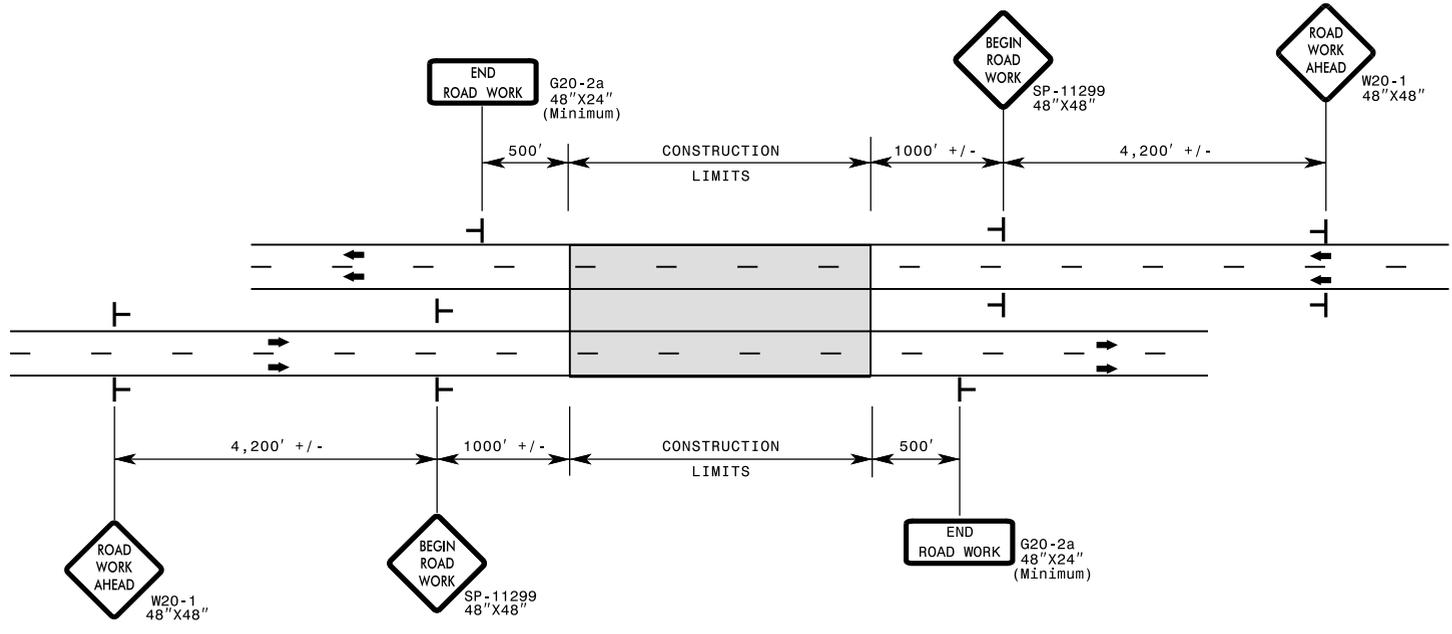
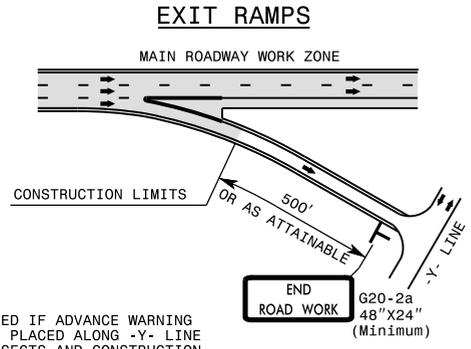


DETAIL A

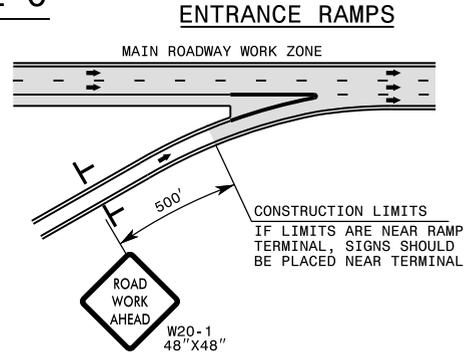


DETAIL B



NOTE: SIGN NOT REQUIRED IF ADVANCE WARNING SIGNS HAVE BEEN PLACED ALONG -Y- LINE THAT RAMP INTERSECTS AND CONSTRUCTION IS UNDERWAY. IF CONSTRUCTION LIMITS ARE AT END OF RAMP, PLACE SIGN AT END OF RAMP.

DETAIL C



GENERAL NOTES

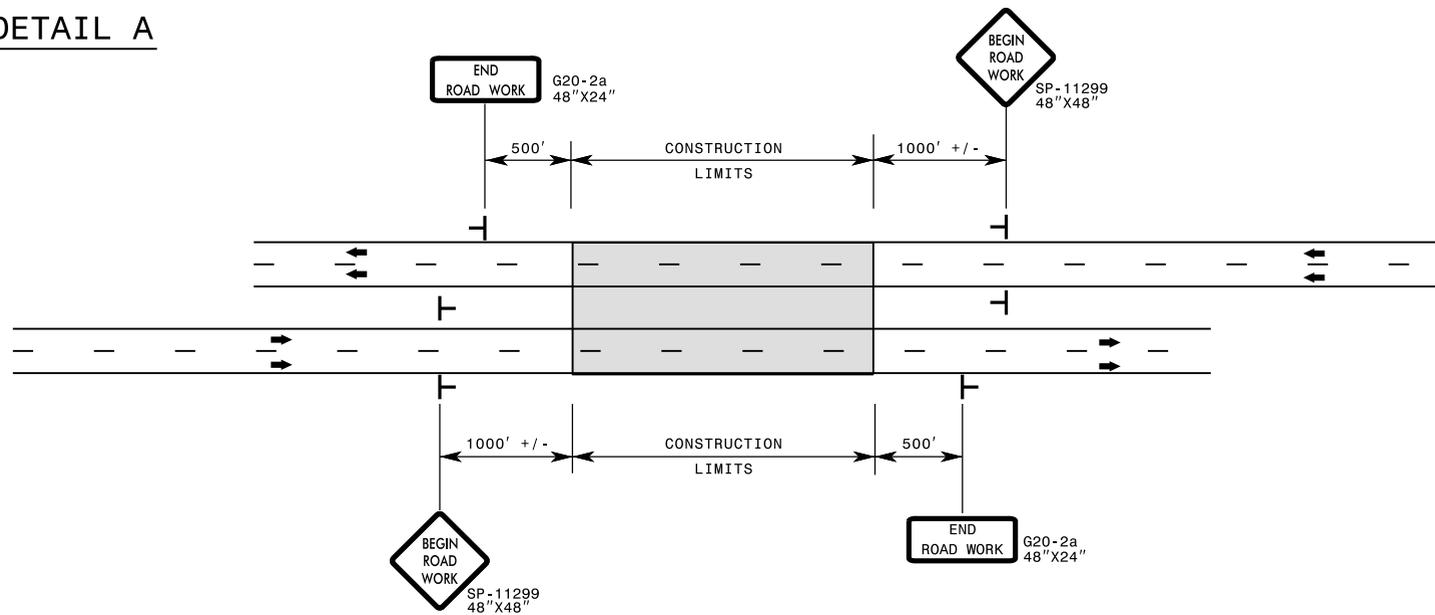
- 1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.
- 2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 72 CONSECUTIVE HOURS.
- 3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- 4- ERECT SIGNS PER RSD. 1110.01. PAYMENT FOR WOOD POSTS, 3 LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.
- 5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.
- 6- DO NOT BACK BRACE SIGN SUPPORTS.

LEGEND
 ┆ STATIONARY SIGN
 ← DIRECTION OF TRAFFIC FLOW

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
WORK ZONE ADVANCE WARNING SIGNS FOR HIGH SPEED FACILITIES > 60 MPH

DETAIL A

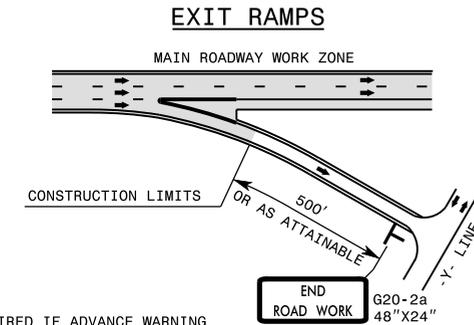


GENERAL NOTES

- 1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.
- 2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 72 CONSECUTIVE HOURS.
- 3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- 4- ERECT SIGNS PER RSD. 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.
- 5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.
- 6- DO NOT BACK BRACE SIGN SUPPORTS.
- 7- TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

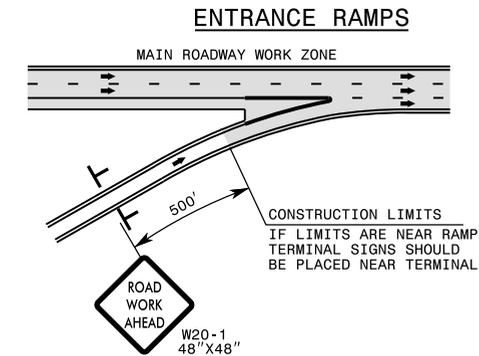


DETAIL B

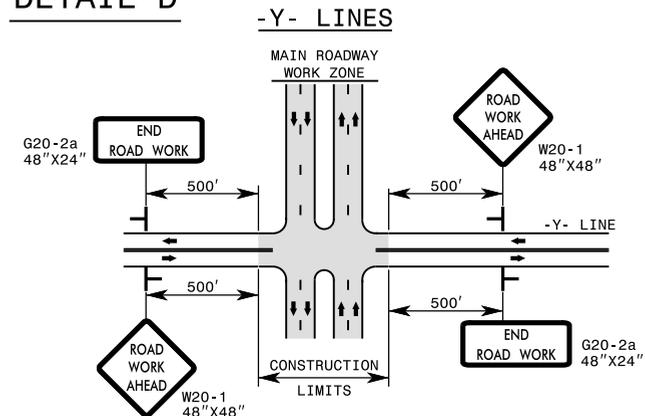


NOTE: SIGN NOT REQUIRED IF ADVANCE WARNING SIGNS HAVE BEEN PLACED ALONG -Y- LINE THAT RAMP INTERSECTS. IF CONSTRUCTION LIMITS ARE AT END OF RAMP, PLACE SIGN AT END OF RAMP.

DETAIL C



DETAIL D



DUAL MOUNT SIGNS ON DIVIDED HIGHWAYS AND INCREASE SIGN SPACING TO 1000'+/-.

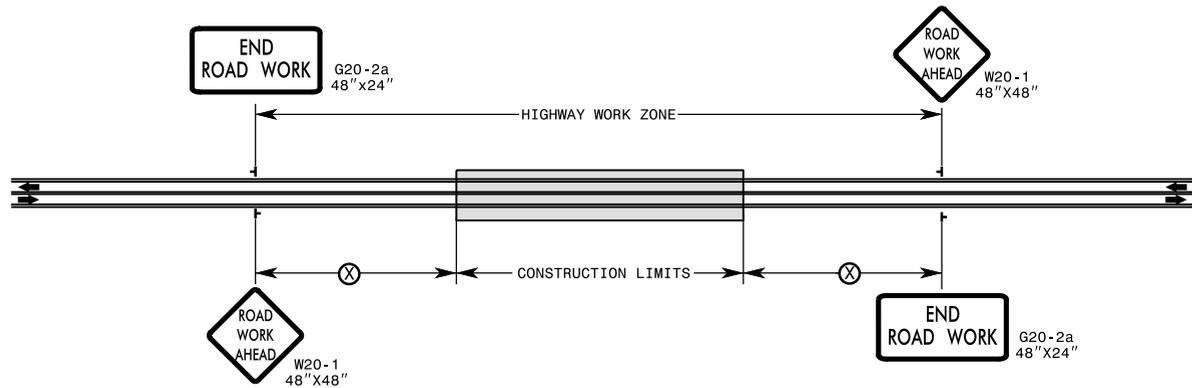
NO STATIONARY -Y- LINE ADVANCE WARNING SIGNAGE IS REQUIRED UNLESS THERE IS MORE THAN 1000' OF CONSTRUCTION ALONG THE -Y- LINE.

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

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 ROADWAY STANDARD DRAWING FOR
WORK ZONE ADVANCE WARNING SIGNS FOR FACILITIES ≤ 55 MPH

SHEET 2 OF 3
1101.01

TWO-WAY UNDIVIDED (L-LINES)

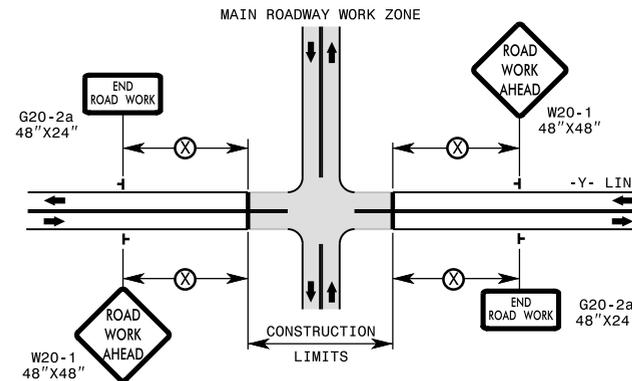


POSTED SPEED LIMIT (MPH)	RECOMMENDED MINIMUM SIGN SPACING
≤ 50	500'
55	1000'

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

1-24

ROADWAYS INTERSECTING ALONG TWO-WAY UNDIVIDED WORK ZONE (Y-LINES)



NO STATIONARY -Y- LINE ADVANCE WARNING SIGNAGE IS REQUIRED UNLESS THERE IS MORE THAN 1000' OF CONSTRUCTION ALONG THE -Y- LINE.

GENERAL NOTES

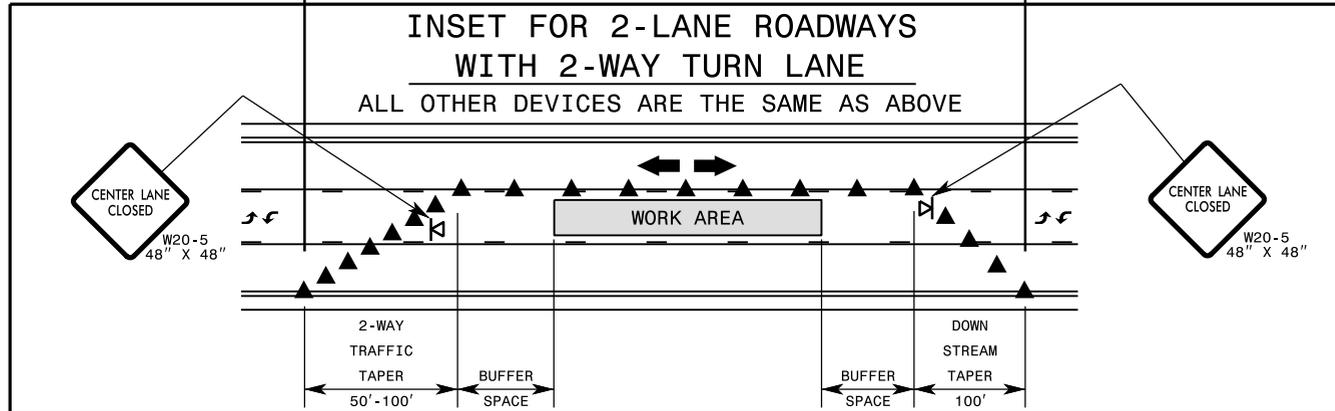
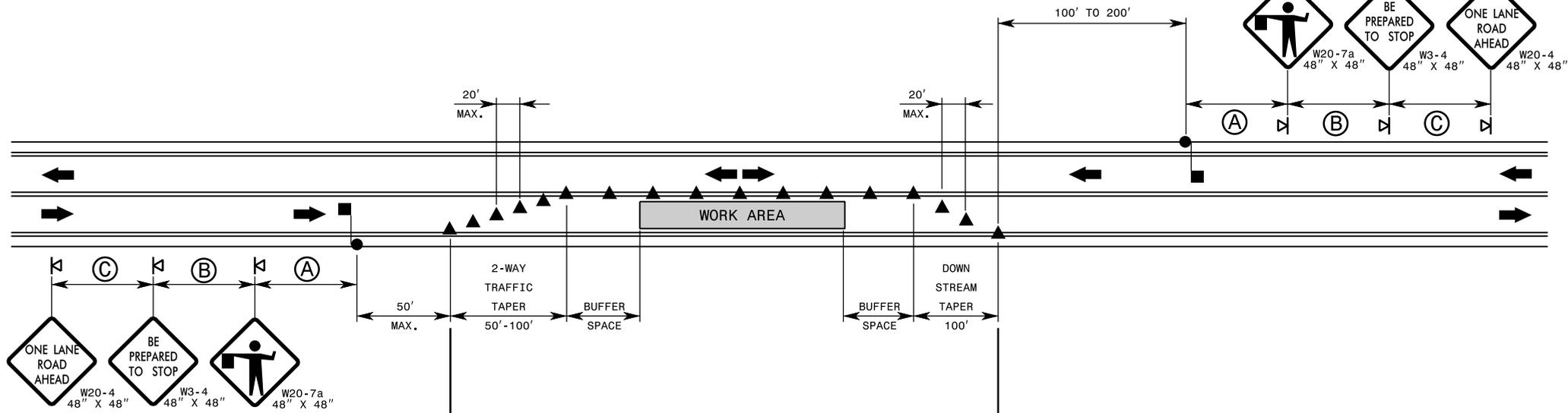
- 1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.
- 2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 72 CONSECUTIVE HOURS.
- 3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- 4- ERECT SIGNS PER RSD 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.
- 5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.
- 6- DO NOT BACK BRACE SIGN SUPPORTS.

LEGEND

- ┆ STATIONARY SIGN
- ← DIRECTION OF TRAFFIC FLOW

ROADWAY STANDARD DRAWING FOR

**WORK ZONE ADVANCE WARNING SIGNS FOR
 TWO-WAY UNDIVIDED FACILITIES**



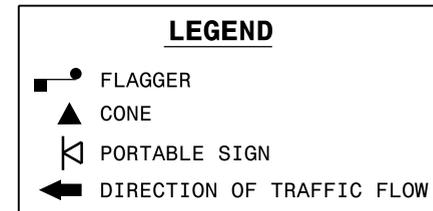
GENERAL NOTES FOR FLAGGING OPERATIONS

- 1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.
- 2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.
- 3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 4- FOR POSTED SPEED LIMITS BELOW 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 20 FEET IN THE TAPERS AND THE SHIFTS AND 40 FEET IN THE TANGENTS. FOR POSTED SPEED LIMITS GREATER THAN OR EQUAL TO 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 40 FEET IN THE TAPERS AND THE SHIFTS AND 80 FEET IN THE TANGENTS.
- 5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO RSD. 1101.11, SHEET 2).
- 6- DO NOT STOP ALL DIRECTIONS OF TRAFFIC FOR MORE THAN 5 MINUTES AT A TIME.
- 7- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.
- 8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7A) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.
- 9- REFER TO THE CURRENT MUTCD FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.
- 10- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

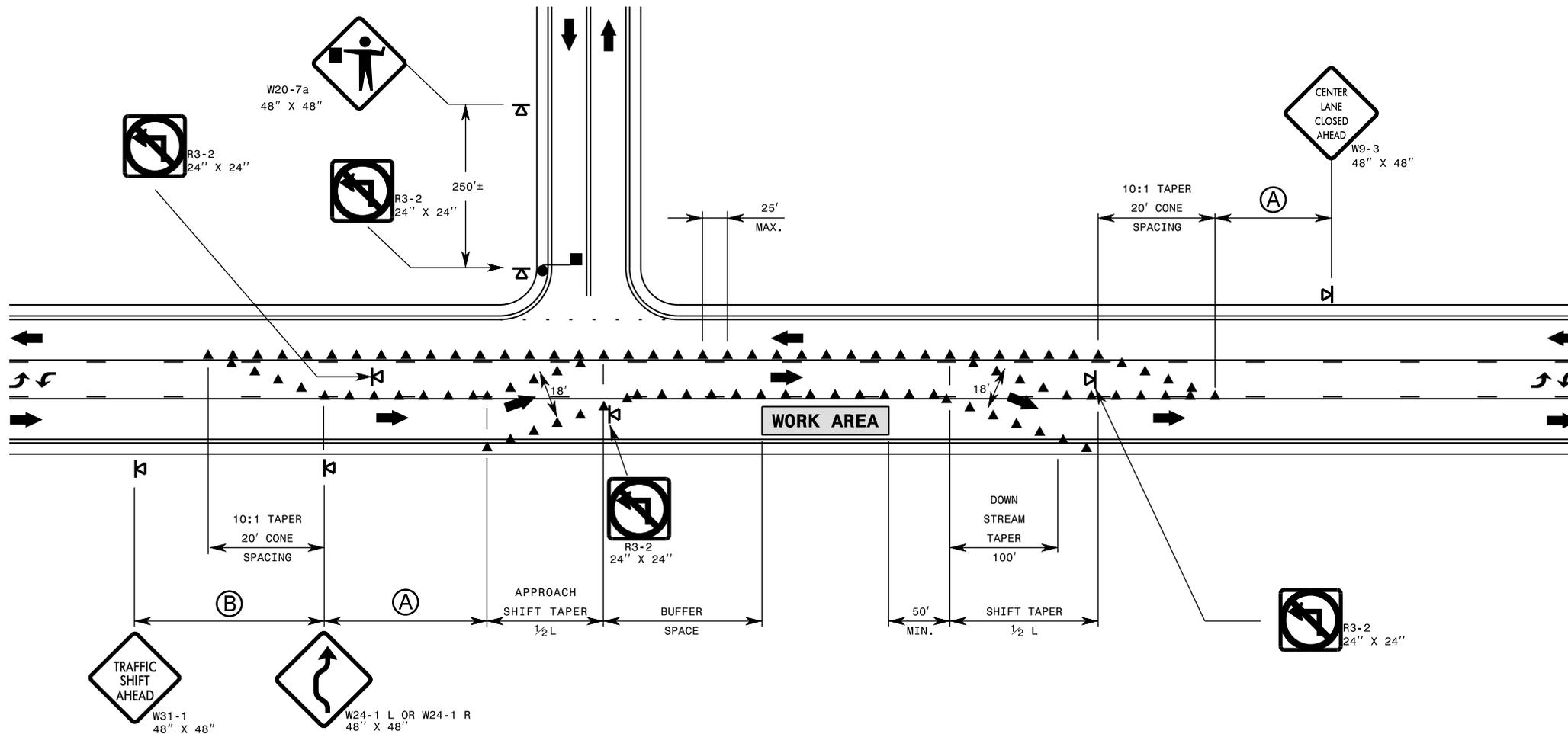
- 11- IF VEHICLE QUEUES WILL REACH WITHIN 100' OF EITHER SIDE OF ACTIVE RAILROAD TRACKS, PROVIDE A UNIFORMED LAW ENFORCEMENT OFFICER OR FLAGGER TO PREVENT VEHICLES FROM STOPPING WITHIN THE GRADE CROSSING. PROVIDE OFFICER OR FLAGGER EVEN IF AUTOMATIC WARNING MEASURES ALREADY EXIST.
- 12- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

GENERAL NOTES FOR PILOT CAR OPERATIONS

- 1- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.
- 2- IF ROADWAY WIDTH IS LESS THAN 22 FEET (EOP TO EOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA, AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.
- 3- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.
- 4- MOUNT SIGN G20-4 "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.
- 5- UNLESS APPROVED BY THE ENGINEER, DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE, MEASURED FROM THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.
- 6- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.

