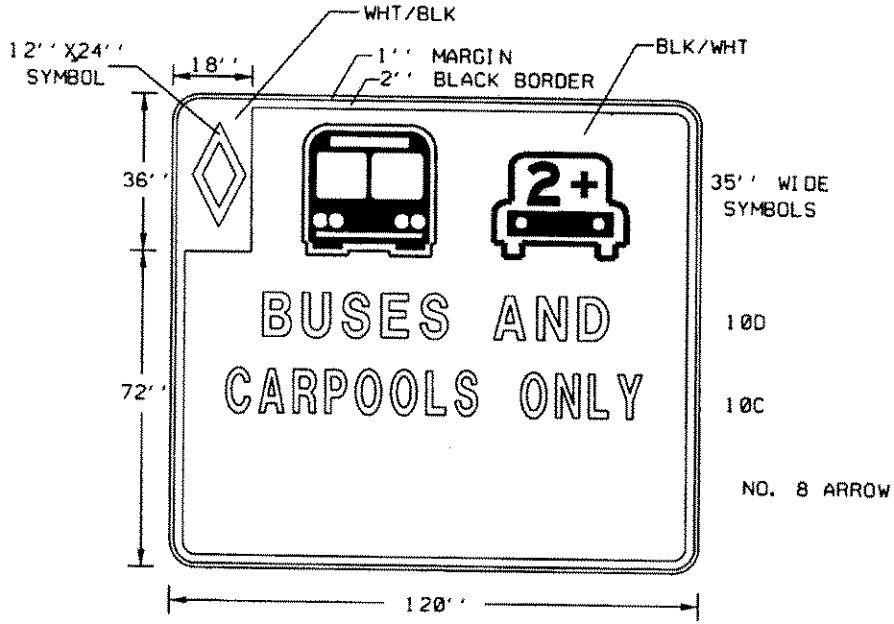
SKIP WIDE LINE DETAIL

Section 6
Sign Details



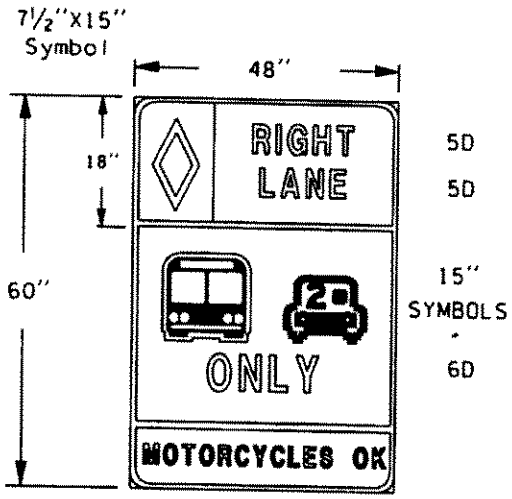
R3-12



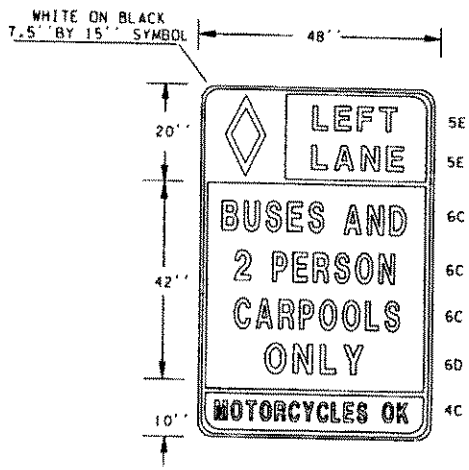


R3-1401

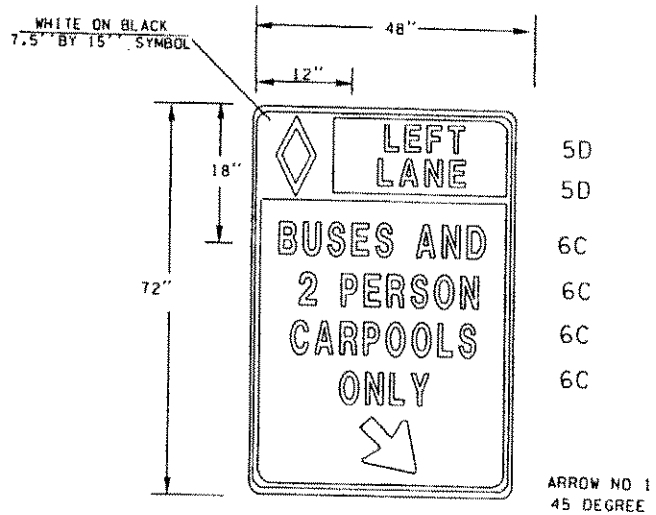
TO SCALE



R3-1103L&R
BLACK ON WHITE

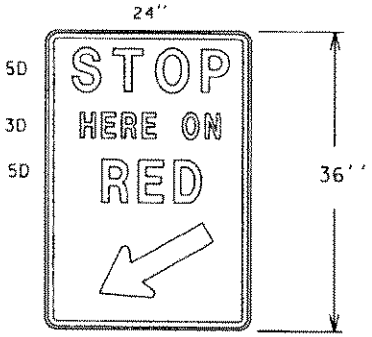


R3-1101L&R

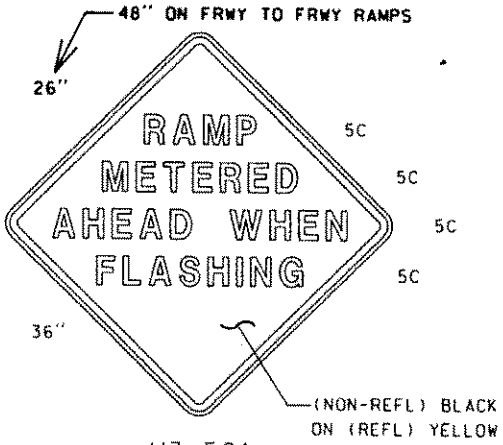