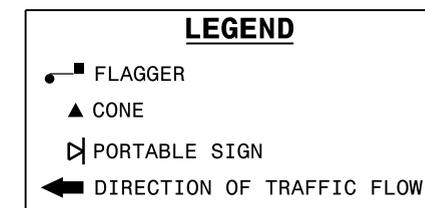


1-24

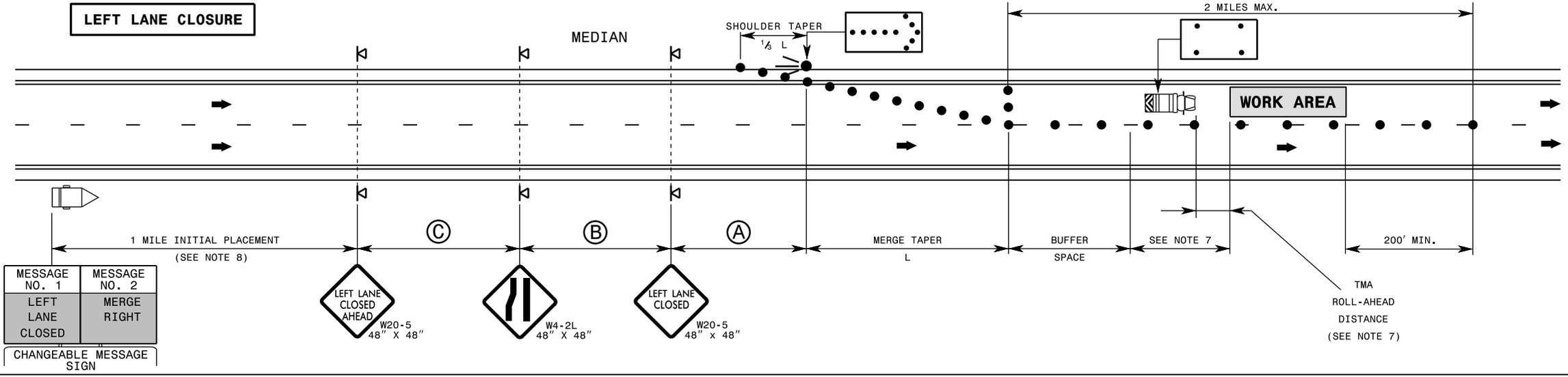


GENERAL NOTES

- 1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.
- 2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 3- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE BEGINNING OF THE APPROACH SHIFT TAPER (REFER TO RSD. 1101.11, SHEET 2).
- 4- TMAs ARE REQUIRED WHEN ADEQUATE BUFFER SPACE CANNOT BE ATTAINED. POSITION TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01.
- 5- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.
- 6- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
- 7- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7a) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS, PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.
- 8- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.



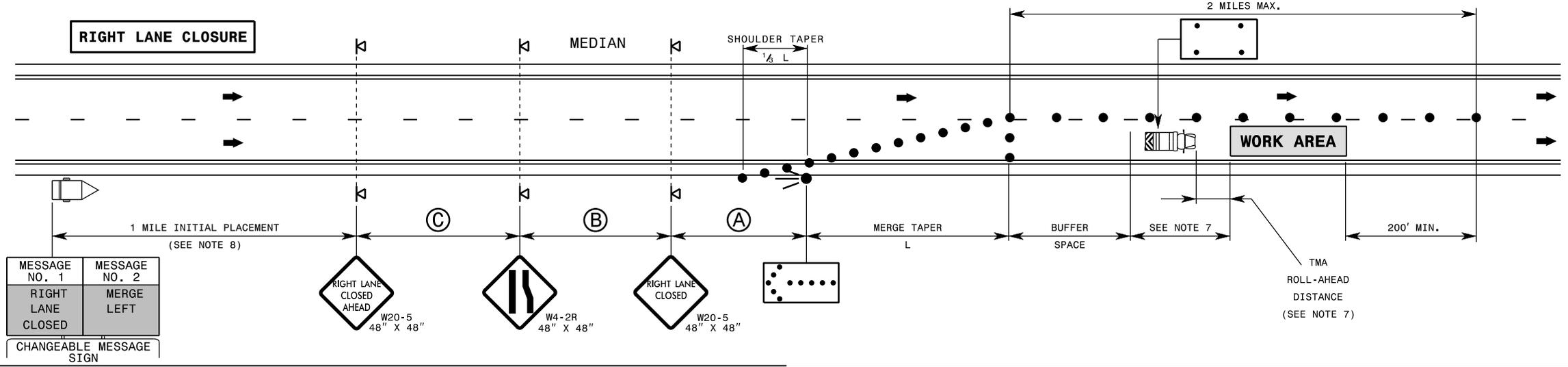
LEFT LANE CLOSURE



MESSAGE NO. 1	MESSAGE NO. 2
LEFT LANE CLOSED	MERGE RIGHT

CHANGEABLE MESSAGE SIGN

RIGHT LANE CLOSURE



MESSAGE NO. 1	MESSAGE NO. 2
RIGHT LANE CLOSED	MERGE LEFT

CHANGEABLE MESSAGE SIGN

GENERAL NOTES

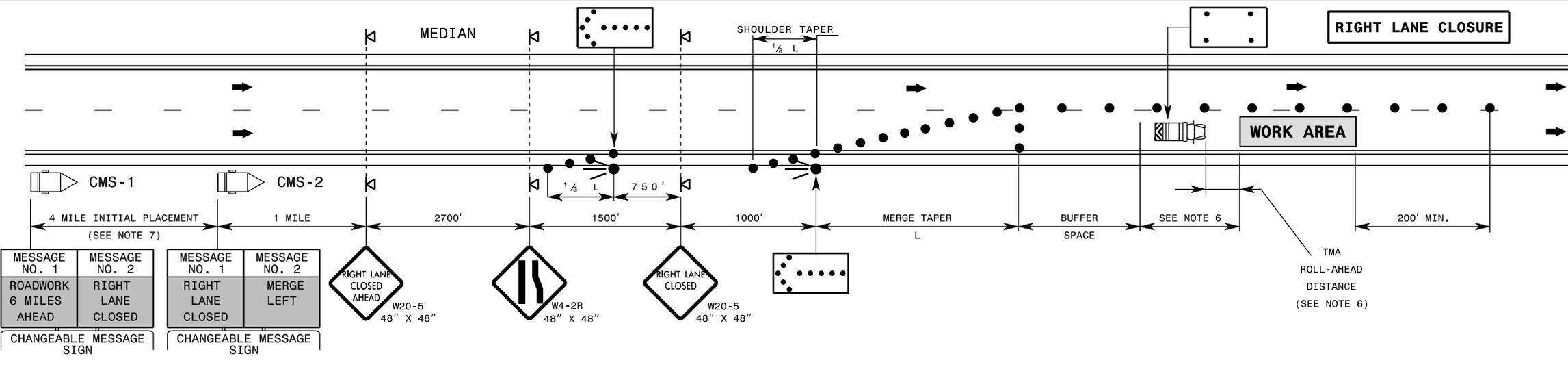
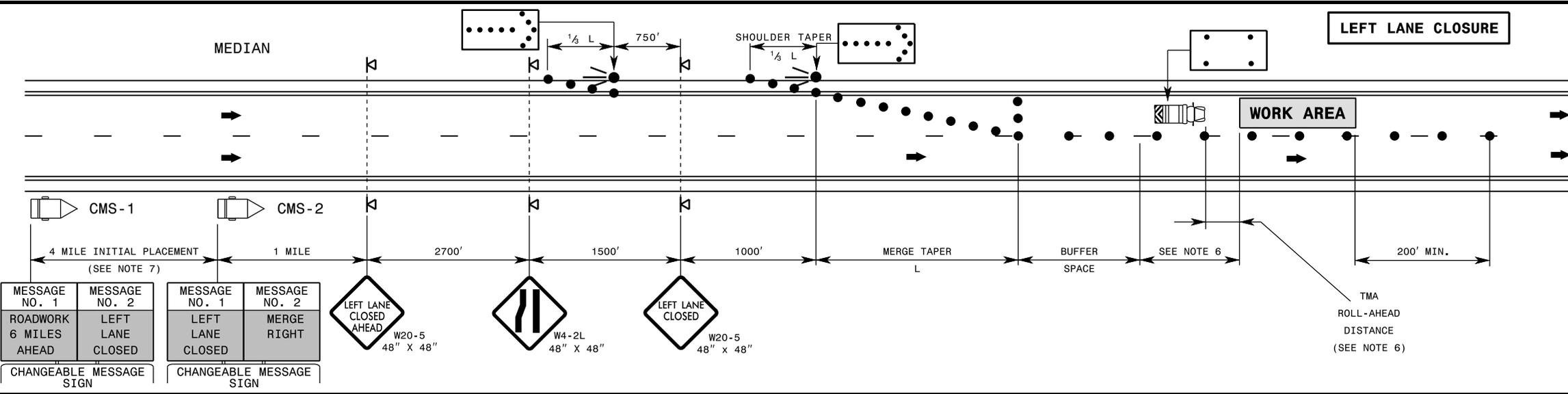
- IF NECESSARY USE THIS RSD, FOR ONE-WAY CITY TYPE STREETS WHERE SIGNS MAY BE MOUNTED ON BOTH SIDES OF THE ROADWAY.
- PLACE FLASHING ARROW BOARDS (FAB) ON THE SHOULDER (PAVED OR UNPAVED). PLACE FAB WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE FAB LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE, SUCH THAT STOPPING SIGHT DISTANCE TO THE FAB IS MET (SEE RSD. 1101.11, SHEET 2).
- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
- REFER TO RSD. 1101.11, SHEETS 1, 2, & 4, FOR "L" DISTANCE, BUFFER SPACE, AND SIGN SPACING.
- REFER TO RSD. 1101.02, SHEETS 10 & 11, FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.
- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- POSITION THE TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01 AND CONTINUOUSLY ADVANCE TMAs AS WORK PROGRESSES. TMA IS NOT REQUIRED WHEN POSTED SPEED LIMIT IS BELOW 45 MPH.
- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY, UNLESS DIRECTED OTHERWISE BY THE ENGINEER. PLACE CMS APPROXIMATELY 1 MILE IN ADVANCE OF THE FIRST W20-5 SIGNS. IF TRAFFIC BACKS UP TO WHERE THE CMS IS INITIALLY PLACED, RELOCATE CMS 1/2 MILE IN ADVANCE OF BACKUP. MONITOR TRAFFIC, AND WHEN NECESSARY, MOVE CMS APPROXIMATELY 1/2 MILE IN ADVANCE OF BACKUP. CMS IS NOT REQUIRED WHEN POSTED SPEED LIMIT IS BELOW 45 MPH.
- DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

- FLASHING ARROW BOARD
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- TRUCK MOUNTED ATTENUATOR(TMA)
- CHANGEABLE MESSAGE SIGN (CMS)
- DRUM
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
DIVIDED MULTI-LANE ROADWAY-1 LANE CLOSED
(FOR ROADWAYS ≥ 60 MPH)

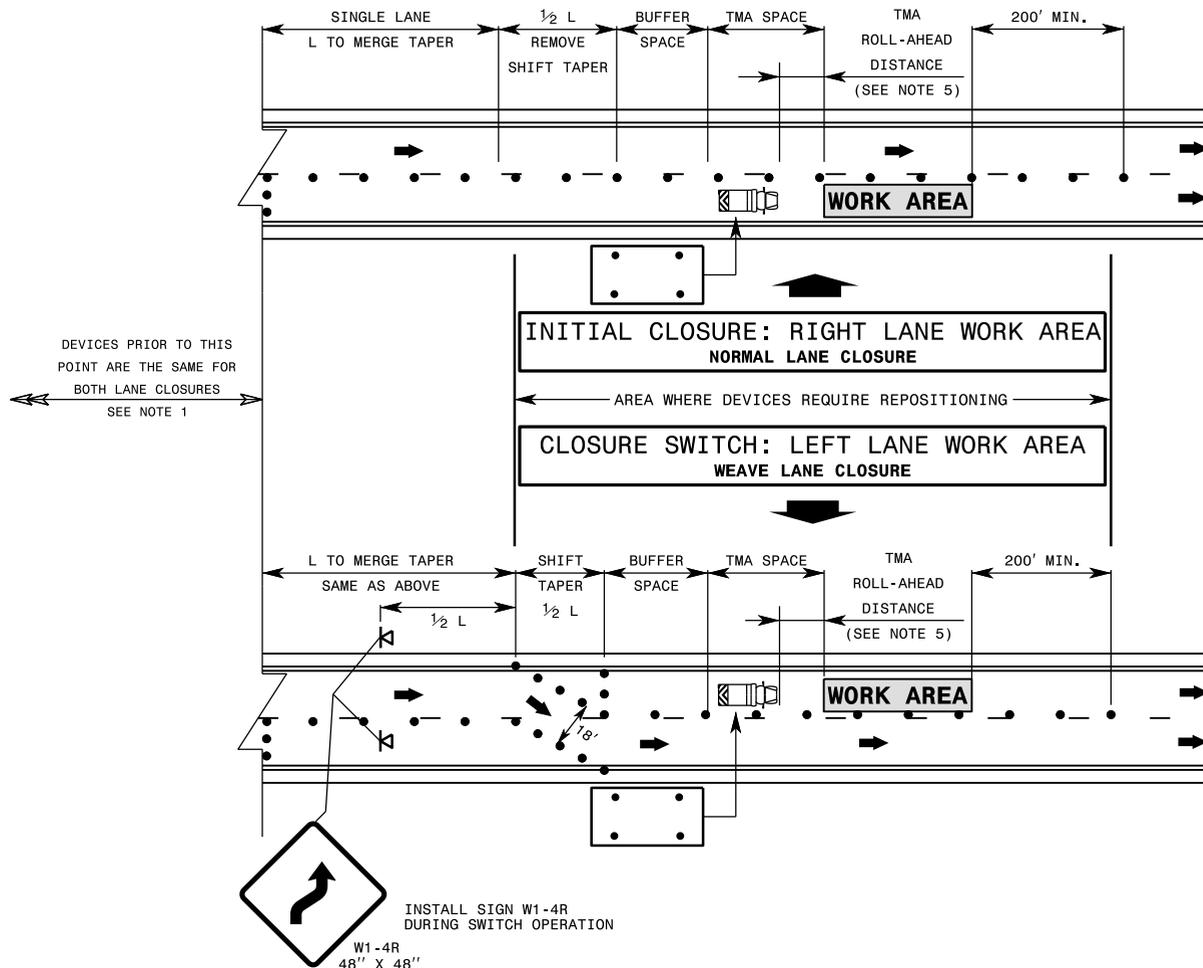


GENERAL NOTES

- 1- PLACE ARROW BOARDS ON THE SHOULDER (PAVED OR UNPAVED). PLACE ARROW BOARDS WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE ARROW BOARD LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE, SUCH THAT STOPPING SIGHT DISTANCE TO THE ARROW BOARD IS MET (REFER TO RSD. 1101.11, SHEET 2).
- 2- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
- 3- REFER TO RSD. 1101.11, SHEETS 1 & 2, FOR "L" DISTANCE AND BUFFER SPACE.
- 4- REFER TO RSD. 1101.02, SHEETS 10 & 11, FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.
- 5- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 6- POSITION THE TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01 AND CONTINUOUSLY ADVANCE TMAs AS WORK PROGRESSES.
- 7- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY AS DIRECTED BY THE ENGINEER. PLACE CMS-1 5 MILES IN ADVANCE OF THE W20-5 SIGNS. IF TRAFFIC BACKS UP TO WHERE CMS-1 IS INITIALLY PLACED, RELOCATE CMS-1 1/2 MILE IN ADVANCE OF BACKUP. CONTINUE TO MONITOR TRAFFIC, MOVE CMS-1 APPROXIMATELY 1/2 MILE IN ADVANCE OF BACKUP.
- 8- DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
- 9- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

- FLASHING ARROW BOARD
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- TRUCK MOUNTED ATTENUATOR(TMA)
- CHANGEABLE MESSAGE SIGN (CMS)
- DRUM
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

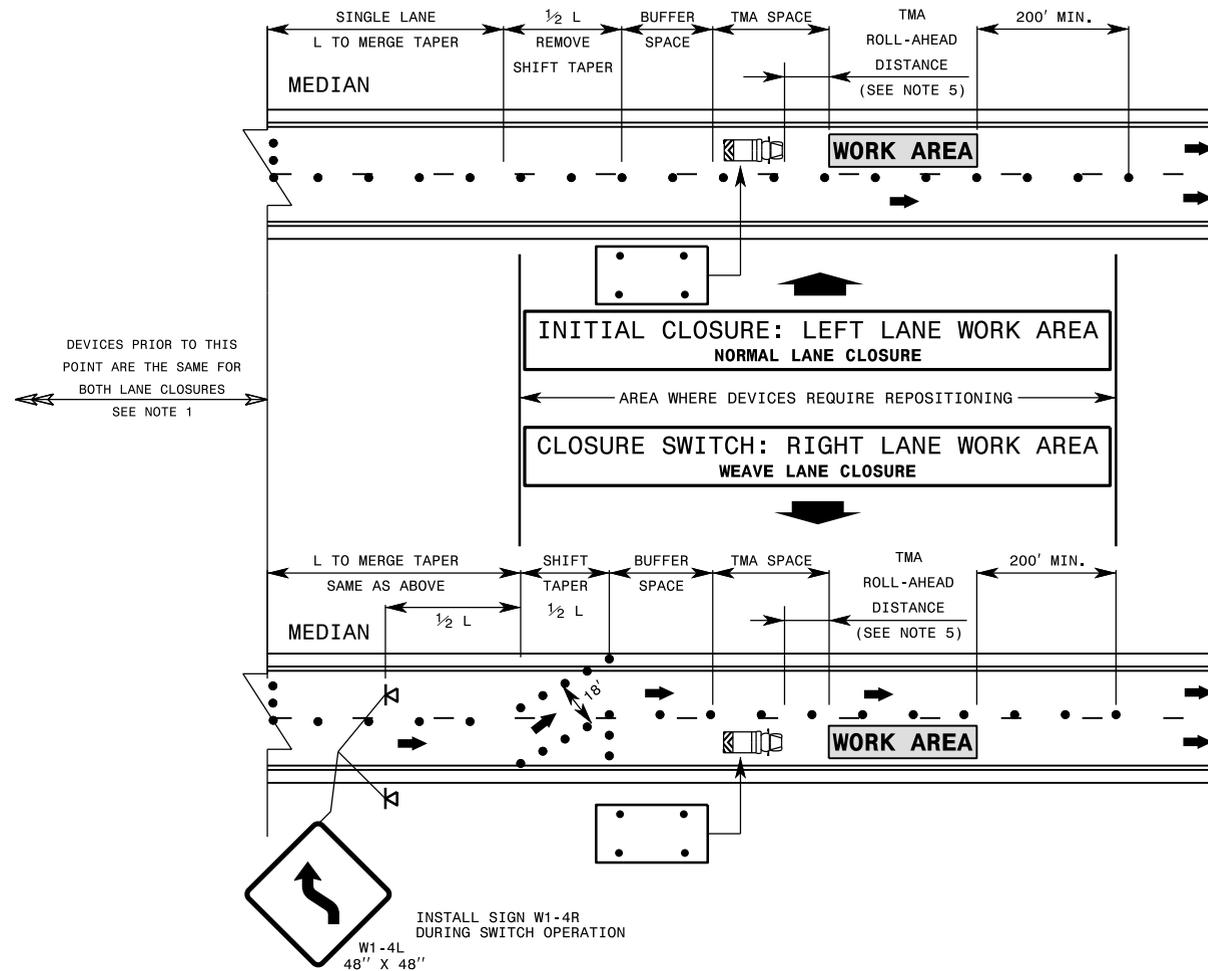


GENERAL NOTES

- 1- REFER TO THE APPROPRIATE LANE CLOSURE RSD 1101.02 FOR SIGNS, DEVICES, AND NOTES FOR THE LANE CLOSURE.
- 2- THE MAXIMUM SPACING OF DRUMS IN TAPERS SHALL BE EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE MAXIMUM SPACING OF DRUMS ALONG THE BUFFER SPACE, AND WORK AREA, SHALL BE EQUAL IN FEET TO (2) TIMES THE POSTED SPEED LIMIT.
- 3- REFER TO RSD. 1101.11, SHEET 1, FOR VALUES OF "L".
- 4- LANE CLOSURE SWITCHES TO BE PERFORMED BY A ROLLING ROADBLOCK OPERATION. SEE RSD 1101.03, SHEET 9.
- 5- POSITION THE TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01 AND CONTINUOUSLY ADVANCE TMAs AS WORK PROGRESSES. TMA IS NOT REQUIRED WHEN POSTED SPEED LIMIT IS BELOW 45 MPH.
- 6- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