R3-1102L&R
BLACK ON WHITE

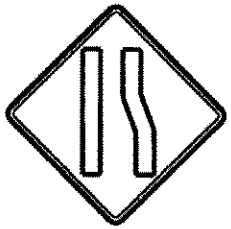
SIGN COLORS THIS PAGE PER SIGN DESIGN MANUAL EXCEPT AS NOTED



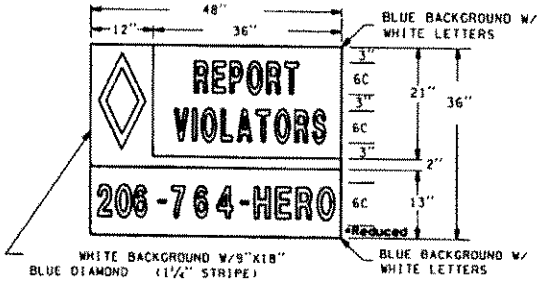
R10-6



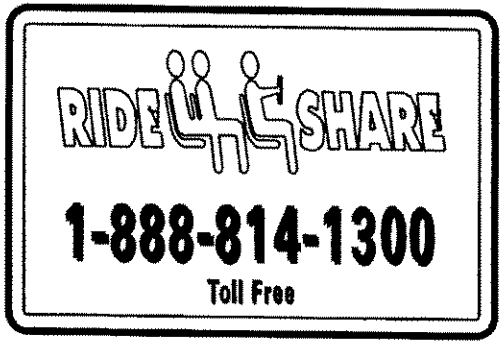
W3-501



W4-2L



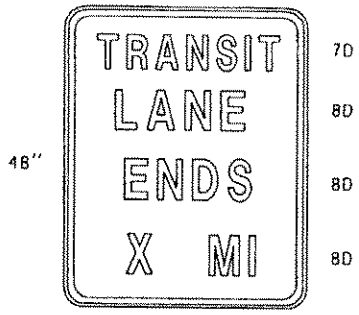
110-101



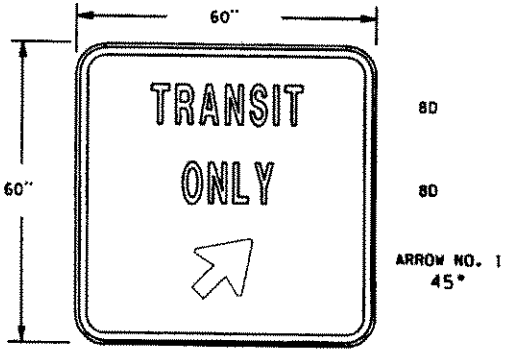
SPECIAL

(SEE NOTE 5)