- FLASHING ARROW BOARD, (96"X48" MIN.), "CAUTION MODE"
- TRUCK MOUNTED ATTENUATOR (TMA)
- DRUM
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

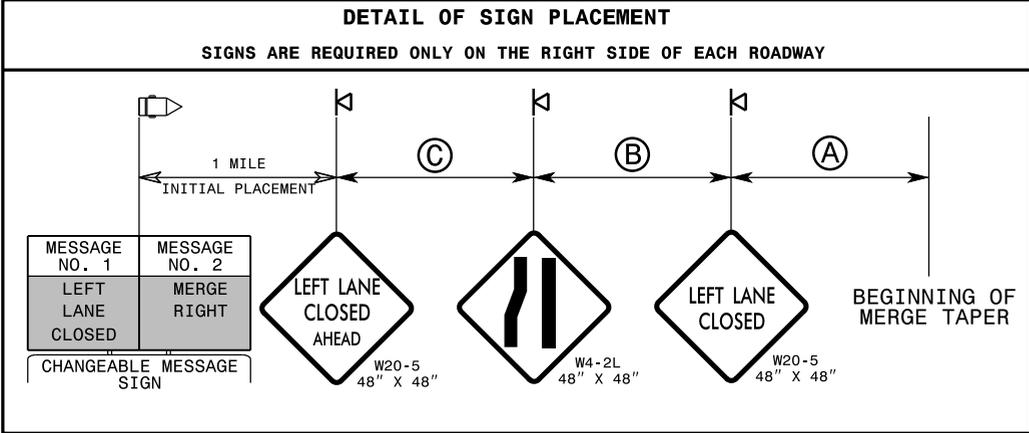
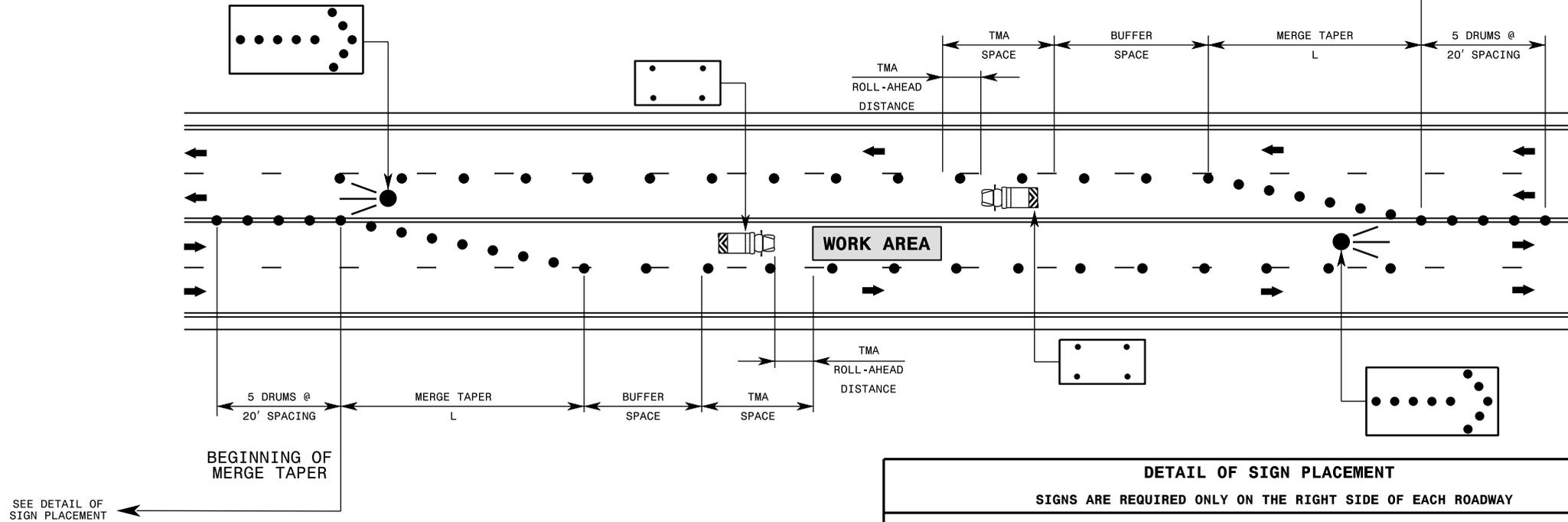


GENERAL NOTES

- 1- REFER TO THE APPROPRIATE LANE CLOSURE RSD 1101.02 FOR SIGNS, DEVICES, AND NOTES FOR THE LANE CLOSURE.
- 2- THE MAXIMUM SPACING OF DRUMS IN TAPERS SHALL BE EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE MAXIMUM SPACING OF DRUMS ALONG THE BUFFER SPACE, AND WORK AREA, SHALL BE EQUAL IN FEET TO (2) TIMES THE POSTED SPEED LIMIT.
- 3- REFER TO RSD. 1101.11, SHEET 1, FOR VALUES OF "L".
- 4- LANE CLOSURE SWITCHES TO BE PERFORMED BY A ROLLING ROADBLOCK OPERATION. SEE RSD 1101.03, SHEET 9.
- 5- POSITION THE TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01 AND CONTINUOUSLY ADVANCE TMAs AS WORK PROGRESSES. TMA IS NOT REQUIRED WHEN POSTED SPEED LIMIT IS BELOW 45 MPH.
- 6- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND	
	FLASHING ARROW BOARD, (96"X48" MIN.), "CAUTION MODE"
	TRUCK MOUNTED ATTENUATOR (TMA)
	DRUM
	PORTABLE SIGN
	DIRECTION OF TRAFFIC FLOW

LEFT LANE CLOSURE DEPICTED
SEE NOTE FOR RIGHT LANE CLOSURE



GENERAL NOTES

- 1- RIGHT LANE CLOSURES ON UNDIVIDED ROADWAYS ARE THE SAME AS FOR DIVIDED ROADWAYS AS SHOWN ON RSD. 1101.02, SHEET 3, EXCEPT APPROACH WARNING SIGNS ARE NOT REQUIRED TO BE MOUNTED ON THE LEFT SIDE OF THE ROADWAY.
- 2- REFER TO NOTES ON RSD. 1101.02, SHEET 3.
- 3- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

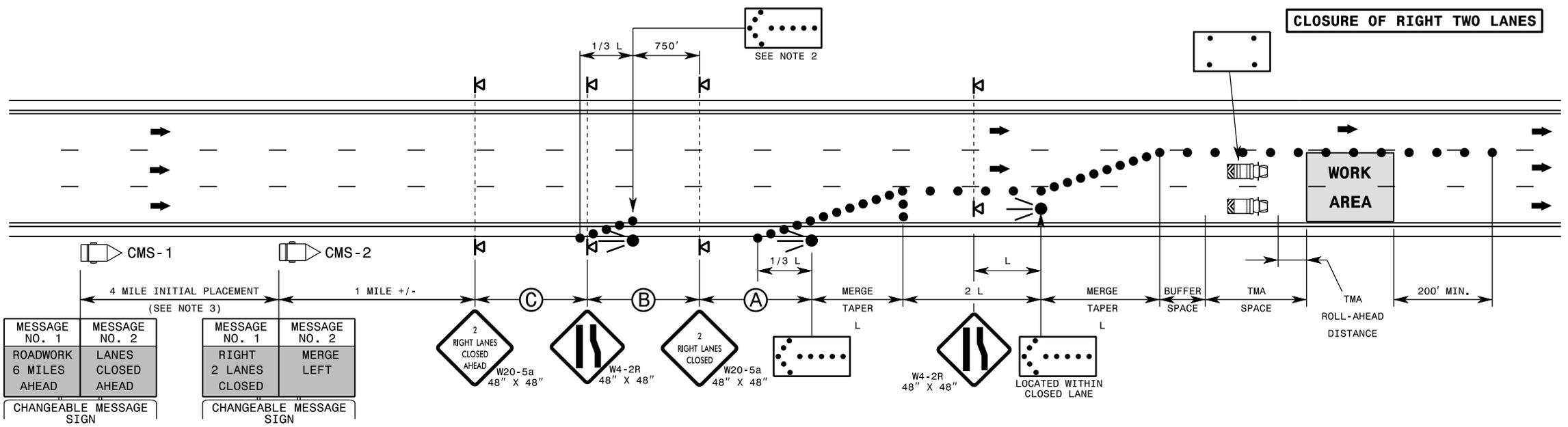
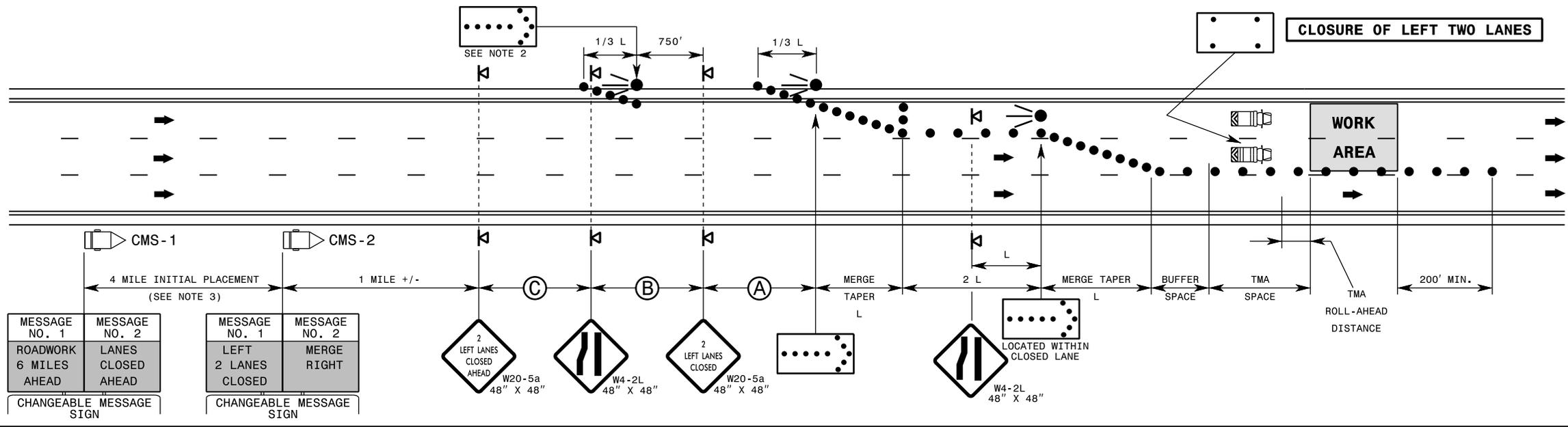
LEGEND

- FLASHING ARROW BOARD
- ▭ FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- ▭ TRUCK MOUNTED ATTENUATOR(TMA)
- ▭ CHANGEABLE MESSAGE SIGN (CMS)
- DRUM
- ⚡ PORTABLE SIGN
- ➔ DIRECTION OF TRAFFIC FLOW

1-24

1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
DIVIDED MULTI-LANE ROADWAY-2 LANES CLOSED



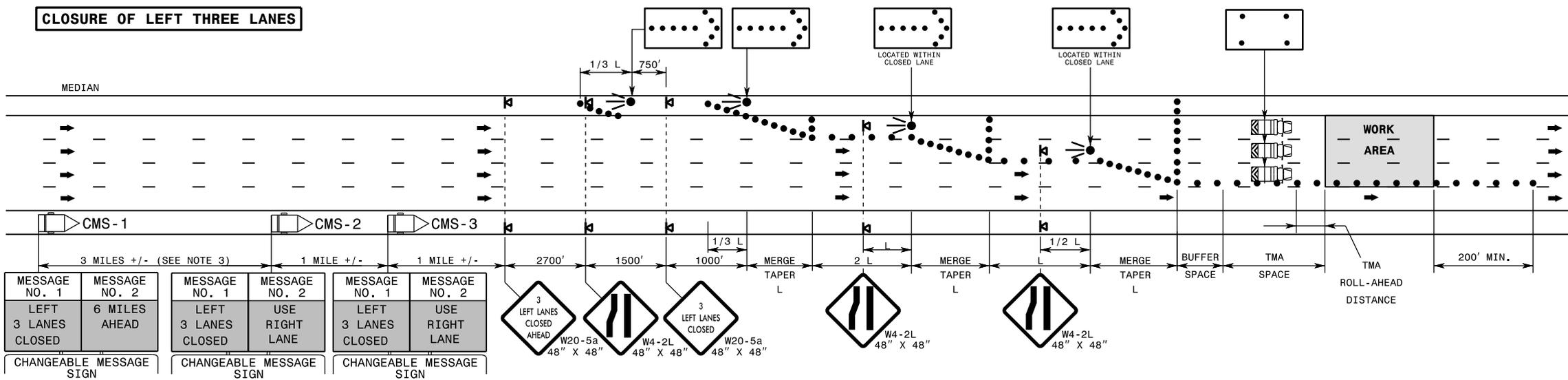
GENERAL NOTES

- 1- REFER TO NOTES ON RSD. 1101.02, SHEET 3.
- 2- THE FIRST FLASHING ARROW BOARD IS NOT REQUIRED ON FACILITIES \leq 55 MPH.
- 3- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY AS DIRECTED BY THE ENGINEER. PLACE CMS-1 5 MILES IN ADVANCE OF THE W20-5 SIGNS. IF TRAFFIC BACKS UP TO WHERE CMS-1 IS INITIALLY PLACED, RELOCATE CMS-1 1/2 MILE IN ADVANCE OF BACKUP. CONTINUE TO MONITOR TRAFFIC, MOVE CMS-1 APPROXIMATELY 1/2 MILE IN ADVANCE OF BACKUP.
- 4- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

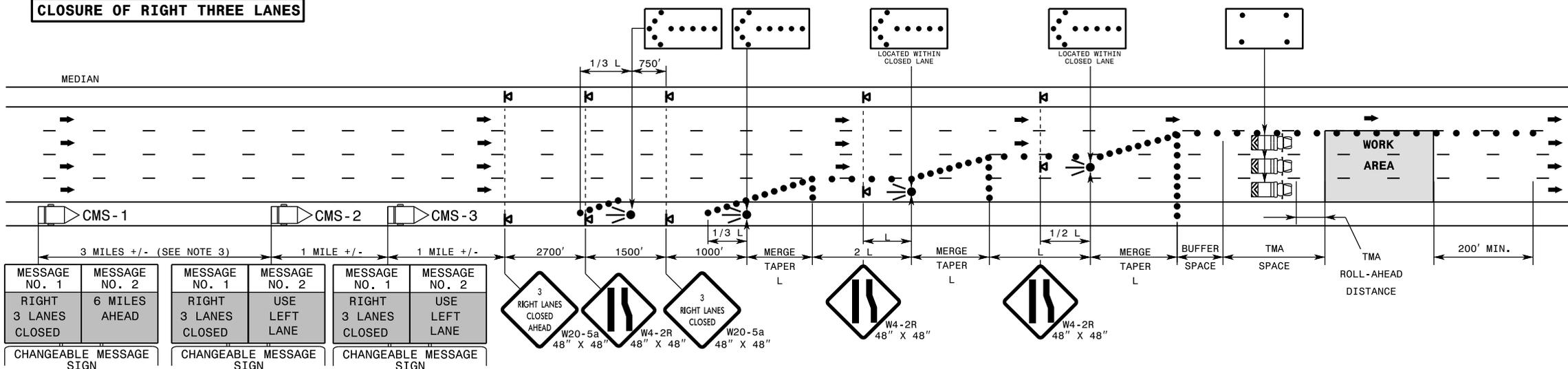
LEGEND

- FLASHING ARROW BOARD
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- TRUCK MOUNTED ATTENUATOR (TMA)
- DRUM
- PORTABLE SIGN
- CHANGEABLE MESSAGE SIGN (CMS)
- DIRECTION OF TRAFFIC FLOW

CLOSURE OF LEFT THREE LANES



CLOSURE OF RIGHT THREE LANES



GENERAL NOTES

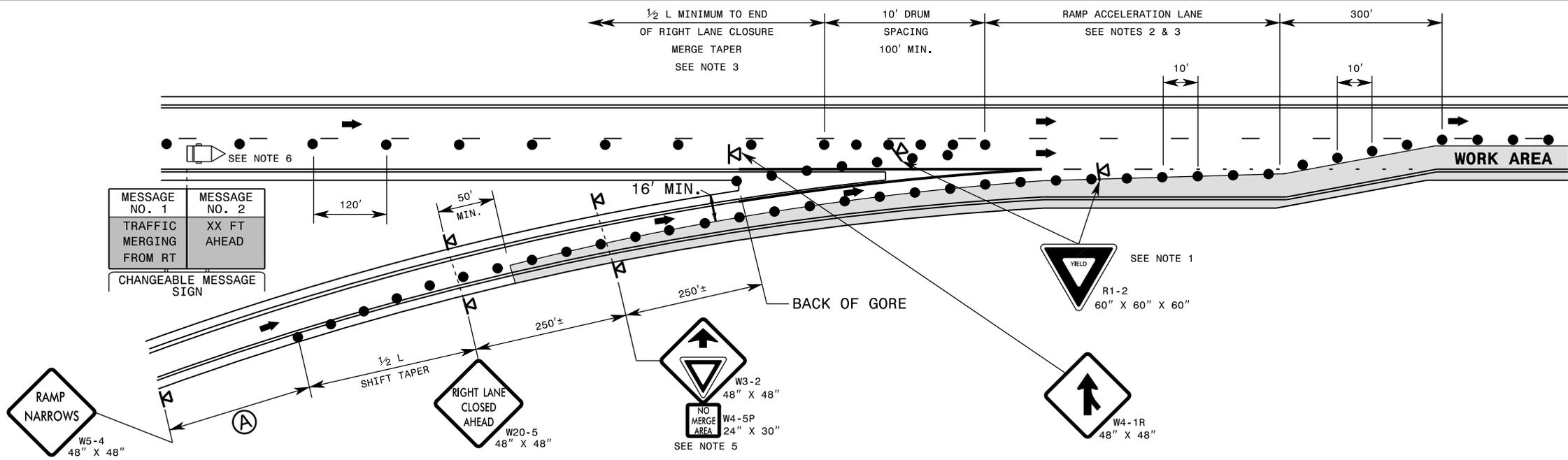
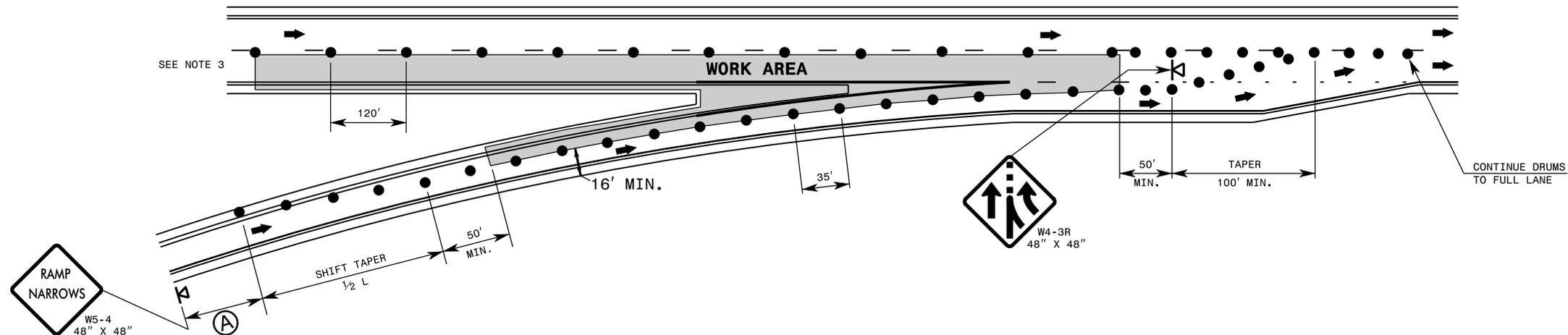
- 1- REFER TO NOTES ON RSD. 1101.02, SHEET 3.
- 2- THE FIRST FLASHING ARROW BOARD IS NOT REQUIRED ON FACILITIES ≤ 55 MPH.
- 3- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY AS DIRECTED BY THE ENGINEER. PLACE CMS-1 5 MILES IN ADVANCE OF THE W20-5 SIGNS. IF TRAFFIC BACKS UP TO WHERE CMS-1 IS INITIALLY PLACED, RELOCATE CMS-1 1/2 MILE IN ADVANCE OF BACKUP. CONTINUE TO MONITOR TRAFFIC, MOVE CMS-1 APPROXIMATELY 1/2 MILE IN ADVANCE OF BACKUP.
- 4- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

- FLASHING ARROW BOARD
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- TRUCK MOUNTED ATTENUATOR (TMA)
- DRUM
- PORTABLE SIGN
- CHANGEABLE MESSAGE SIGN (CMS)
- DIRECTION OF TRAFFIC FLOW

1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
RIGHT LANE CLOSURES THRU ENTRANCE RAMP