PANTONES 072, 100
(BLUE, YELLOW)



R3-1503



R3-2003
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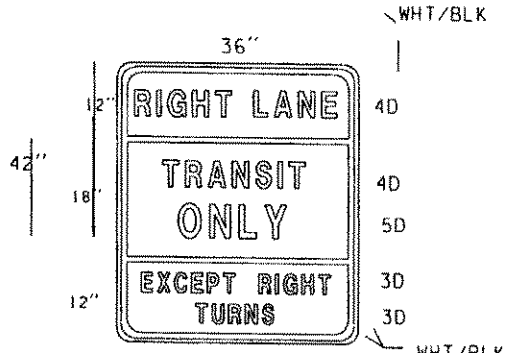
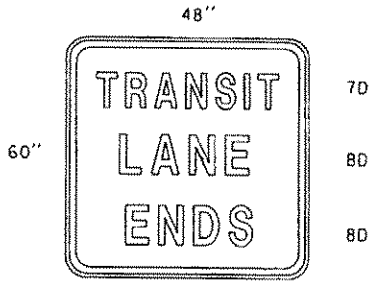
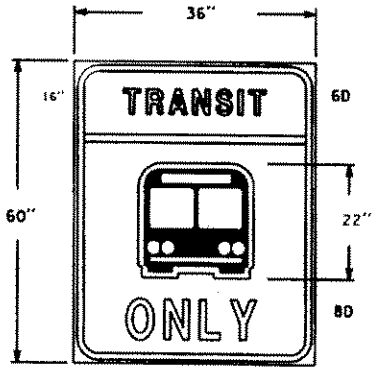


R3-2004



R3-1502



R3-2002
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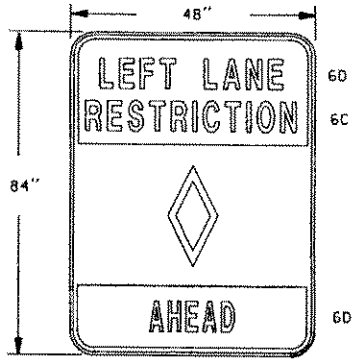
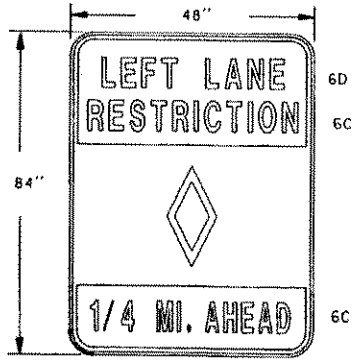


R3-103



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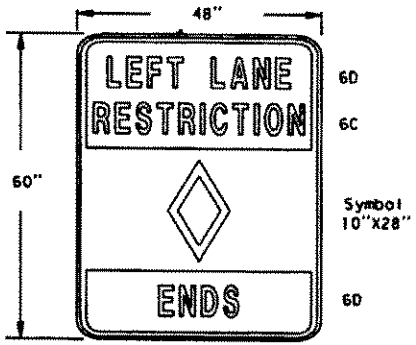
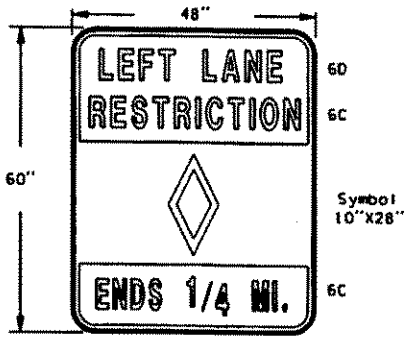
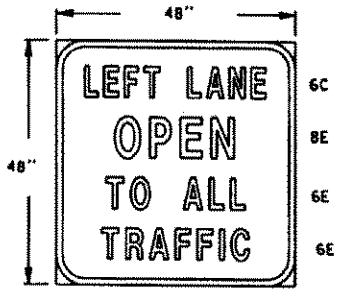