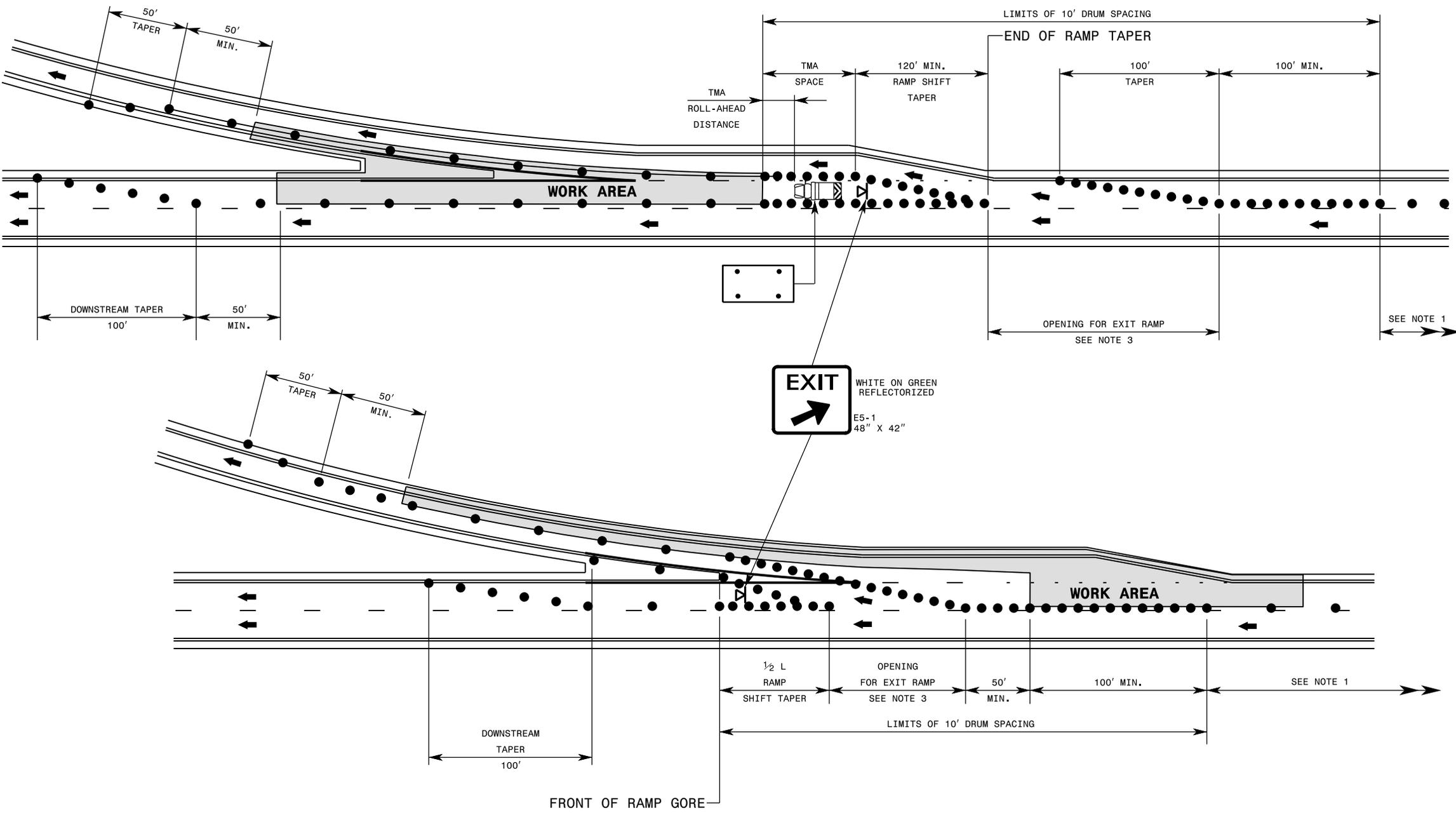


GENERAL NOTES

- 1- STOP SIGNS SHALL NEVER BE USED IN LIEU OF A R1-2 'YIELD' SIGN AT THE END OF AN ENTRANCE RAMP
- 2- IF A MINIMUM OF 400' OF ACCELERATION LANE OR THE EXISTING ACCELERATION LANE DISTANCE (WHICHEVER IS LESS) IS UNATTAINABLE, CLOSE THE RAMP.
- 3- REFER TO THE APPROPRIATE LANE CLOSURE RSD 1101.02 FOR SIGNS, DEVICES, AND NOTES FOR THE LANE CLOSURE.
- 4- MOUNT SIGNS SHOWN A MINIMUM OF 5' ABOVE THE PAVEMENT ELEVATION.
- 5- INSTALL W4-5P BELOW THE YIELD AHEAD SIGN (AS SHOWN) TO ALERT MOTORISTS IF THE ACCELERATION DISTANCE HAS BEEN REDUCED FROM THE PERMANENT CONDITION.
- 6- COORDINATE WITH THE ENGINEER FOR LOCATION OF CMS.
- 7- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.
- 8- IF THE MAINLINE GRADE EXCEEDS 2% OR THE RAMP TRUCK PERCENTAGE EXCEEDS 10%, INCREASE MINIMUM ACCELERATION DISTANCE OR CLOSE THE RAMP AT THE DIRECTION OF THE ENGINEER.
- 9- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.

LEGEND

- CHANGEABLE MESSAGE SIGN (CMS)
- DRUM
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW



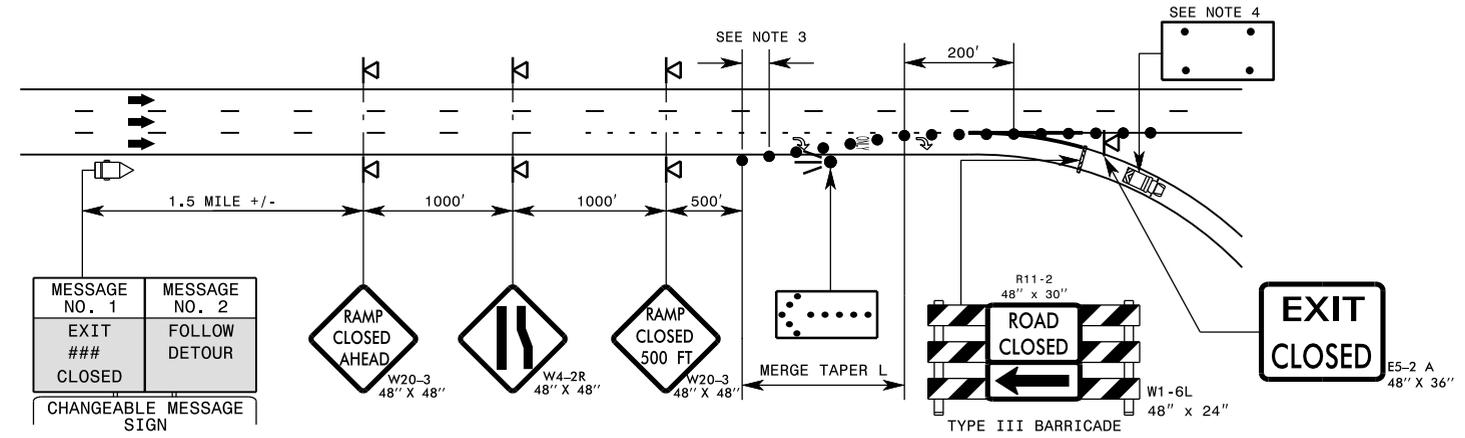
GENERAL NOTES

- 1- REFER TO THE APPROPRIATE LANE CLOSURE RSD 1101.02 FOR SIGNS, DEVICES, AND NOTES FOR THE LANE CLOSURE.
- 2- MOUNT EXIT SIGNS A MINIMUM OF 5 FEET ABOVE THE PAVEMENT ELEVATION.
- 3- USE EXISTING RAMP OPENING LENGTH, BUT NO LESS THAN 1/2 ORIGINAL LENGTH. CONSIDER CLOSING RAMP IF 1/2 ORIGINAL LENGTH CANNOT BE OBTAINED, AS DIRECTED BY THE ENGINEER.
- 4- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

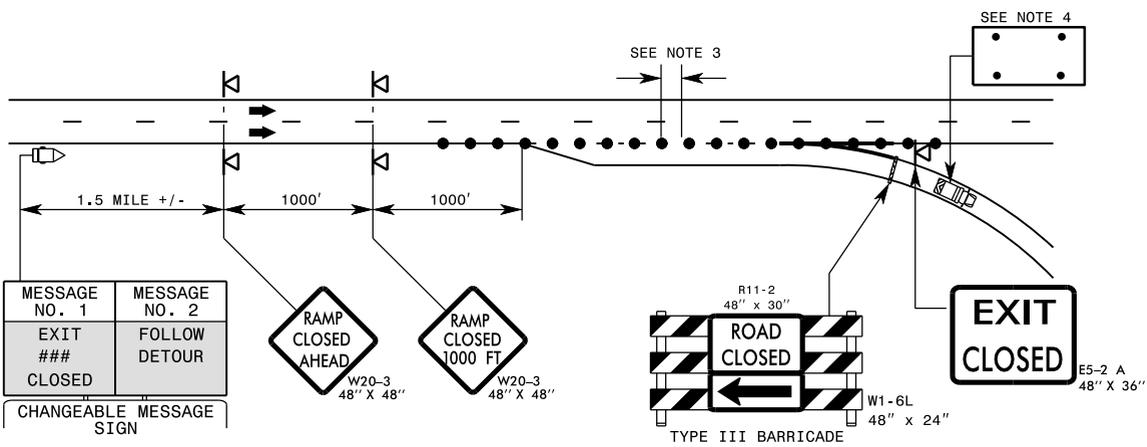
LEGEND

- TRUCK MOUNTED ATTENUATOR
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- DRUM
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

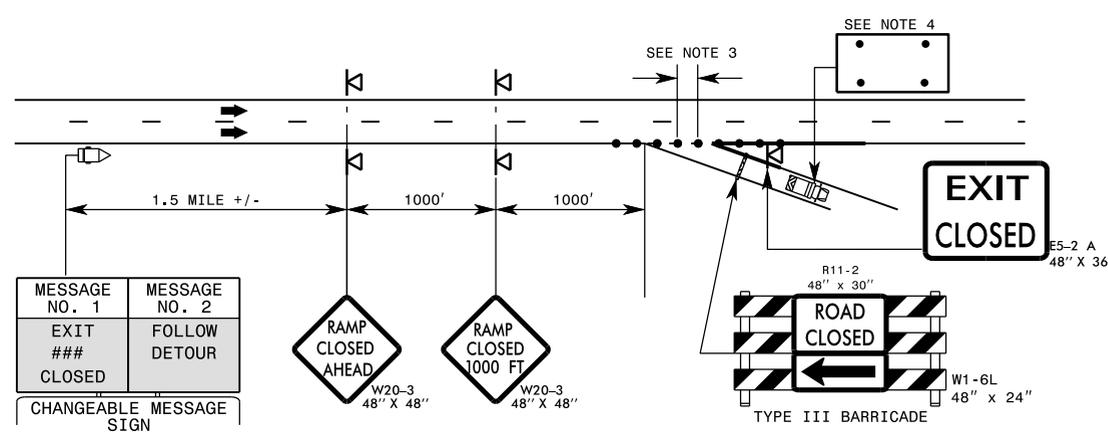
EXIT ONLY LANE



DECELERATION LANE



DIVERGING EXIT LANE

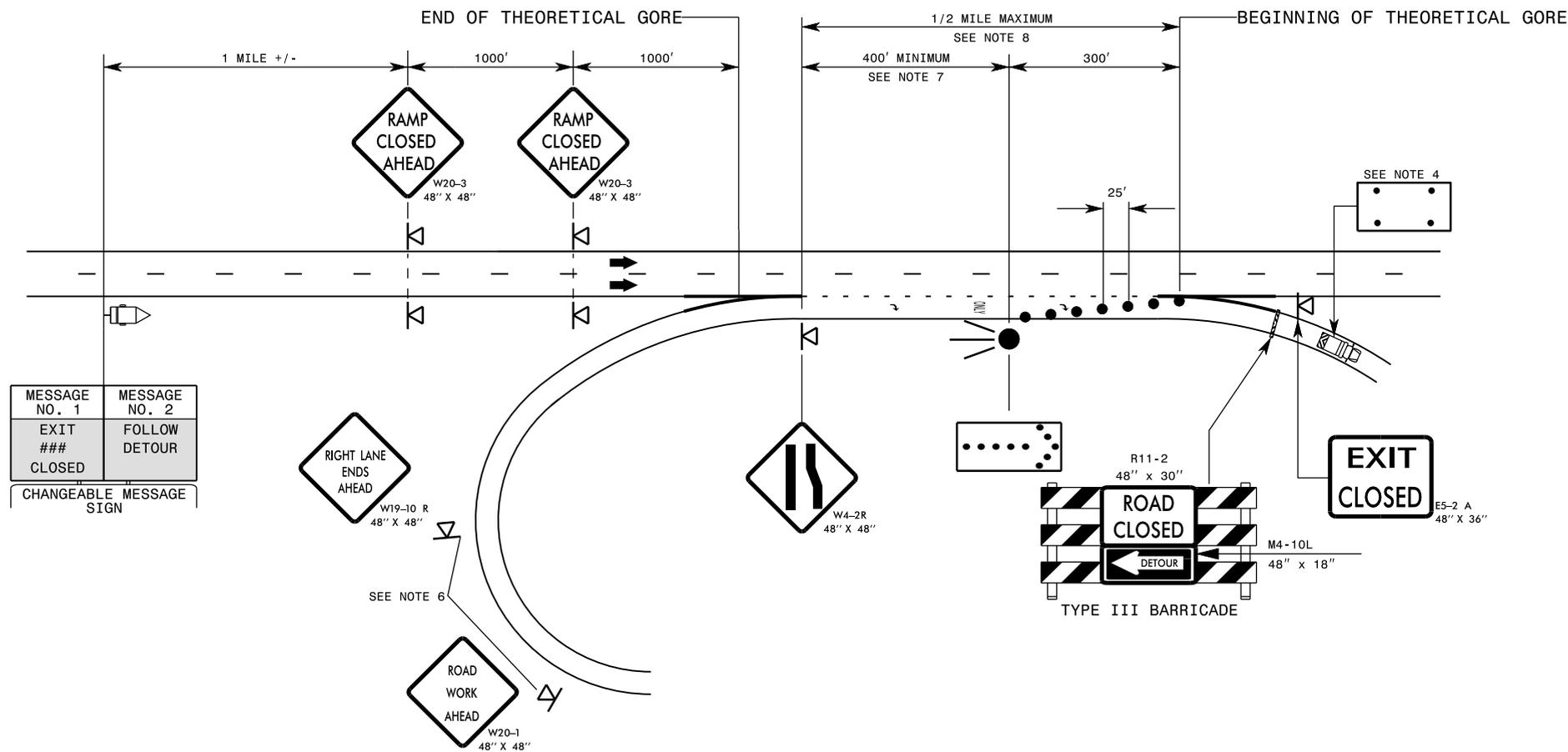


GENERAL NOTES

- 1- REFER TO RSD. 1101.11 SHEET 1 OF 4 FOR "L" DISTANCE. IF THE MERGE TAPER "L" DISTANCE CANNOT BE ACHIEVED DUE TO FIELD CONDITIONS, ENGINEER SHALL DETERMINE ACCEPTABLE DISTANCE FOR THE LENGTH OF THE TAPER.
- 2- IF APPLICABLE, INSTALL LANE CLOSURES WITH THE FLOW OF TRAFFIC, BEGINNING ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE FLOW OF TRAFFIC BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 3- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT.
- 4- POSITION THE TMA TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01.
- 5- PLACE FLASHING ARROW BOARD (FAB) ON THE SHOULDER. PLACE THE FAB WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE FAB LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE, SUCH THAT STOPPING SIGHT DISTANCE HAS BEEN MET. (SEE RSD. 1101.11, SHEET 2)
- 6- LAW ENFORCEMENT WITH EMERGENCY LIGHTS ILLUMINATED MAY BE USED AS A SUBSTITUTE FOR THE TMA.
- 7- COVER EXISTING EXIT SIGN LOCATED WITHIN THE GORE.
- 8- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

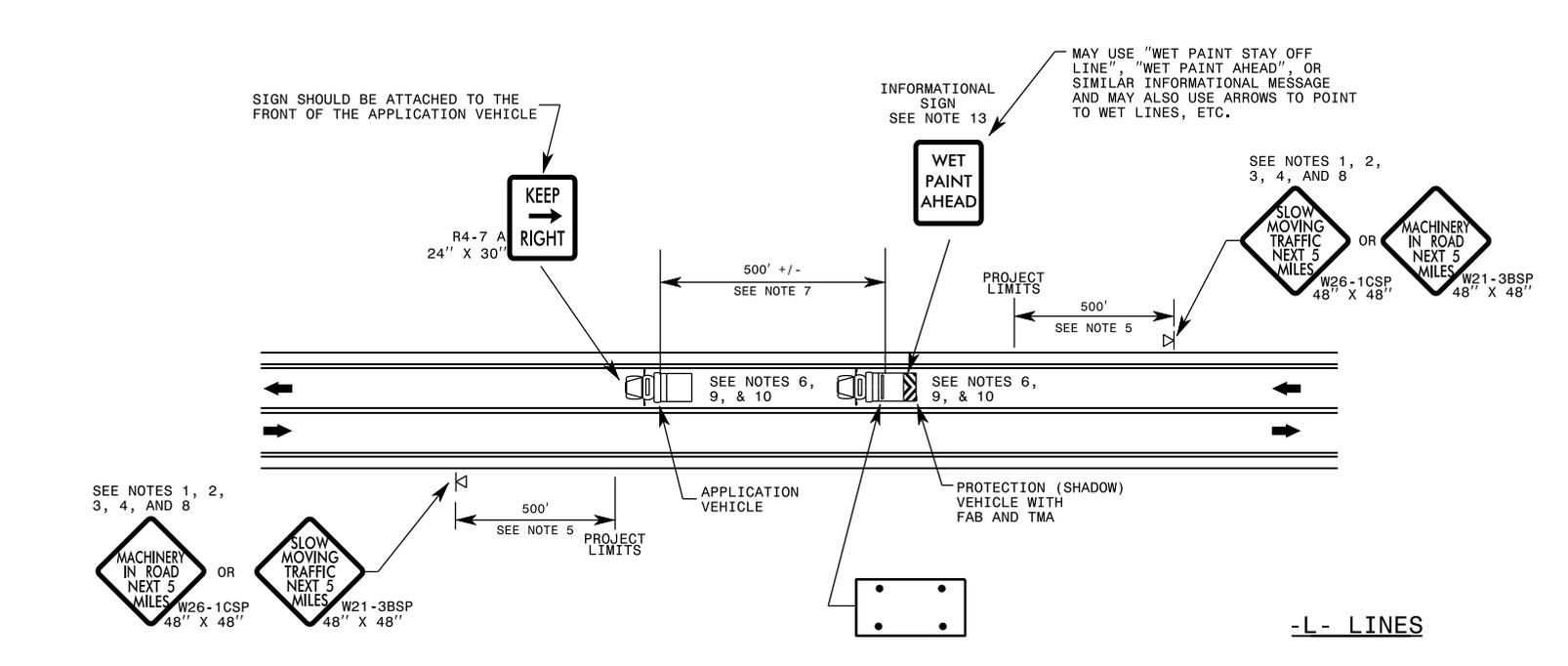
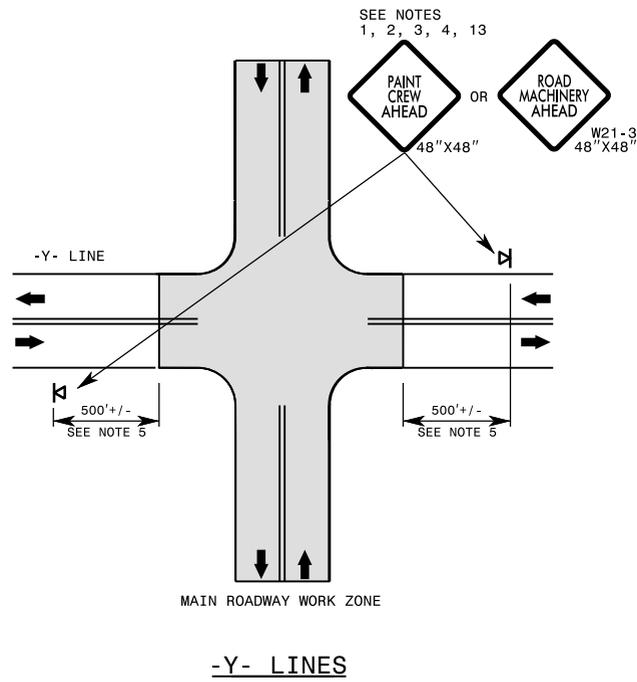
- CHANGEABLE MESSAGE SIGN (CMS)
- TRUCK MOUNTED ATTENUATOR
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- DRUM
- TYPE III BARRICADE
- PORTABLE SIGN
- FLASHING ARROW BOARD
- DIRECTION OF TRAFFIC FLOW



GENERAL NOTES

- 1- IF APPLICABLE, INSTALL LANE CLOSURES WITH THE FLOW OF TRAFFIC, BEGINNING ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE FLOW OF TRAFFIC BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 2- POSITION THE TMA TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY RSD 1165.01.
- 3- PLACE FLASHING ARROW BOARD (FAB) ON THE SHOULDER. PLACE THE FAB WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE FAB LOCATION.
- 4- LAW ENFORCEMENT WITH EMERGENCY LIGHTS ILLUMINATED MAY BE USED AS A SUBSTITUTE FOR THE TMA.
- 5- COVER EXISTING EXIT SIGN LOCATED WITHIN THE GORE.
- 6- PLACE ON-RAMP SIGNAGE ON RIGHT SHOULDER FOR RAMPS AND ON LEFT SHOULDER FOR LOOPS.
- 7- IF THE EXISTING ACCELERATION DISTANCE OR A MINIMUM OF 400' ACCELERATION DISTANCE IS UNATTAINABLE, CLOSE THE RAMP.
- 8- FOR AUXILIARY LANES GREATER THAN 1/2 MILE, REFER TO RSD 1101.02, SHEET 12 OF 19.
- 9- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND	
	CHANGEABLE MESSAGE SIGN (CMS)
	TRUCK MOUNTED ATTENUATOR
	FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
	DRUM
	TYPE III BARRICADE
	PORTABLE SIGN
	FLASHING ARROW BOARD
	DIRECTION OF TRAFFIC FLOW



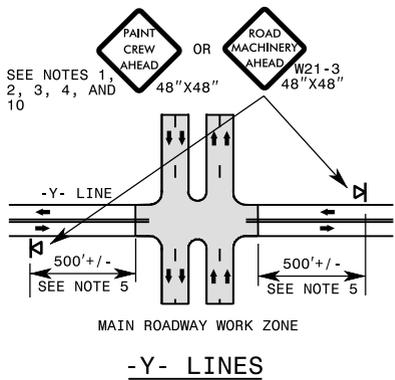
GENERAL NOTES

- 1- THE FOLLOWING OPTIONS MAY BE USED FOR ADVANCE WARNING SIGNS:
 - A. TRUCK MOUNTED SIGNS
 - B. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
 - C. PORTABLE MOUNTED ADVANCE WARNING SIGNS (MUST CIRCLE TO PICK UP SIGNS)
 - D. PORTABLE CHANGEABLE MESSAGE SIGN (CMS) (MUST CIRCLE TO PICK UP SIGNS)
- 2- IF SPACE LIMITATIONS ON SHOULDER PROHIBIT A 48" X 48" SIGN, A SMALLER SIGN CAN BE USED WITH APPROVAL FROM ENGINEER.
- 3- SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW BOARD AND/OR WARNING LIGHT(S).
- 4- GROUND MOUNTED ADVANCED WARNING SIGNS SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND TO BOTTOM OF SIGN.
- 5- SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.
- 6- ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMAs ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMA.
- 7- ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMODATE SIGHT DISTANCE NEEDS.
- 8- WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH. ROUND UP MILEAGE TO NEXT WHOLE MILE.
- 9- RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.