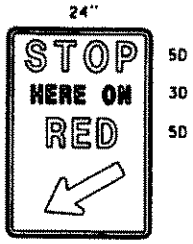
R3-1201



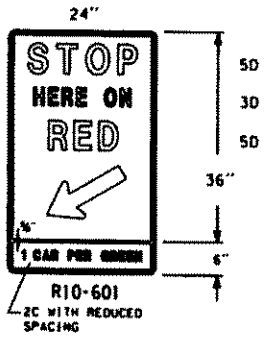
R3-1202



R3-1203



R10-6
BLACK ON WHITE



R10-601
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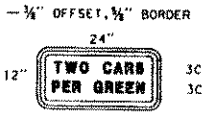
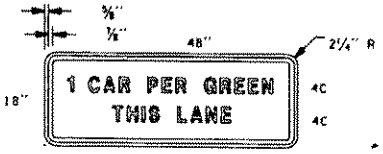
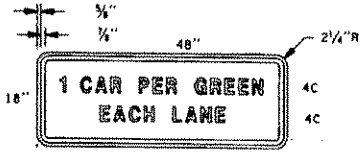


R3-1401
BLACK ON WHITE



R3-1402
BLACK ON WHITE

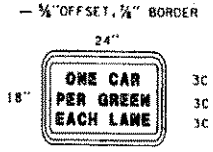
Alternate Message:
2 CARS PER GREEN THIS LANE
(With reduced letter spacing)



R3-1403
BLACK ON WHITE

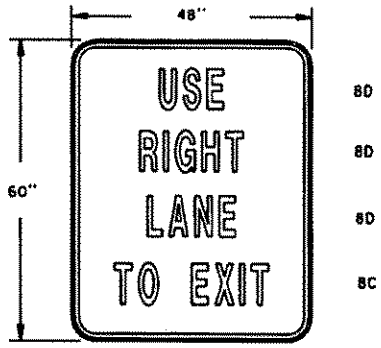
Alternate Message:
2 CARS PER GREEN EACH LANE
(With reduced letter spacing)

R10-1404
BLACK ON WHITE

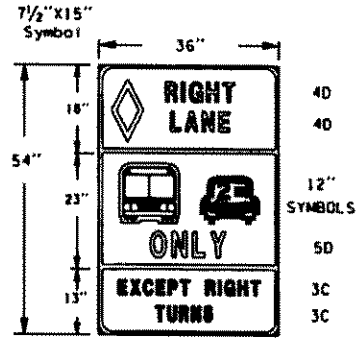


R10-1405
BLACK ON WHITE

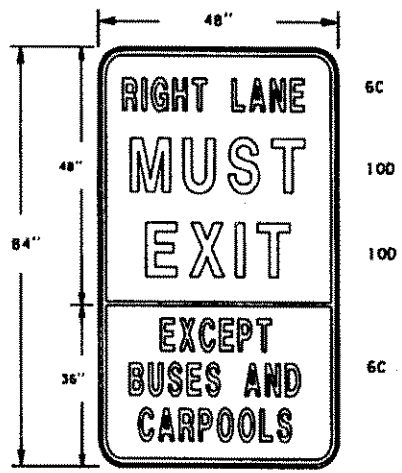
Alternate Message:
2 CARS PER GREEN EACH LANE



R3-703



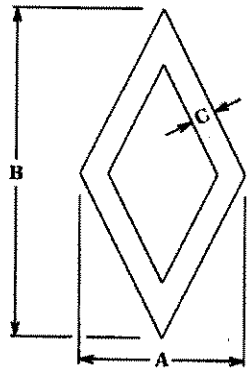
R3-2004
BLACK ON WHITE



R3-701 MOD

39

Preferential Sign Symbol

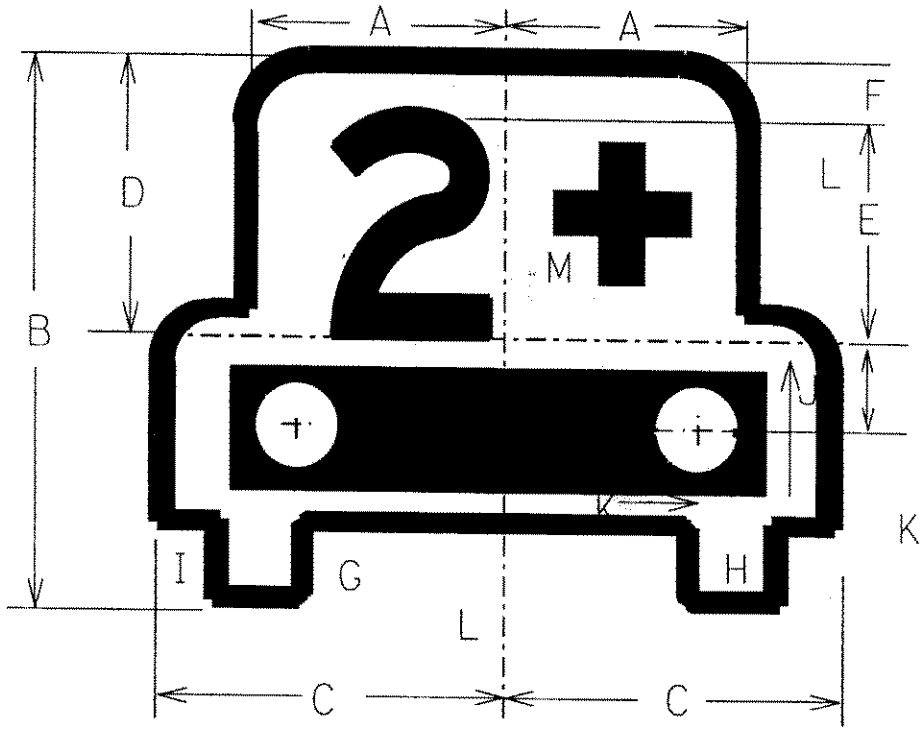


ENGLISH (inches)

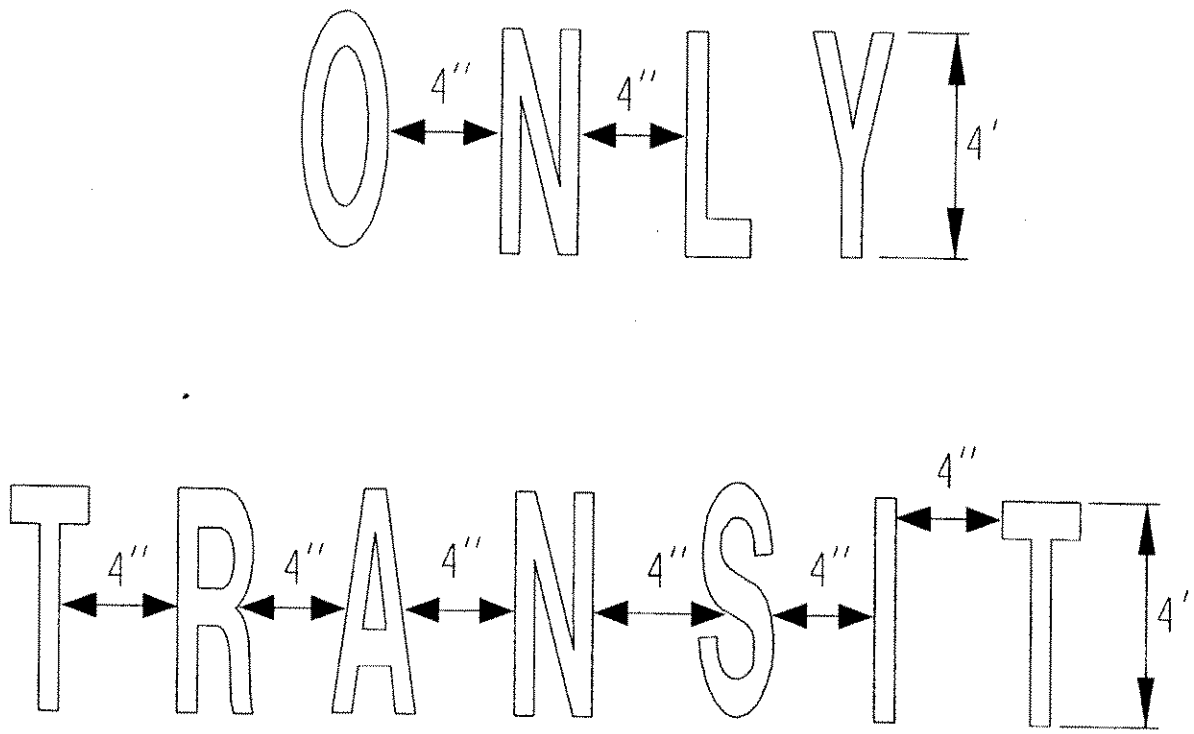
Symbol Size	A	B	C
5X10	5"	10"	¾"
7½X15	7½"	15"	1⅛"
8X16	8"	16"	1¼"
9X18	9"	18"	1¼"
10X28	10"	20"	1½"
12X28	12"	24"	2"
16X32	16"	32"	2½"
28X40	20"	40"	3"