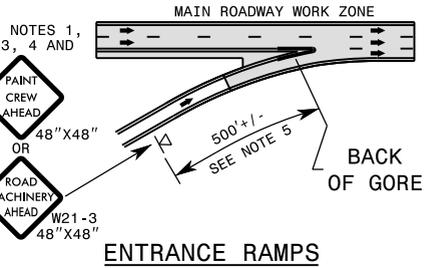
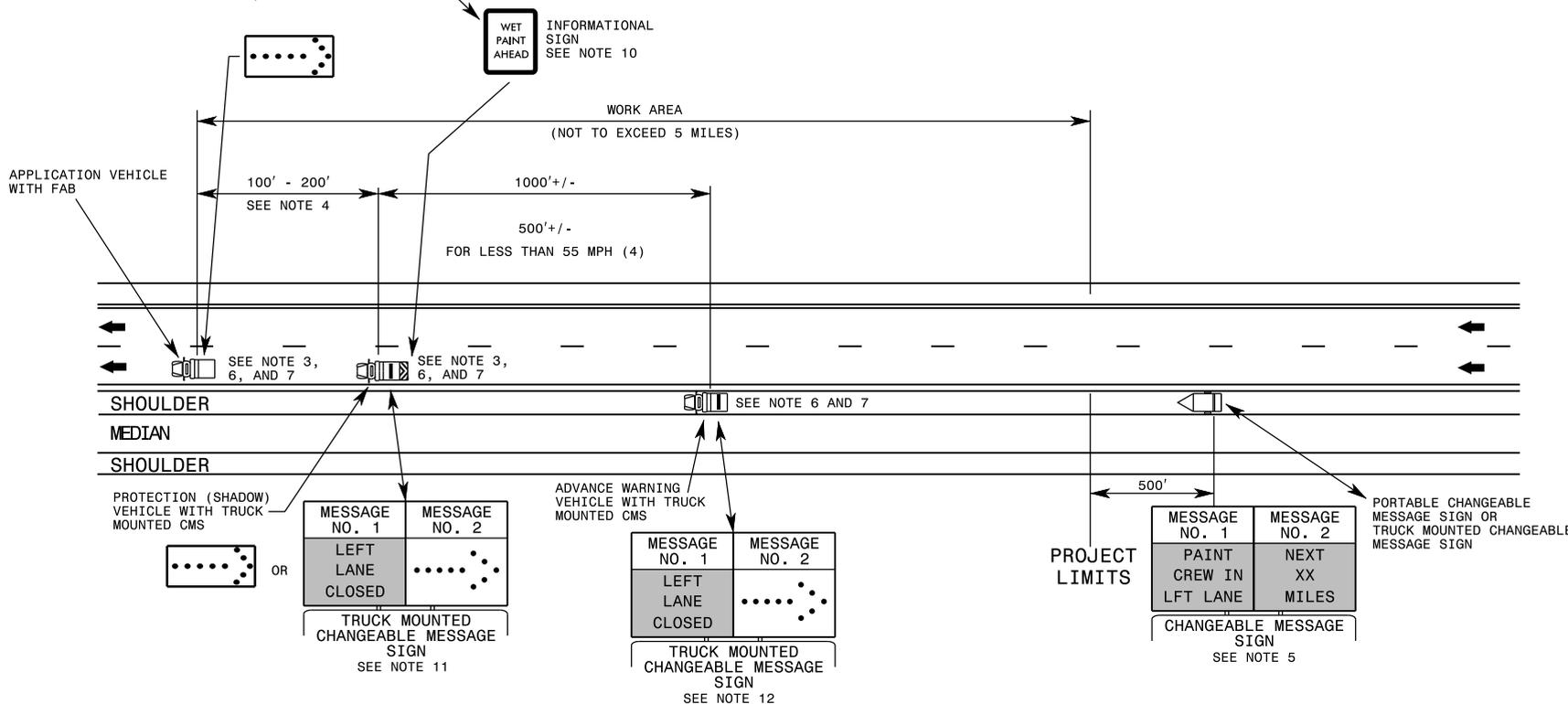
- 10- IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.
- 11- ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.
- 12- INFORMATIONAL SIGNS SHOULD BE ACTIVITY SPECIFIC, i.e. "PAINT CREW IN ROAD". SIGNS MAY BE RECTANGULAR OR DIAMOND SHAPE. SIGN SIZE SHOULD BE BASED ON THE MOTORIST ABILITY TO RECOGNIZE SIGN WHEN TRAVELING FIVE (5) MILES ABOVE POSTED SPEED LIMIT.
- 13- IF A LEAD VEHICLE IS ADDED TO OPERATION, IT SHOULD HAVE THE SAME ADVANCE WARNING SIGNS AS THE APPLICATION VEHICLE SHOWN BELOW.

LEGEND

	PORTABLE SIGN
	DIRECTION OF TRAFFIC FLOW
	APPLICATION VEHICLE WITH WARNING LIGHT(S)
	PROTECTION VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA) AND WARNING LIGHT(S)
	FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"



MAY USE "WET PAINT STAY OFF LINE", "WET PAINT AHEAD", OR SIMILAR INFORMATIONAL MESSAGE AND MAY ALSO USE ARROWS TO POINT TO WET LINES, ETC.



GENERAL NOTES

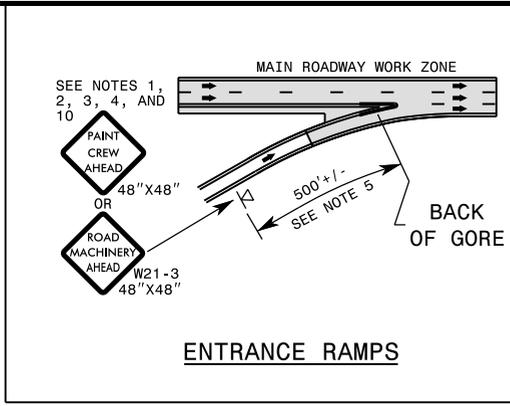
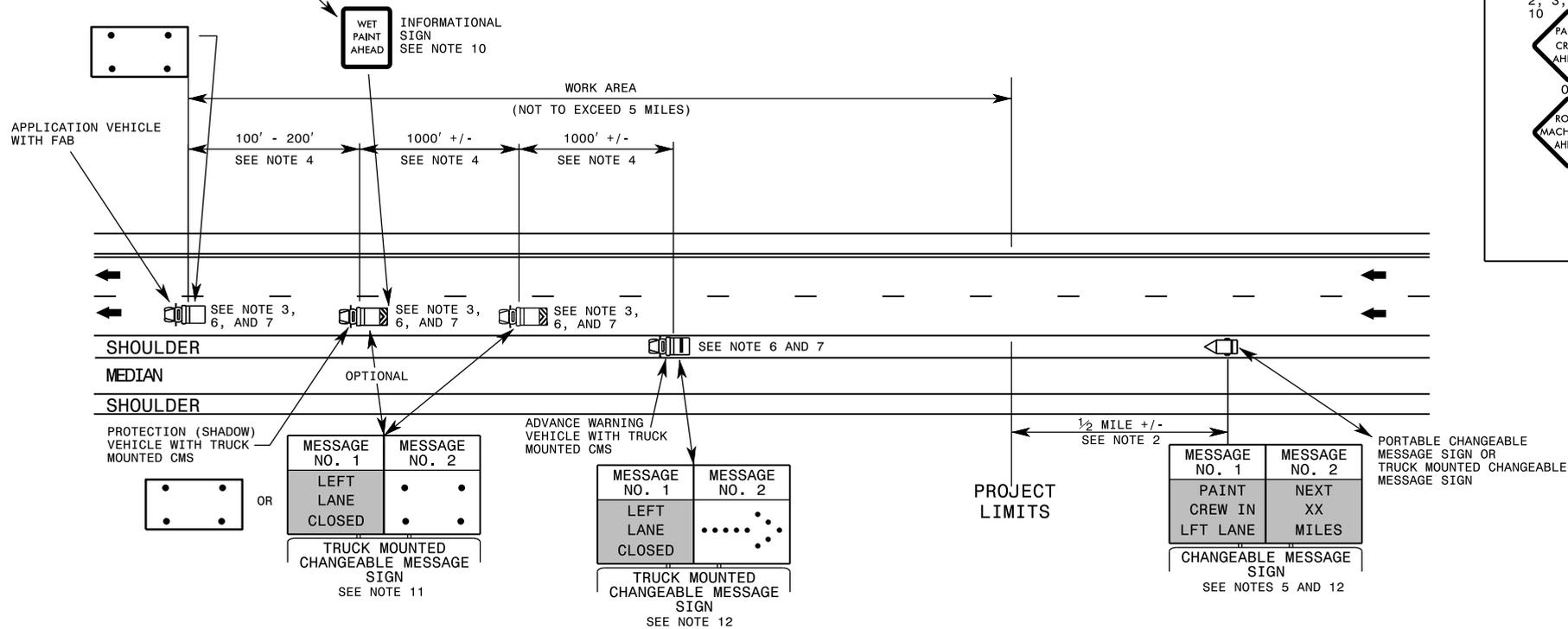
- THE FOLLOWING OPTIONS MAY BE USED FOR ADVANCE WARNING SIGNS:
A. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
B. PORTABLE CHANGEABLE MESSAGE SIGN (CMS)
- SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF FIVE (5) FEET FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW BOARD AND/OR WARNING LIGHTS.
- ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMAS ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMA.
- ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMMODATE SIGHT DISTANCE NEEDS.
- WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH. ROUND UP MILEAGE TO NEXT WHOLE MILE. RELOCATE CHANGEABLE MESSAGE SIGN SUCH THAT WORK AREA DOES NOT EXCEED 5 MILES FROM BEGIN PROJECT LIMITS.
- RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.
- IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.
- ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.
- INFORMATIONAL SIGNS SHOULD BE ACTIVITY SPECIFIC, i.e. "PAINT CREW IN ROAD". SIGNS MAY BE RECTANGULAR OR DIAMOND SHAPE. SIGN SIZE SHOULD BE BASED ON THE MOTORIST ABILITY TO RECOGNIZE SIGN WHEN TRAVELING 5 MILES PER HOUR ABOVE POSTED SPEED LIMIT.

- THE CARAVAN IS TO MOVE AT 3 MPH OR GREATER TO OBTAIN THE DESIRED LEVEL OF SAFETY FOR THE MOVING OPERATION. IF AT ANYTIME AN VEHICLE STOPS DURING THE OPERATION, THE REMAINDER OF THE CARAVAN SHALL CONTINUE MOVING AND THE APPLICATION VEHICLE SHALL RESUME WORK OPERATIONS WITHIN 60 SECONDS. OTHERWISE, ALL VEHICLES ARE TO BE REMOVED FROM THE TRAVEL LANE AND THE OPERATION RESET.
- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES, SHALL BE A MINIMUM SIZE OF 43" X 73". FOR ADDITIONAL SUGGESTED MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.
- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON VEHICLES LOCATED ON THE SHOULDER FOR ADVANCED WARNING MAY BE SMALLER THAN 43" X 73". FOR ADDITIONAL SUGGESTED MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

LEGEND

- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW
- APPLICATION VEHICLE WITH WARNING LIGHT(S)
- PROTECTION VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA) AND WARNING LIGHT(S)
- ADVANCE WARNING VEHICLE WITH TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS) AND WARNING LIGHT(S)
- FLASHING ARROW BOARD (96"X48" MIN.), APPROPRIATE DIRECTION INDICATED
- CHANGEABLE MESSAGE SIGN

MAY USE "WET PAINT STAY OFF LINE", "WET PAINT AHEAD", OR SIMILAR INFORMATIONAL MESSAGE AND MAY ALSO USE ARROWS TO POINT TO WET LINES, ETC.



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

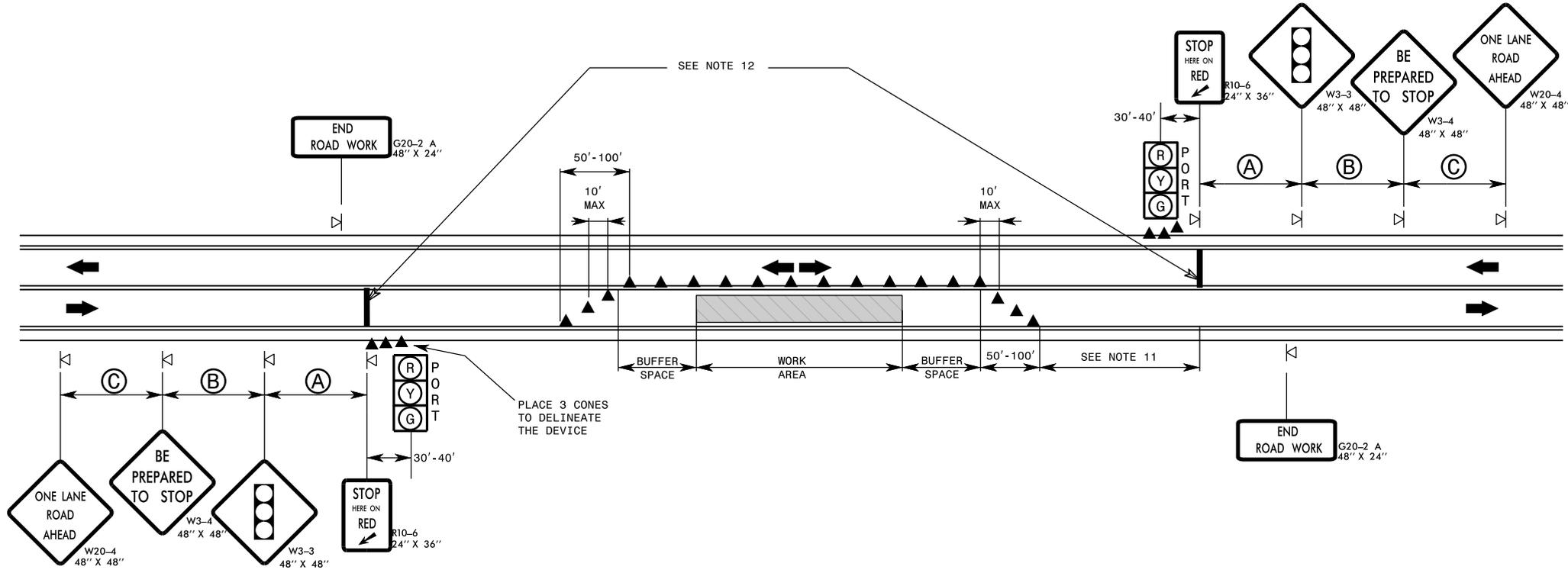
1-24
ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
MOVING OPERATION CARAVAN (OPERATIONS TRAVELING 3 MPH OR FASTER) PLACING PAVEMENT MARKING OR MARKERS ON MULTILANE ROADWAYS ≥ 60 MPH

GENERAL NOTES

- SIGNS ON VEHICLES SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW BOARD AND/OR WARNING LIGHTS.
- CMS SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.
- ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMAs ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMA.
- ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMODATE SIGHT DISTANCE NEEDS.
- WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH. ROUND UP MILEAGE TO NEXT WHOLE MILE. RELOCATE CHANGEABLE MESSAGE SIGN SUCH THAT WORK AREA DOES NOT EXCEED 5 MILES FROM BEGIN PROJECT LIMITS.
- RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.
- IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.
- ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.
- INFORMATIONAL SIGNS SHOULD BE ACTIVITY SPECIFIC, i.e. "PAINT CREW IN ROAD". SIGNS MAY BE RECTANGULAR OR DIAMOND SHAPE. SIGN SIZE SHOULD BE BASED ON THE MOTORIST ABILITY TO RECOGNIZE SIGN WHEN TRAVELING 5 MILES PER HOUR ABOVE POSTED SPEED LIMIT.
- THE CARAVAN IS TO MOVE AT 3 MPH OR GREATER TO OBTAIN THE DESIRED LEVEL OF SAFETY FOR THE MOVING OPERATION. IF AT ANYTIME AN VEHICLE STOPS DURING THE OPERATION, THE REMAINDER OF THE CARAVAN SHALL CONTINUE MOVING AND THE APPLICATION VEHICLE SHALL RESUME WORK OPERATIONS WITHIN 60 SECONDS. OTHERWISE, ALL VEHICLES ARE TO BE REMOVED FROM THE TRAVEL LANE AND THE OPERATION RESET.
- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES, SHALL BE A MINIMUM SIZE OF 43" X 73". FOR ADDITIONAL SUGGESTED MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.
- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON VEHICLES LOCATED ON THE SHOULDER FOR ADVANCED WARNING MAY BE SMALLER THAN 43" X 73". FOR ADDITIONAL SUGGESTED MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

LEGEND

- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW
- APPLICATION VEHICLE WITH WARNING LIGHT(S)
- PROTECTION VEHICLE WITH TRUCK MOUNTED ATTENUATOR (TMA) AND WARNING LIGHT(S)
- ADVANCE WARNING VEHICLE WITH TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS) AND WARNING LIGHT(S)
- FLASHING ARROW BOARD (96"X48" MIN.), APPROPRIATE DIRECTION INDICATED
- CHANGEABLE MESSAGE SIGN



GENERAL NOTES

- 1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.
- 2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.
- 3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 4- FOR POSTED SPEED LIMITS BELOW 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 40 FEET IN THE TANGENTS. FOR POSTED SPEED LIMITS GREATER THAN OR EQUAL TO 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 80 FEET IN THE TANGENTS.
- 5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE SIGNAL (REFER TO RSD 1101.11, SHEET 2).
- 6- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD 1180.01 FOR SKINNY DRUM REQUIREMENTS.
- 7- REFER TO THE CURRENT MUTCD FOR REQUIREMENTS AND PROCEDURES.
- 8- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
- 9- DO NOT PLACE TEMPORARY SIGNALS IN LOCATIONS SUCH THAT VEHICLE QUEUES WILL REACH WITHIN 100' OF EITHER SIDE OF ACTIVE RAILROAD TRACKS OR ANOTHER SIGNALIZED INTERSECTION.
- 10- INTERSECTIONS AND DRIVEWAYS LOCATED WITHIN THE ONE-LANE OPERATION WILL REQUIRE ADDITIONAL SIGNALIZATION.
- 11- ALLOW ADEQUATE ROOM FOR ROAD USERS TO RETURN TO THEIR NORMAL DRIVING PATH.
- 12- STOP BARS REQUIRED FOR OPERATIONS OCCUPYING A SINGLE LOCATION FOR MORE THAN ONE DAYLIGHT PERIOD.
- 13- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND	
⊏	PORTABLE SIGN
←	DIRECTION OF TRAFFIC FLOW
⊏⊏⊏	PORTABLE SIGNAL
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ROADWAY STANDARD DRAWING FOR

TEMPORARY LANE CLOSURES

2-LANE, 2-WAY ROADWAY - 1 LANE CLOSED
PORTABLE TEMPORARY SIGNALS

1-24

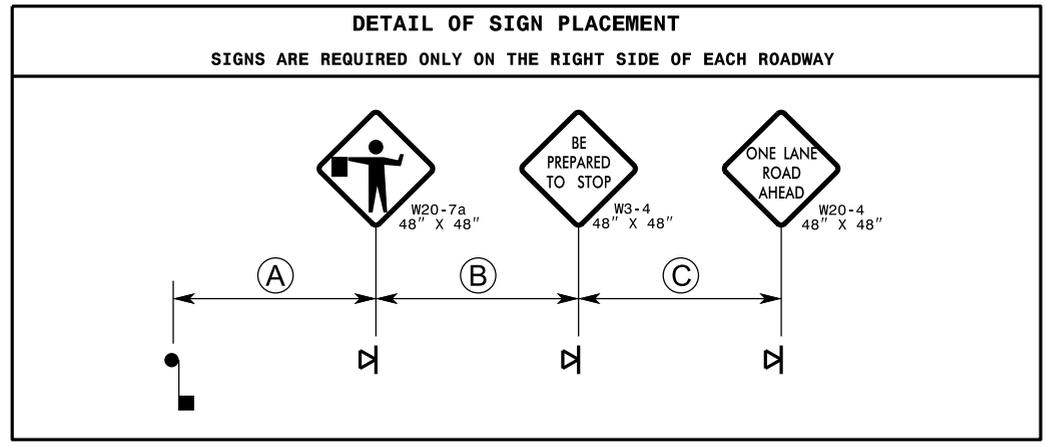
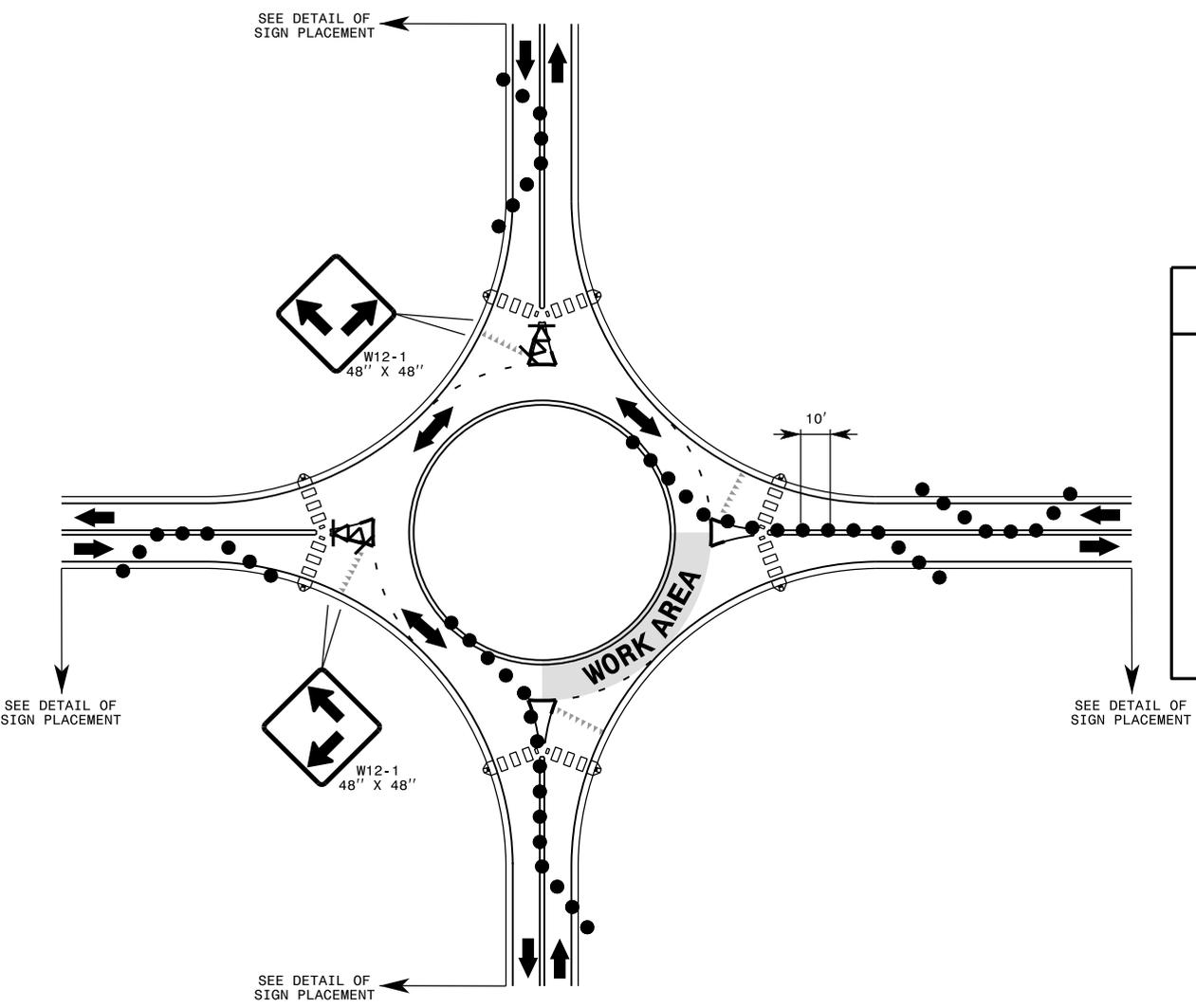
STATE OF

NORTH CAROLINA

DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
SINGLE-LANE ROUNDABOUT



GENERAL NOTES

- 1- EACH ROUNDABOUT IS UNIQUE AND THE TRAFFIC CONTROL MUST BE DEVELOPED TO MEET THE SPECIFIC CONDITIONS OF THE LOCATION AND THE WORK OPERATION. A DETOUR COULD POSSIBLY BETTER SERVE TRAFFIC MOVEMENT AND MUST BE CONSIDERED AS AN ALTERNATIVE TO A FLAGGING OPERATION.
- 2- FLAGGERS SHALL CONTROL TRAFFIC FLOW ON ALL APPROACHES OF THE ONE LANE ROUNDABOUT.
- 3- A LEAD FLAGGER SHALL BE DESIGNATED AND RADIO COMMUNICATION SHALL BE USED BY THE FLAGGERS.
- 4- ONLY ONE QUADRANT OF TRAFFIC SHALL BE RELEASED AT A TIME.
- 5- AT NIGHT, FLAGGER STATIONS SHALL BE ILLUMINATED. STREET LIGHTS AND VEHICLE HEADLIGHTS SHALL NOT BE USED TO ILLUMINATE THE FLAGGER STATION.
- 6- REFER TO RSD 1101.11, SHEET 4, FOR SIGN SPACING.
- 7- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO RSD 1101.11, SHEET 2 OF 4).
- 8- PERIODIC ADJUSTMENTS TO THE CHANNELIZING DEVICES MAY BE ALLOWED IN AN ACTIVE WORK ZONE TO ACCOMMODATE THE TURNING MOVEMENTS OF TRACTOR TRAILER VEHICLES AND OTHER LARGE VEHICLES.

- 9- FLAGGING OPERATIONS MAY NOT BE NECESSARY WHEN WORKING ON THE SHOULDERS OR IN THE ISLAND OF THE ROUNDABOUT. IF A DRIVING LANE(S) WIDTH OF AT LEAST 10 FEET (OR MORE DEPENDING ON THE DESIGN OF THE VEHICLE) CAN BE MAINTAINED WHILE SHOULDER WORK ON AN APPROACH IS BEING CONDUCTED, THE DRIVING LANE(S) MAY REMAIN OPEN TO TRAFFIC. ROAD WORK AHEAD, SHOULDER WORK AHEAD AND/OR SHOULDER CLOSED SIGNS SHOULD BE USED WHERE APPLICABLE, ALONG THE LANE OR SHOULDER TAPERS AND WORK AREA DELINEATION.
- 10- COVER EXISTING SIGNS THAT CONFLICT WITH WORK ZONE TRAFFIC PATTERN DURING ACTIVE WORK HOURS. UNCOVER SIGNS WHENEVER WORK IS NOT TAKING PLACE.
- 11- PROVIDE PEDESTRIAN ACCOMMODATIONS WHEN CLOSING OFF CROSSWALKS.
- 12- INSTALL SINGLE LANE ROUNDABOUT CLOSURE SO THAT VEHICLES AVOID TRAVERSING CONCRETE/MEDIANS ALONG ROUNDABOUT.
- 13- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

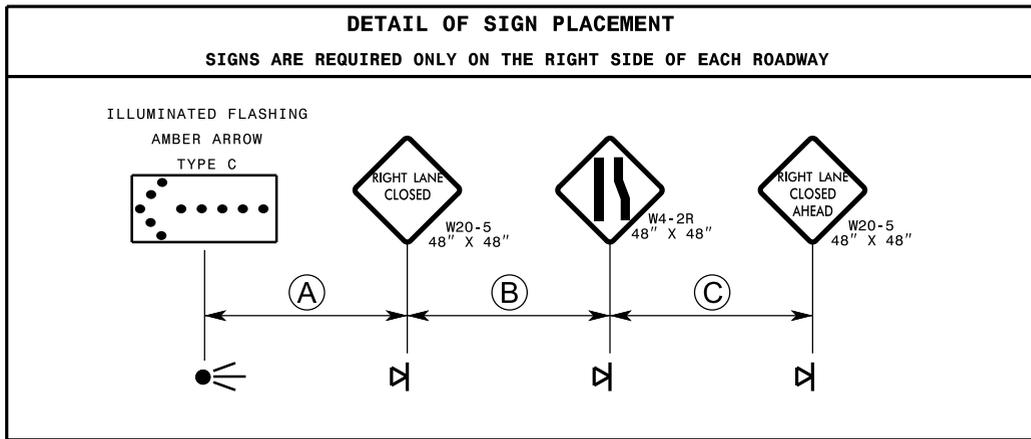
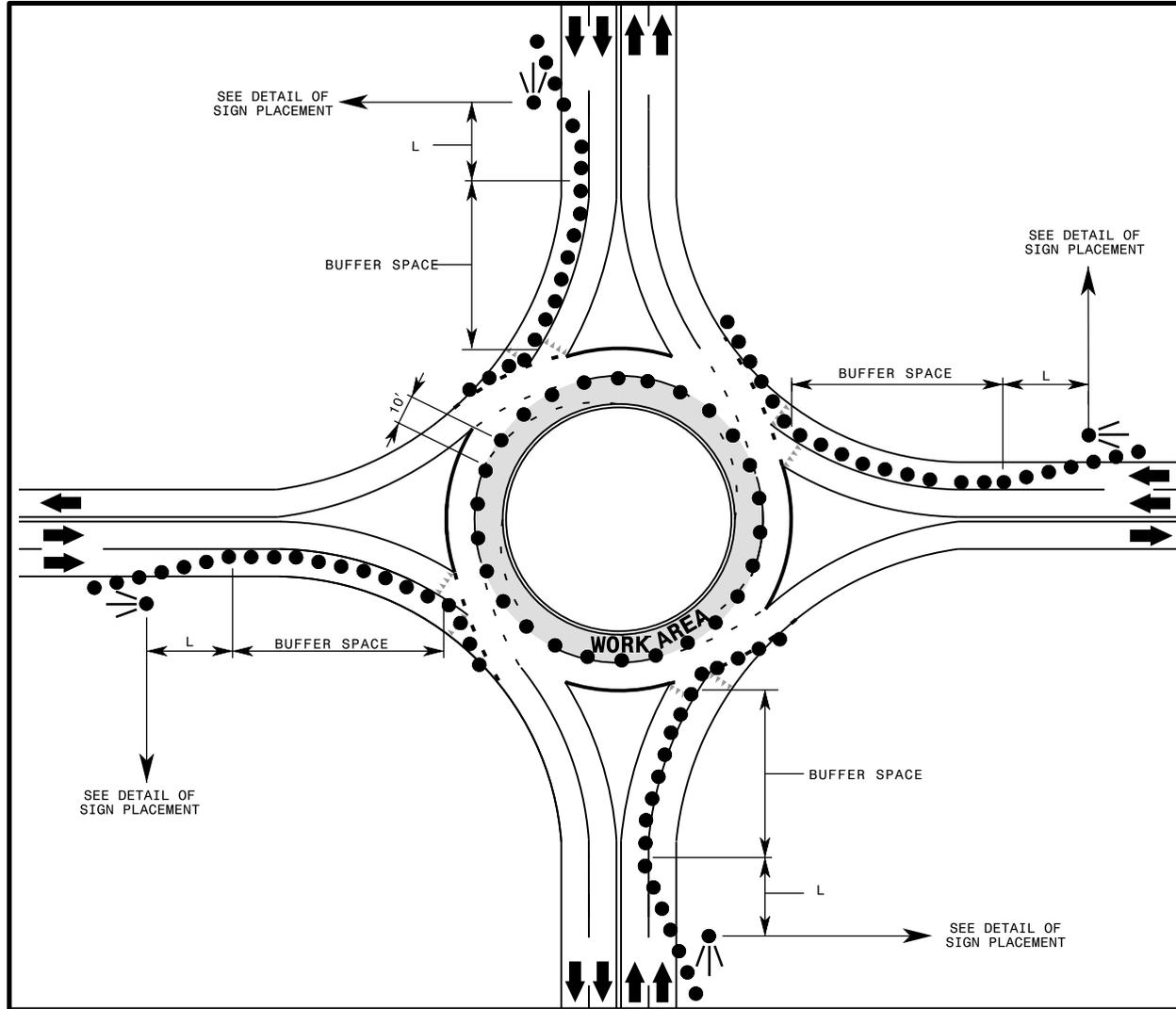
- ← DIRECTION OF TRAFFIC FLOW
- ◻ FLAGGER STATION
- ◁ PORTABLE SIGN
- DRUM

1-24

ROADWAY STANDARD DRAWING FOR

TEMPORARY LANE CLOSURES

INSIDE LANE CLOSURE ON TWO-LANE ROUNDABOUT



GENERAL NOTES

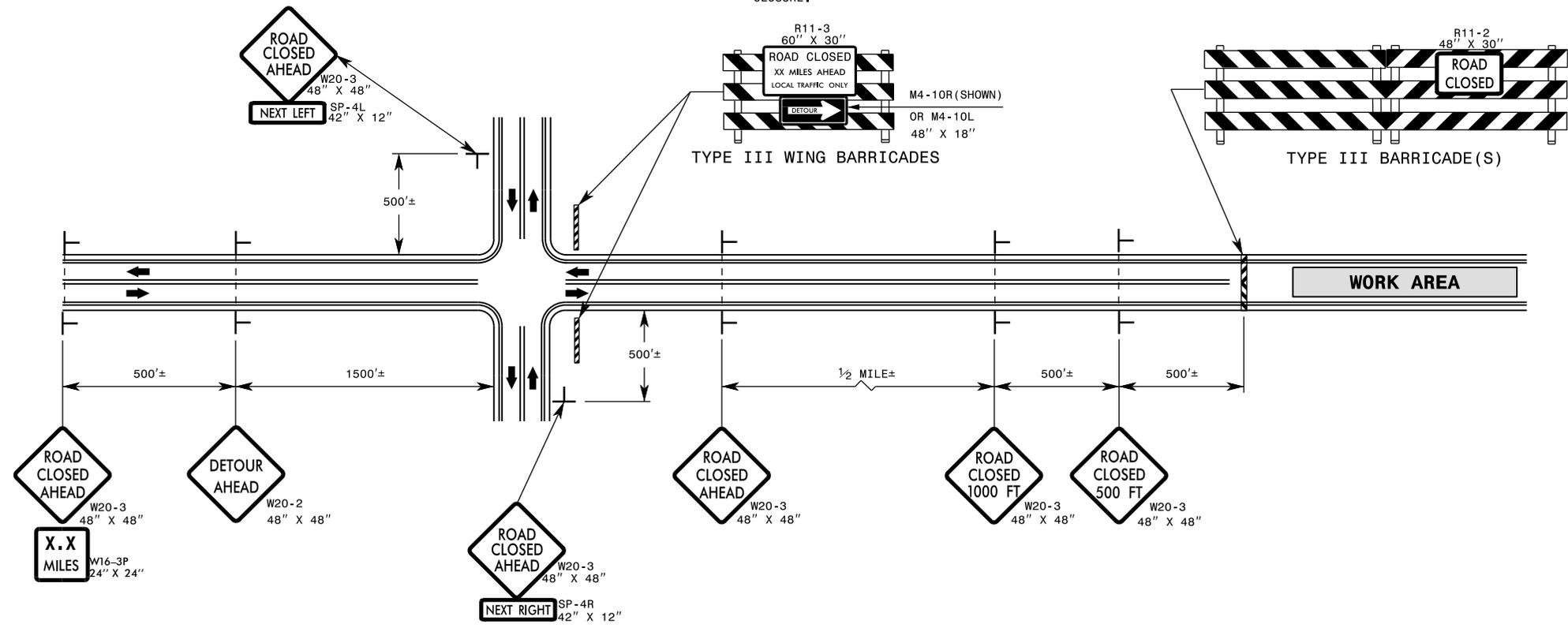
- 1- EACH ROUNDABOUT IS UNIQUE AND THE TRAFFIC CONTROL MUST BE DEVELOPED TO MEET THE SPECIFIC CONDITIONS OF THE LOCATION AND THE WORK OPERATION. A DETOUR COULD POSSIBLY BETTER SERVE TRAFFIC MOVEMENT AND MUST BE CONSIDERED AS AN ALTERNATIVE TO A LANE CLOSURE OPERATION.
- 2- PLACE ARROW BOARDS ON THE SHOULDER (PAVED OR UNPAVED). PLACE ARROW BOARDS WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE ARROW BOARD LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE, SUCH THAT STOPPING SIGHT DISTANCE TO THE ARROW BOARD IS MET (REFER TO RSD 1101.11, SHEET 2 OF 4).
- 3- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT.
- 4- REFER TO RSD 1101.11, SHEET 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.
- 5- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE FLOW OF TRAFFIC, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 6- FLASHING WARNING LIGHTS MAY BE USED TO CALL ATTENTION TO THE ADVANCE WARNING SIGNS IN ACCORDANCE WITH THE LATEST EDITION OF THE MUTCD, STATE OR LOCAL STANDARDS OR GUIDELINES.
- 7- A PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) SHOULD BE CONSIDERED AS PART OF THE TRAFFIC CONTROL PLAN TO PROVIDE CLEAR GUIDANCE TO MOTORIST ON ALL APPROACHES OF THE ROUNDABOUT, ESPECIALLY APPROACHES THAT MUST REVERSE TRAFFIC FLOW.

- 8- VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH INTENSITY AMBER ROTATING, FLASHING, OSCILLATING, OR STROBE LIGHTS. VEHICLE HAZARD WARNING SIGNALS CAN BE USED TO SUPPLEMENT HIGH INTENSITY AMBER ROTATING, FLASHING, OSCILLATING, OR STROBE LIGHTS.
- 9- PERIODIC ADJUSTMENTS TO THE CHANNELIZING DEVICES MAY BE ALLOWED IN AN ACTIVE WORK ZONE TO ACCOMMODATE THE TURNING MOVEMENTS OF TRACTOR TRAILER VEHICLES AND OTHER LARGE VEHICLES.
- 10- REFER TO RSD 1205.14, SHEET 2 OF 2, FOR PAVEMENT MARKINGS ON ROUNDABOUTS.
- 11- IN CASES WHERE PAVEMENT MARKINGS ARE NO LONGER APPLICABLE TO THE TRAFFIC PATTERN, CONSIDER REMOVING OR COVERING THE MARKINGS AT THE DISCRETION OF THE ENGINEER.
- 12- COVER EXISTING SIGNS THAT CONFLICT WITH WORK ZONE TRAFFIC PATTERN DURING ACTIVE WORK HOURS. UNCOVER SIGNS WHENEVER WORK IS NOT TAKING PLACE.
- 13- PROVIDE PEDESTRIAN ACCOMMODATIONS WHEN CLOSING OFF CROSSWALKS.
- 14- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

- ← DIRECTION OF TRAFFIC FLOW
- ⊞ PORTABLE SIGN
- DRUM
- ⚡ FLASHING ARROW BOARD

NOTE: PLACE WING BARRICADES WITH R11-3 SIGN AT THROUGH SIDE ROADS BETWEEN THE DETOUR POINT AND THE POINT OF CLOSURE.