Carpool Symbols (English)

For HOV Signs

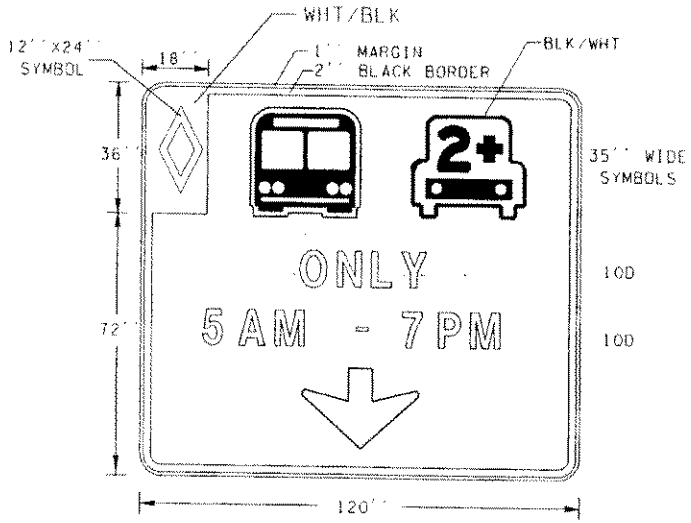


SIGN	DIMENSIONS (INCHES)															
	A	B	C	D	E	F	G	H	I	J	M	K	L	R1	R2	R3
MIN	5¾	12	7⅝	5 9/16	6E	2	1¾	2	1¼	2	2	4½	¾	1½	1 3/16	1
STD	8⅝	18	11½	8⅜	9E	3	2⅝	3	1⅞	3	3	6¾	1¼	2¼	1¾	1½
SPEC	11½	28	15¼	11⅛	12E	4	3½	4	2½	4	4	9	1¾	3	2⅜	2
SPEC	14⅜	30	19	13⅞	15E	5	4⅜	5	3⅛	5	5	11¼	2	3⅜	3	2½