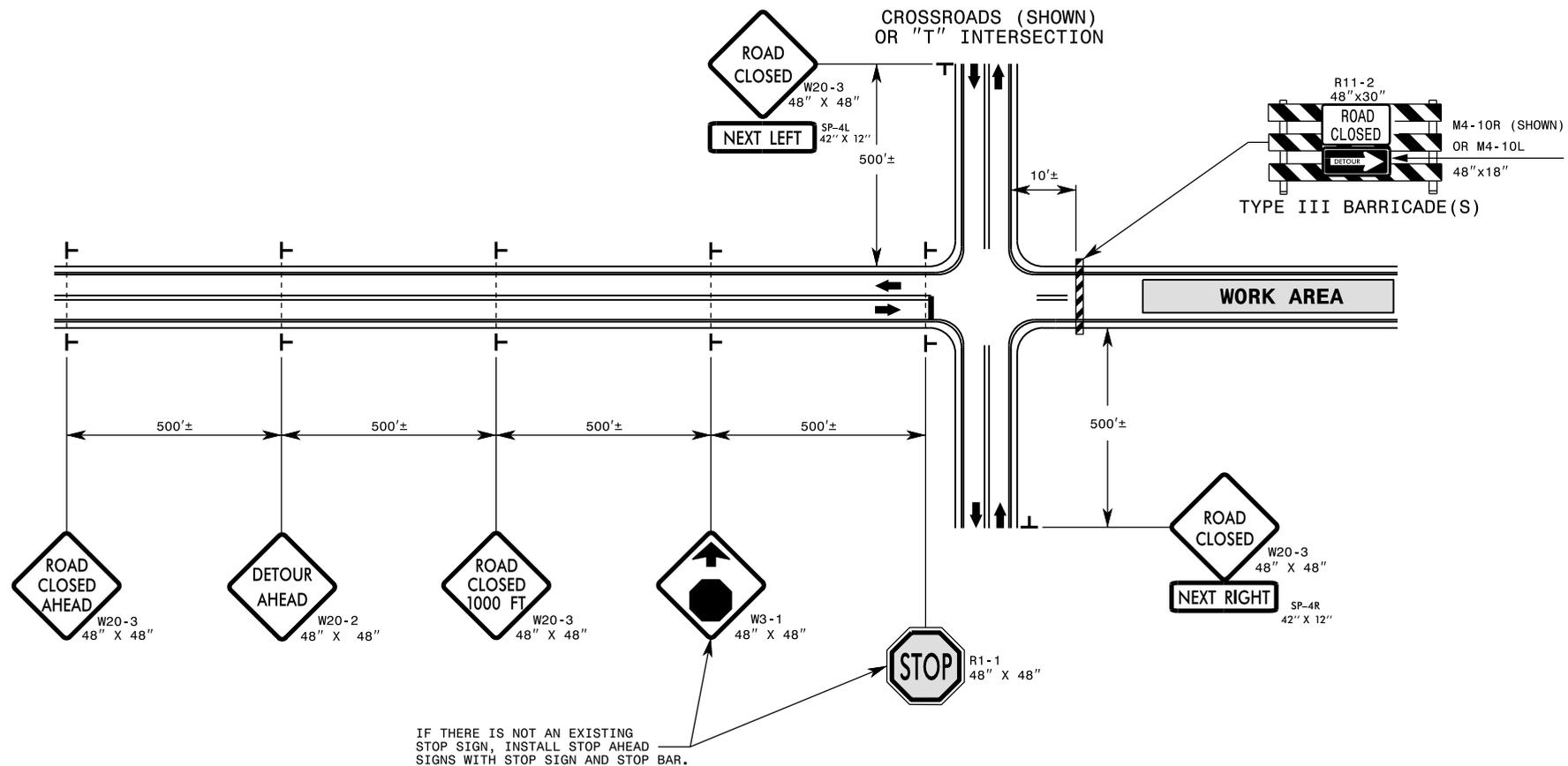


GENERAL NOTES

- 1- USE THIS RSD. FOR 2-LANE, 2-WAY, AND MULTILANE DIVIDED AND UNDIVIDED ROADWAYS.
- 2- INSTALLATION OF DETOUR ROUTING PANELS, TEMPORARY ROUTE MARKERS, DESTINATION SIGNS, AND ANY NECESSARY MODIFICATIONS TO EXISTING OR PROPOSED REGULATORY OR WARNING SIGNS WILL BE MADE BY OTHERS (STATE OR CITY FORCES) UNLESS OTHERWISE DESIGNATED IN THE PLANS. PROVIDE A MINIMUM 30 CALENDAR DAY NOTICE TO STATE FORCES BEFORE A ROADWAY IS CLOSED TO TRAFFIC SUCH THAT THE NECESSARY PROVISIONS CAN BE MADE TO INSTALL DETOUR ROUTE SIGNS, INFORM LOCAL EMERGENCY AND LAW ENFORCEMENT PERSONNEL, SCHOOLS, OR ANY OTHER PARTIES AFFECTED BY THE ROAD CLOSURE.
- 3- INSTALL SIGNS BEFORE THE BARRICADES WHEN CLOSING THE ROADWAY TO TRAFFIC. REMOVE BARRICADES BEFORE SIGNS WHEN OPENING THE ROADWAY TO TRAFFIC. INSTALL/REMOVE SIGNS AND BARRICADES WITHIN THE SAME CALENDAR DAY.
- 4- USE ADDITIONAL TYPE III BARRICADES IN STAGGERED LOCATIONS SUPPLEMENTED WITH SIGN R11-3 IN THE EVENT THAT TRAFFIC MUST BE MAINTAINED BEYOND THE DETOUR POINT.
- 5- POSITION WING BARRICADES ON THE SHOULDERS AND SLOPE THE STRIPES DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING.
- 6- USE PORTABLE SIGNS IF ROAD CLOSURE IS TO BE IMPLEMENTED FOR LESS THAN THREE DAYS, OR FOR EMERGENCIES.

LEGEND

- T STATIONARY SIGN
- ← DIRECTION OF TRAFFIC FLOW
- ▩ TYPE III BARRICADE

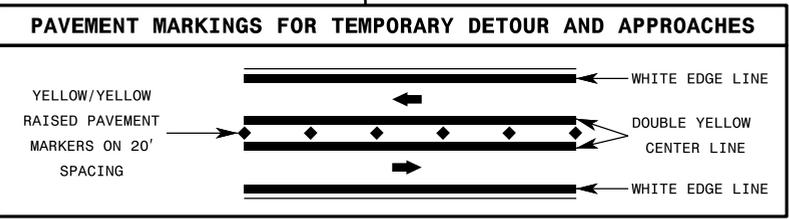
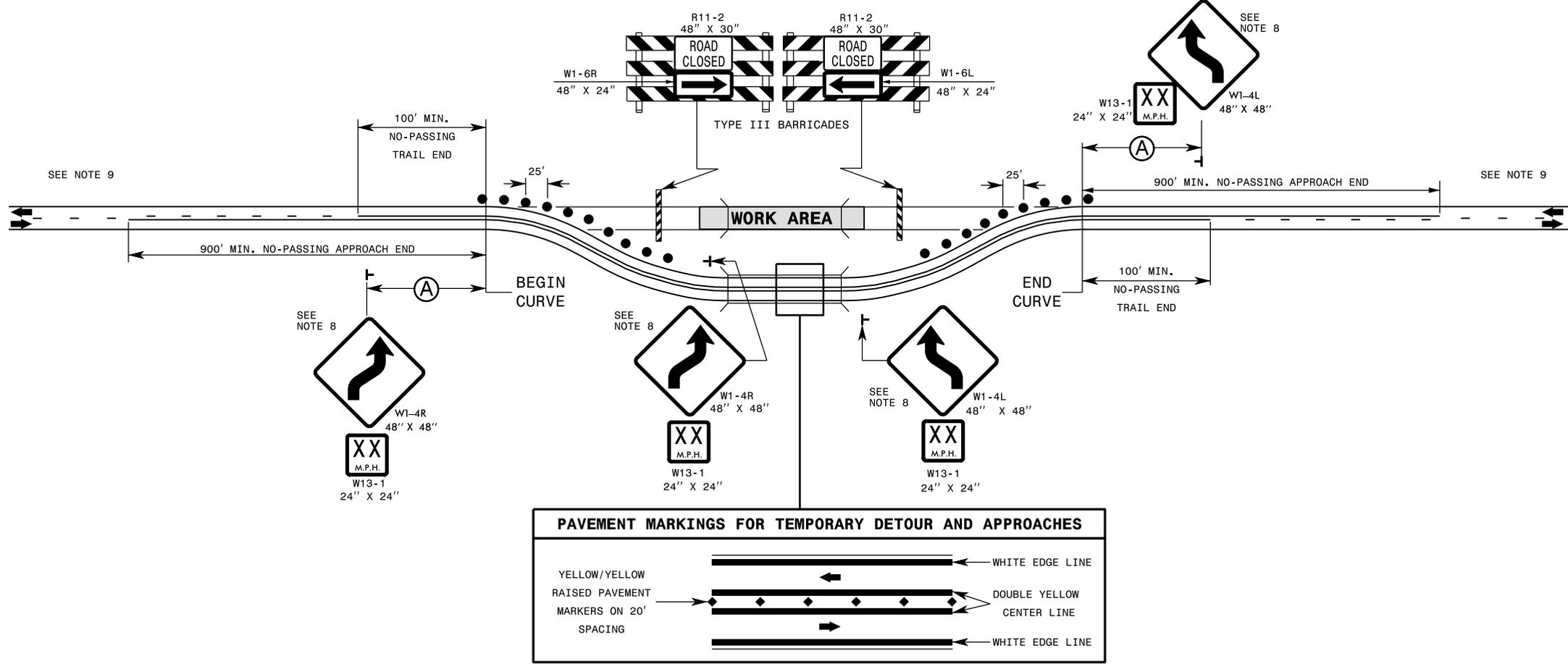


GENERAL NOTES

- 1- IF NECESSARY USE THIS RSD. FOR CROSS-ROADS AS SHOWN OR FOR "T" INTERSECTIONS ON 2-LANE, 2-WAY AND MULTILANE UNDIVIDED AND DIVIDED ROADWAYS.
- 2- INSTALLATION OF DETOUR ROUTING PANELS, TEMPORARY ROUTE MARKERS, DESTINATION SIGNS, AND ANY NECESSARY MODIFICATIONS TO EXISTING OR PROPOSED REGULATORY OR WARNING SIGNS WILL BE MADE BY OTHERS (STATE OR CITY FORCES) UNLESS OTHERWISE DESIGNATED IN THE PLANS. A MINIMUM 30 CALENDAR DAY NOTICE IS REQUIRED TO BE PROVIDED TO STATE FORCES BEFORE A ROADWAY IS CLOSED TO TRAFFIC SUCH THAT THE NECESSARY PROVISIONS CAN BE MADE TO INSTALL DETOUR ROUTE SIGNS, AND TO INFORM LOCAL EMERGENCY AND LAW ENFORCEMENT PERSONNEL, SCHOOLS, OR ANY OTHER PARTIES AFFECTED BY THE ROAD CLOSURE.
- 3- INSTALL SIGNS BEFORE BARRICADES WHEN CLOSING THE ROADWAY TO TRAFFIC. REMOVE BARRICADES BEFORE SIGNS WHEN OPENING THE ROADWAY TO TRAFFIC. INSTALL/REMOVE SIGNS AND BARRICADES WITHIN THE SAME CALENDAR DAY.
- 4- POSITION BARRICADES SUCH THAT THE STRIPES ARE SLOPED DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING.
- 5- USE PORTABLE SIGNS IF ROAD CLOSURE IS TO BE IMPLEMENTED FOR LESS THAN THREE DAYS, OR FOR EMERGENCIES. IN THIS CASE, NO STOP BAR IS NECESSARY.

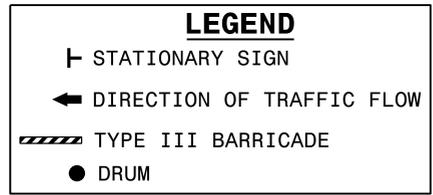
LEGEND	
⊥	STATIONARY SIGN
←	DIRECTION OF TRAFFIC FLOW
▩	TYPE III BARRICADE

ROADWAY STANDARD DRAWING FOR
TEMPORARY ROAD CLOSURES
 CLOSURE AT DETOUR POINT



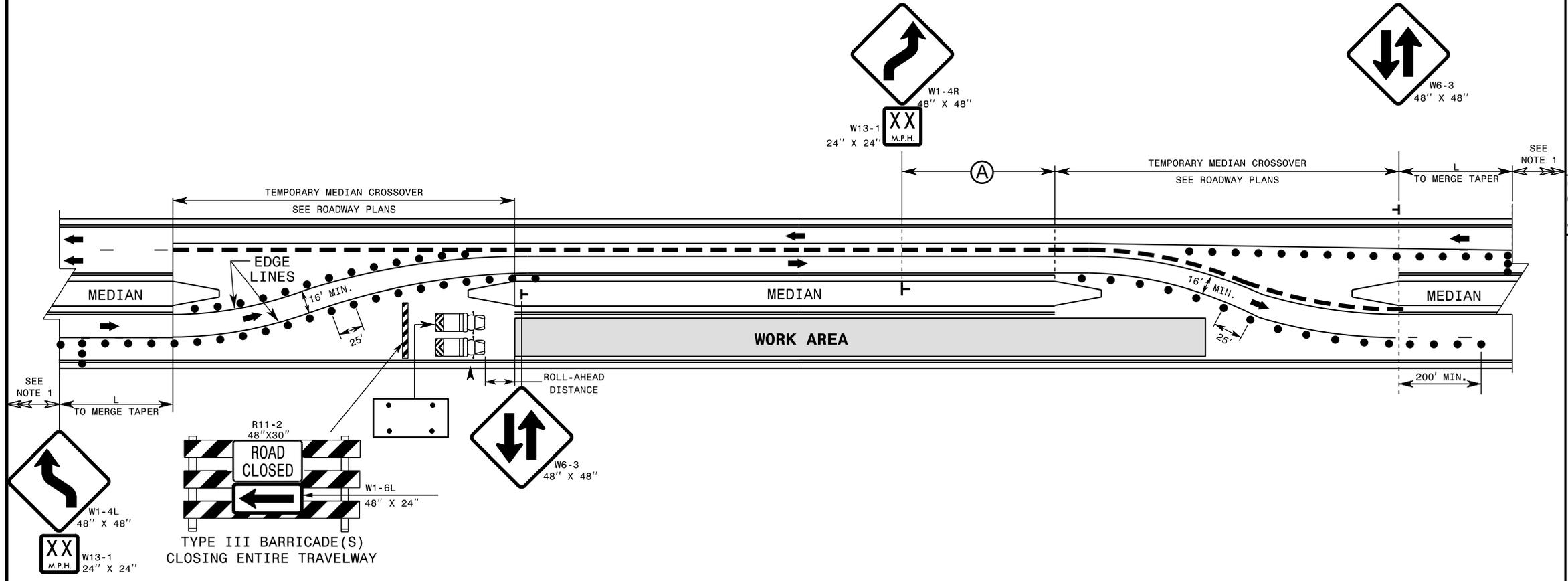
GENERAL NOTES

- 1- THE SIGNS ON THIS RSD. MAY BE APPLIED TO MULTILANE ROADWAYS.
- 2- REFER TO RSD. 1101.11, SHEET 4, FOR SIGN SPACING.
- 3- USE ADDITIONAL TYPE III BARRICADES IN STAGGERED LOCATIONS SUPPLEMENTED WITH SIGN R11-4 "ROAD CLOSED TO THRU TRAFFIC" IN THE EVENT THAT TRAFFIC MUST BE MAINTAINED BEYOND THE CLOSURE LIMITS.
- 4- REMOVE PAVEMENT MARKINGS THAT ARE NO LONGER APPLICABLE IN CONJUNCTION WITH OPENING/CLOSING THE TEMPORARY DETOUR TO TRAFFIC.
- 5- PLACE PAVEMENT MARKERS FROM A POINT 500' PRIOR TO THE BEGINNING OF THE TEMPORARY DETOUR, ALONG THE TEMPORARY DETOUR, AND END APPROXIMATELY 500' PAST THE END OF THE TEMPORARY DETOUR (PLACE MARKERS ON 20' SPACING).
- 6- USE REVERSE TURN SIGNS (W1-3L OR W1-3R) INSTEAD OF THE REVERSE CURVE SIGNS SHOWN IF THE TEMPORARY DETOUR HAS SHARP CURVES (30MPH OR LESS). PLACE CHEVRON SIGNS (W1-8) ALONG THE CURVES WHERE THERE IS INSUFFICIENT ADVANCE WARNING DISTANCE TO PLACE THE SECOND SET.
- 7- USE ADVISORY SPEED PANELS (W13-1) IF THE DESIGN SPEED IS AT LEAST 10MPH LESS THAN THE POSTED SPEED LIMIT UNLESS A LOWER SPEED IS DEEMED NECESSARY BY THE ENGINEER.
- 8- IF THE TANGENT DISTANCE ALONG THE TEMPORARY DETOUR IS LESS THAN 600', INSTALL THE DOUBLE REVERSE CURVE (W24-1 L OR W24-1 R) AT THE LOCATION OF THE FIRST REVERSE CURVE SIGN (W1-4L OR W1-4R) AND OMIT THE SECOND REVERSE CURVE SIGN (W1-4L OR W1-4R).
- 9- VERIFY REMAINING PASSING ZONE MEETS MINIMUM LENGTH AS REQUIRED BY THE MUTCD.



1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY ROAD CLOSURES
CLOSURE OF ONE DIRECTION OF A
4-LANE DIVIDED ROADWAY



GENERAL NOTES

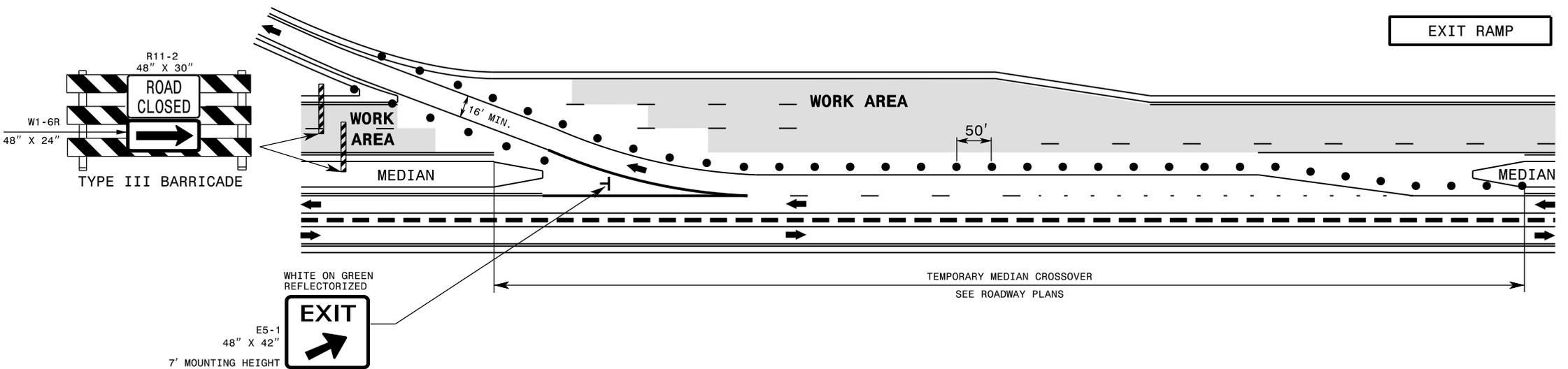
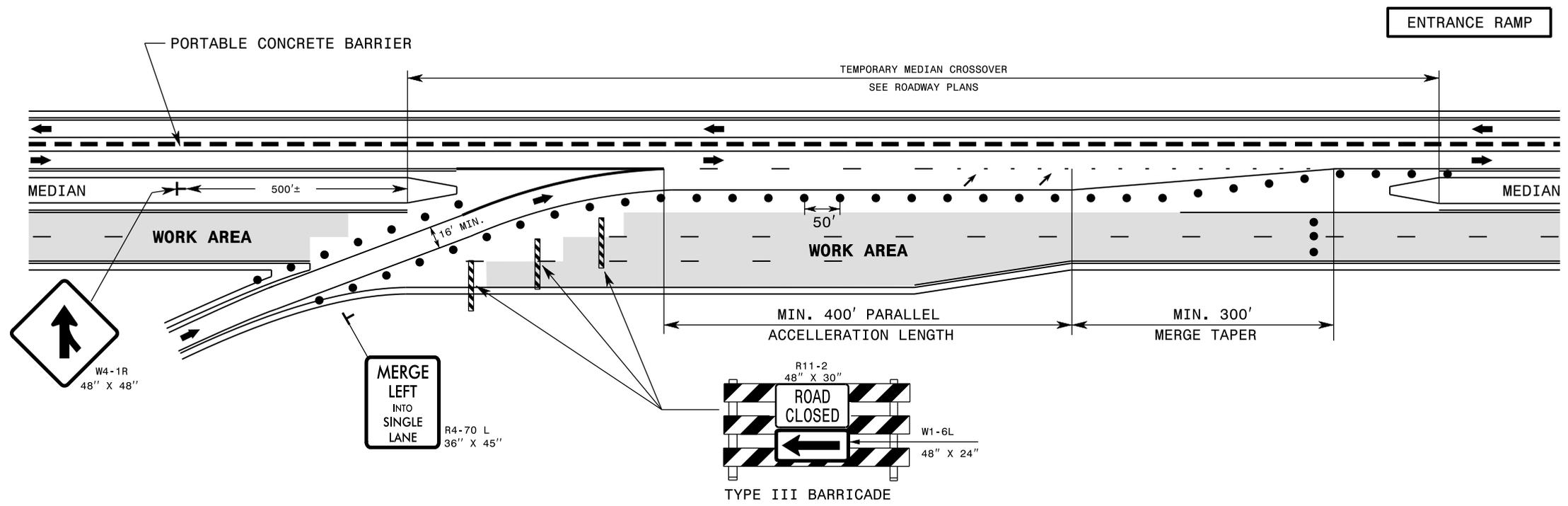
- 1- REFER TO THE APPROPRIATE LANE CLOSURE RSD 1101.02 FOR SIGNS, DEVICES, AND NOTES FOR THE LANE CLOSURE.
- 2- PROVIDE DELINEATORS WITH CONCRETE BARRIER.
- 3- PLACE EDGE LINES BEGINNING AT THE LANE CLOSURE MERGE TAPER AND CONTINUE THRU THE ENTIRE LENGTH OF THE SECTION. REMOVE PAVEMENT MARKINGS THAT ARE NO LONGER APPLICABLE IN CONJUNCTION WITH PLACING TRAFFIC IN THE CROSSOVER PATTERN AND WHEN RETURNING TRAFFIC BACK IN ITS NORMAL PATTERN. USE REMOVABLE TAPE IF TRAFFIC WILL BE SWITCHED ON THE SAME PAVEMENT SURFACE.
- 4- LOCATE CROSSOVERS, BARRIER, AND LANE WIDTHS AS SHOWN IN THE PLANS. FULL DEPTH SHOULDERS MAY BE REQUIRED AS SHOWN IN THE PLANS.
- 5- GUARDRAIL ON TRAFFIC SIDE WILL REQUIRE OVERLAP AND END TREATMENTS. THIS PROCESS MUST BE REVERSED WHEN FACILITY IS OPEN TO FINAL PATTERN.