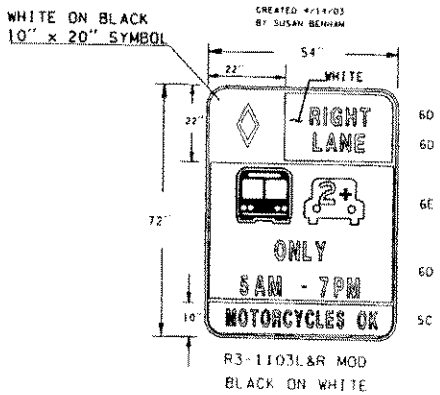


TRANSIT LANE - SPACING FOR LEGEND MARKINGS

Back to TOC

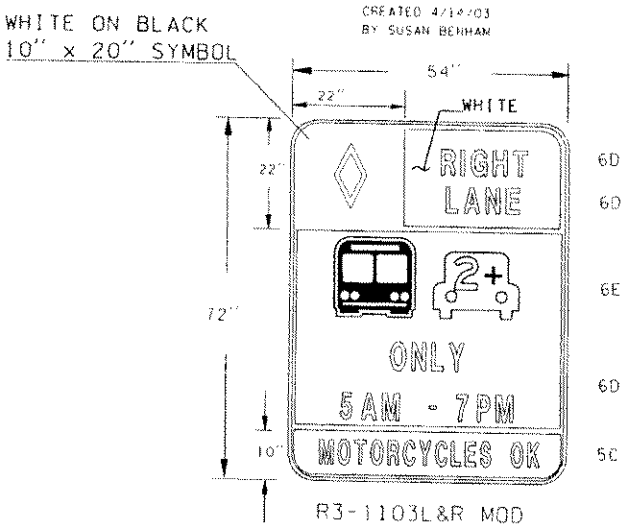

WHT/BLK
12''x24''
SYMBOL
18''
1'' MARGIN
2'' BLACK BORDER
BLK/WHT
36''
2+
35'' WIDE
SYMBOLS
ONLY
10D
72''
5AM - 7PM
10D
120''

Back to TOC


WHITE ON BLACK
10" x 20" SYMBOL
CREATED 4/14/03
BY SUSAN BENHAM
54"
22"
WHITE
22"
72"
10"
RIGHT
LANE
2+
ONLY
5AM - 7PM
MOTORCYCLES OK
6D
6D
6E
6D
SC
R3-1103L&R MOD
BLACK ON WHITE

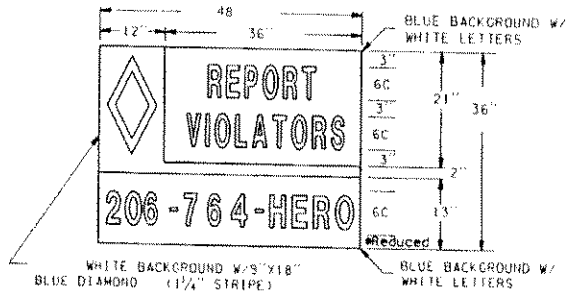
Back to TOC

COMMONLY USED ON SHOULDERS



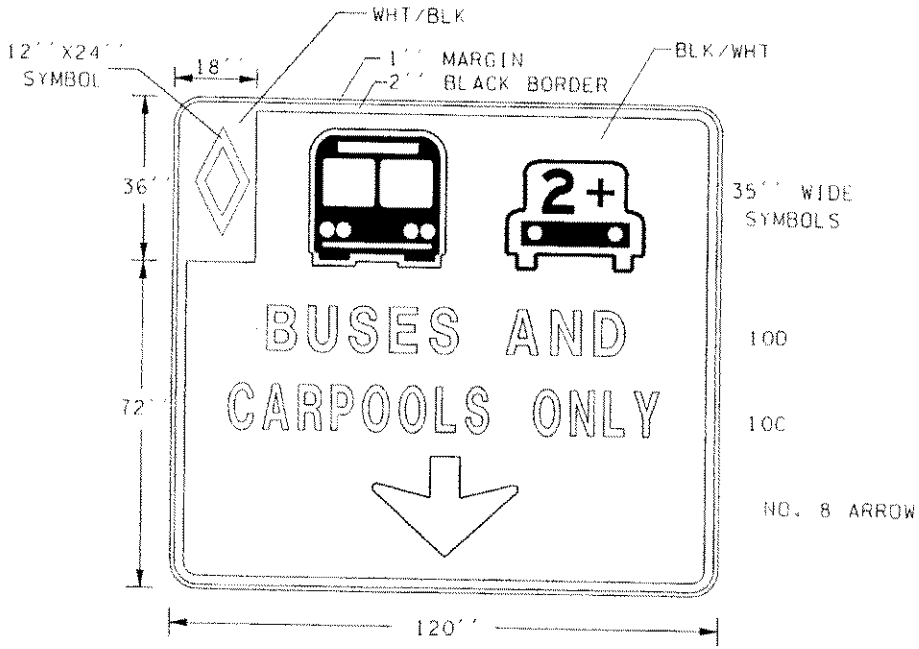
R3-1103L&R MOD
BLACK ON WHITE

COMMONLY USED ON SHOULDERS



110-101

COMMONLY USED ON OVERHEADS



R3-1401