LEGEND

●	DRUM
	TRUCK MOUNTED ATTENUATOR (TMA)
	FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
⊥	STATIONARY SIGN
- - -	PORTABLE CONCRETE BARRIER
←	DIRECTION OF TRAFFIC FLOW
	TYPE III BARRICADE

1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY ROAD CLOSURES
MEDIAN CROSSOVERS FOR RAMPS

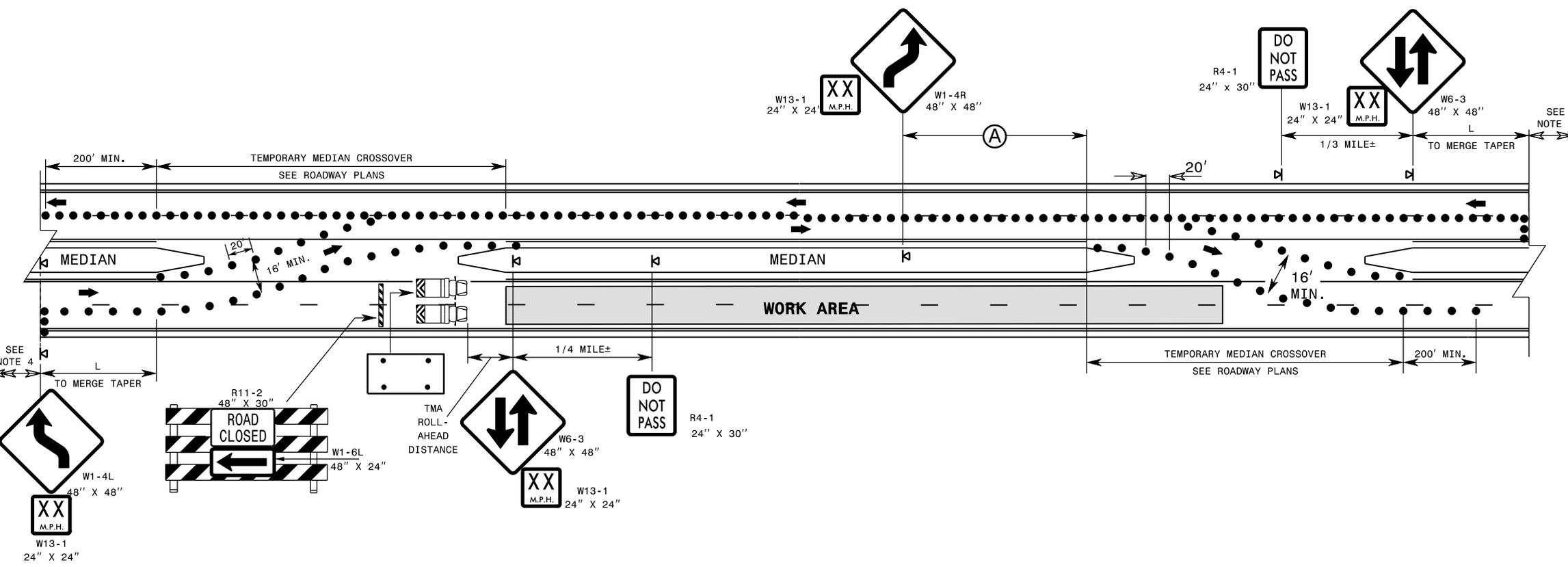


GENERAL NOTES

- 1- THIS SHEET IS TO BE USED IN CONJUNCTION WITH RSD. 1101.03, SHEET 4.
- 2- BARRICADE LOCATIONS ARE TYPICAL AND MAY BE MODIFIED FOR VARIOUS FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER.
- 3- GUARDRAIL ON TRAFFIC SIDE WILL REQUIRE OVERLAP AND END TREATMENTS. THIS PROCESS MUST BE REVERSED WHEN FACILITY IS OPEN TO FINAL TRAFFIC PATTERN.

LEGEND

- DRUM
- ▩ TYPE III BARRICADE
- ⊥ STATIONARY SIGN
- - - PORTABLE CONCRETE BARRIER
- ← DIRECTION OF TRAFFIC FLOW

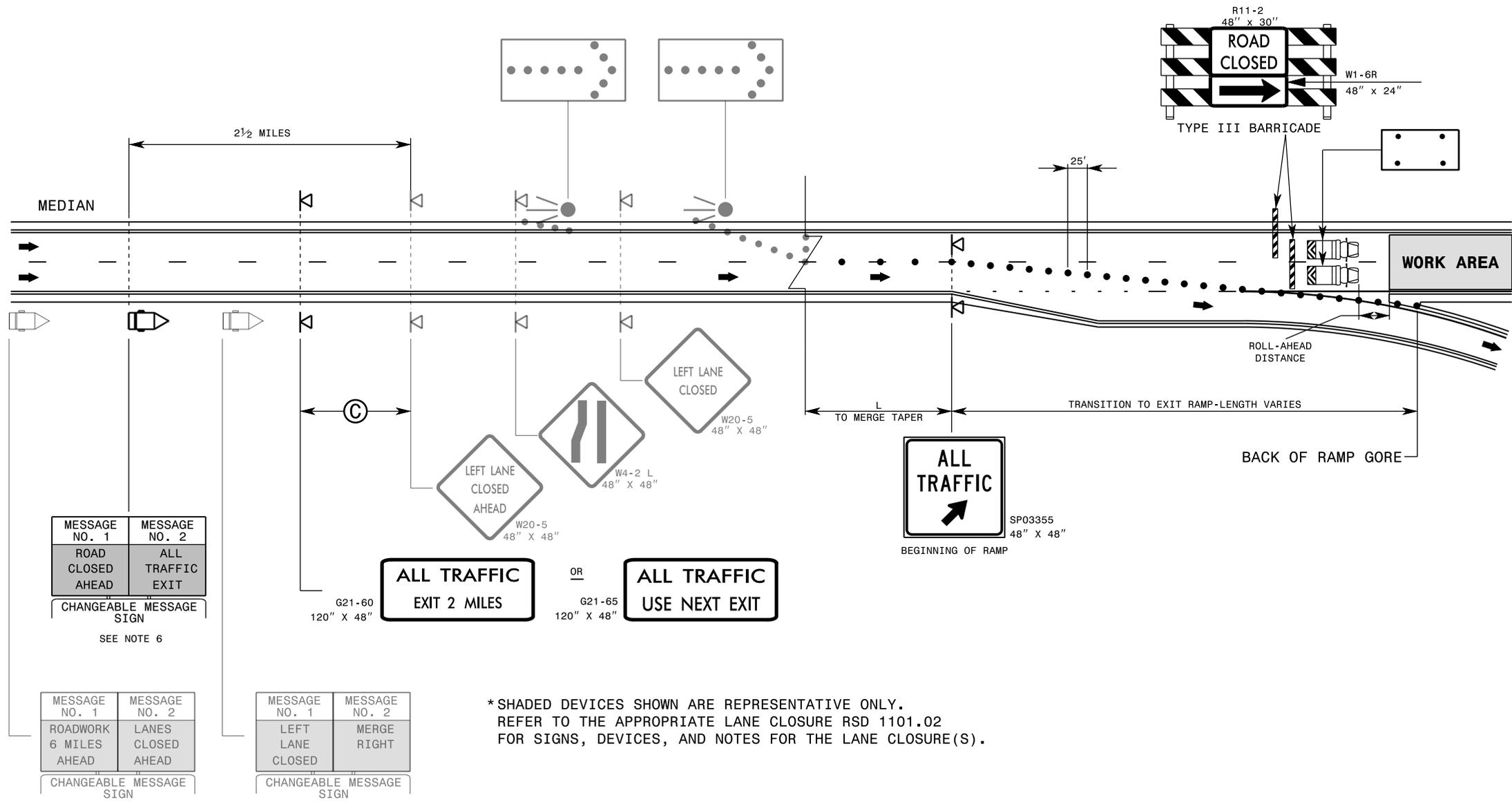


GENERAL NOTES

- 1- USE THIS RSD. FOR OPERATIONS LASTING ONE WORK PERIOD OR LESS.
- 2- CROSSOVERS SHALL MEET A MINIMUM DESIGN SPEED OF 20 MPH BELOW THE EXISTING POSTED SPEED LIMIT BEFORE WORK ZONE SPEED LIMIT REDUCTION.
- 3- LIMIT THE DISTANCE BETWEEN TEMPORARY CROSSOVERS TO 1/2 MILE.
- 4- REFER TO THE APPROPRIATE LANE CLOSURE RSD 1101.02 FOR SIGNS, DEVICES, AND NOTES FOR THE LANE CLOSURE.
- 5- SEPARATE 2-WAY TRAFFIC USING DRUMS OR SKINNY DRUMS AT A 10' SPACING.
- 6- IF USED, LAW ENFORCEMENT SHOULD BE PLACED AFTER MERGE TAPER, WITHIN THE LONGITUDINAL "L", AND IN ADVANCE OF THE TMAs.

LEGEND

	CHANGEABLE MESSAGE SIGN (CMS)
	TRUCK MOUNTED ATTENUATOR
	FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
	DRUM
	TYPE III BARRICADE
	PORTABLE SIGN
	FLASHING ARROW BOARD
	DIRECTION OF TRAFFIC FLOW



* SHADED DEVICES SHOWN ARE REPRESENTATIVE ONLY.
REFER TO THE APPROPRIATE LANE CLOSURE RSD 1101.02
FOR SIGNS, DEVICES, AND NOTES FOR THE LANE CLOSURE(S).

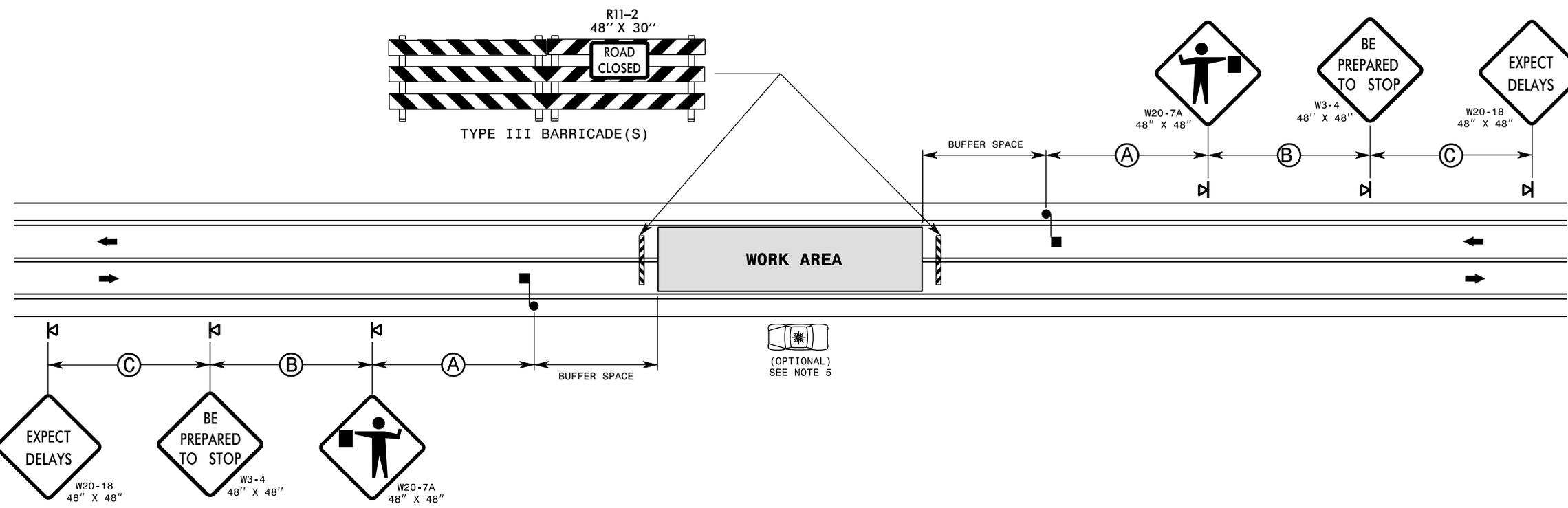
GENERAL NOTES

- 1- IF NECESSARY, USE FLAGGERS OR LAW ENFORCEMENT TO DIRECT TRAFFIC AT RAMP TERMINAL AS DIRECTED BY THE PLANS OR THE ENGINEER.
- 2- IF RAMP TERMINAL IS SIGNALIZED, PLACE SIGNALS IN FLASH MODE AND USE LAW ENFORCEMENT TO DIRECT TRAFFIC.
- 3- DISPLAY CHANGEABLE MESSAGE SIGN (CMS) MESSAGES AS SHOWN OR AS DEEMED NECESSARY BY THE ENGINEER.
- 4- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

LEGEND

- CHANGEABLE MESSAGE SIGN (CMS)
- TRUCK MOUNTED ATTENUATOR
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- DRUM
- TYPE III BARRICADE
- PORTABLE SIGN
- FLASHING ARROW BOARD
- DIRECTION OF TRAFFIC FLOW

1-24



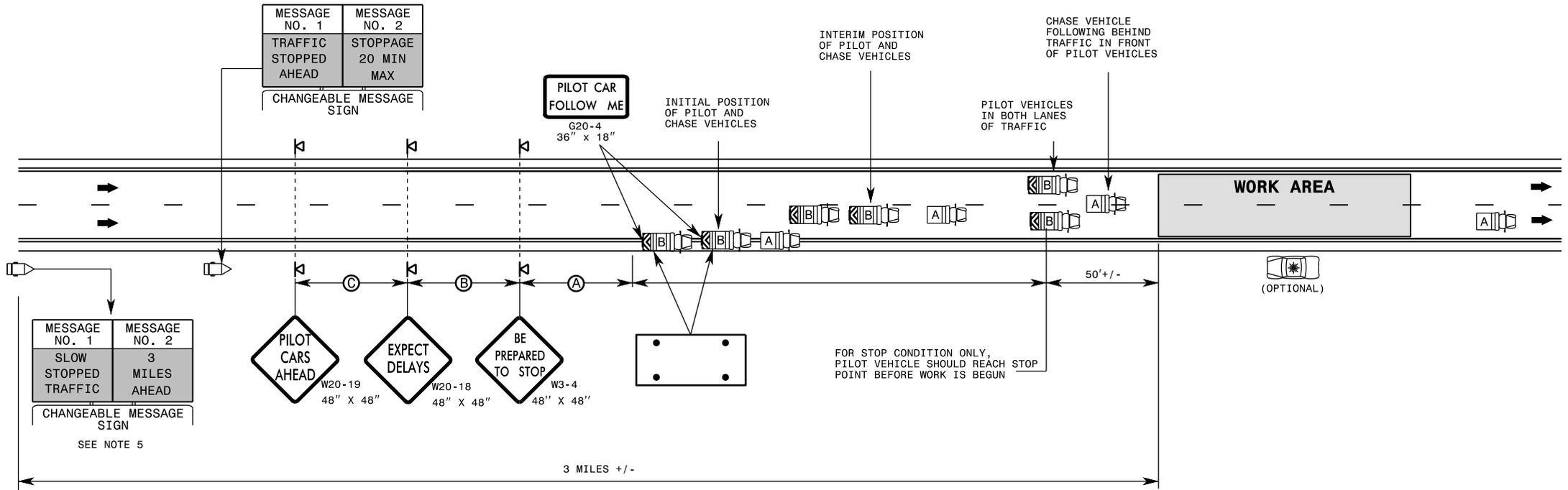
GENERAL NOTES

- 1- USE THIS DETAIL FOR OPERATIONS SUCH AS ERECTION AND REMOVAL OF OVERHEAD SIGNS, BRIDGE GIRDERS, OR OTHER TYPES OF CONSTRUCTION OVER LOW VOLUME, SECONDARY ROADS WHERE THE ENTIRE TRAVELWAY MUST BE CLOSED TO TRAFFIC.
- 2- DO NOT EXCEED 30 MINUTES AT A TIME FOR ROAD CLOSURE.
- 3- IMPLEMENT THIS TYPE OF ROAD CLOSURE DURING PERIODS OF LOW TRAFFIC VOLUMES. DEplete THE EXISTING TRAFFIC QUEUE BEFORE RECLOSING THE ROADWAY TO TRAFFIC IF MULTIPLE CLOSURES ARE REQUIRED.
- 4- REFER TO RSD. 1101.11, SHEETS 2 & 4, FOR SIGN SPACING AND BUFFER SPACE.
- 5- LAW ENFORCEMENT MAY BE USED TO SUPPLEMENT FLAGGER, AS DIRECTED BY THE ENGINEER.
- 6- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE ROAD CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7A) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.
- 7- REFER TO THE CURRENT MUTCD FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.
- 8- DO NOT EXCEED A 1 MILE ROAD CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
- 9- IF VEHICLE QUEUES WILL REACH WITHIN 100' OF EITHER SIDE OF ACTIVE RAILROAD TRACKS, PROVIDE A UNIFORMED LAW ENFORCEMENT OFFICER OR FLAGGER TO PREVENT VEHICLES FROM STOPPING WITHIN THE GRADE CROSSING. PROVIDE OFFICER OR FLAGGER EVEN IF AUTOMATIC WARNING MEASURES ALREADY EXIST.

LEGEND

-  TYPE III BARRICADE
-  PORTABLE SIGN
-  FLAGGER
-  DIRECTION OF TRAFFIC FLOW
-  LAW ENFORCEMENT

1-24



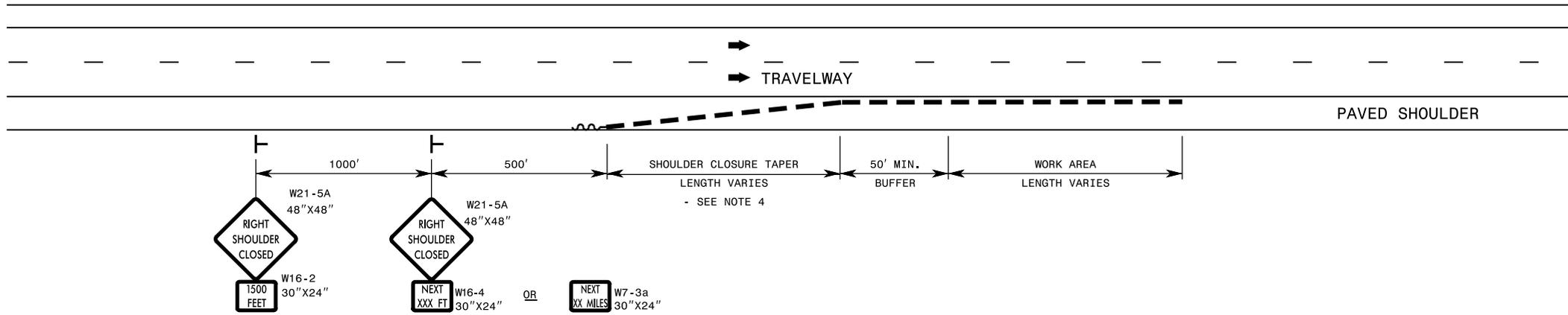
GENERAL NOTES

- 1- THIS DETAIL IS INTENDED TO BE USED FOR OPERATIONS SUCH AS INSTALLATION OF LANE CLOSURES, ERECTION AND REMOVAL OF OVERHEAD SIGNS, OR OTHER TYPES OF CONSTRUCTION WHERE THE ENTIRE TRAVELWAY MUST BE SLOW ROLLING OR CLOSED TO TRAFFIC.
- 2- THE NUMBER OF PILOT VEHICLES SHALL EQUAL THE NUMBER OF LANES. THE NUMBER OF CHASE VEHICLES SHALL BE ONE LESS THAN THE NUMBER OF PILOT VEHICLES.
- 3- IF THIS RSD. IS USED TO STOP TRAFFIC, IMPLEMENT THIS TYPE OF ROAD CLOSURE DURING PERIODS OF LOW TRAFFIC VOLUMES, AND DO NOT PLACE IN EFFECT LONGER THAN 20 MINUTES BEFORE RE-OPENING THE ROADWAY UNLESS OTHERWISE SPECIFIED IN PLANS OR PERMITTED BY THE ENGINEER. IF MULTIPLE CLOSURES WILL BE REQUIRED, A MINIMUM PERIOD OF 30 MINUTES SHOULD TRANSPIRE BEFORE RE-CLOSING THE ROADWAY.
- 4- SIGNS ARE NOT REQUIRED TO BE DUAL MOUNTED FOR UNDIVIDED MULTILANE ROADWAYS. PLACE ALL NECESSARY SIGNING BEFORE IMPLEMENTING THE ROLLING ROAD BLOCK.
- 5- INITIALLY, PLACE THE FIRST CHANGEABLE MESSAGE SIGN APPROXIMATELY 3 MILES IN ADVANCE OF THE WORK AREA. IF IT IS ANTICIPATED THAT TRAFFIC WILL BACK UP TO THE CMS, THEN PLACE THE CMS IN A LOCATION APPROXIMATELY 1/2 MILE OR MORE PRIOR TO WHERE TRAFFIC IS EXPECTED TO BACK UP.
6. COORDINATE WITH LOCAL TRAFFIC OPERATIONS PERSONNEL TO UTILIZE DYNAMIC MESSAGE SIGNS (DMS), IF APPLICABLE.
- 7- DISPLAY CHANGEABLE MESSAGE SIGN (CMS) MESSAGES AS SHOWN OR AS DIRECTED BY THE ENGINEER. USE NO MORE THAN TWO (2) MESSAGE DISPLAYS WITH ANY CYCLE.
- 8- START ROLLING ROAD BLOCK BY HAVING ALL VEHICLES LEAVE THE OUTSIDE SHOULDER AND ACCELERATE TO NORMAL ROADWAY SPEEDS. WHEN NORMAL ROADWAY SPEEDS ARE ATTAINED, THE PILOT VEHICLES (B) WILL POSITION THEMSELVES SIDE BY SIDE AND THEN DECELERATE TO THE SPECIFIED ROLLING ROAD BLOCK SPEED. THE CHASE VEHICLE(S) (A) WILL CONTINUE TO TRAVEL AT NORMAL ROADWAY SPEEDS BEHIND ANY VEHICLES IN FRONT OF THE ROLLING ROAD BLOCK. CLOSE ON-RAMPS/LOOPS OR STOP TRAFFIC ON SAME BETWEEN PILOT VEHICLES (B) AND THE WORK AREA. LAW ENFORCEMENT MAY BE USED AS A SUBSTITUTE FOR ANY VEHICLE(S). DO NOT BEGIN CONSTRUCTION IN ANY LOCATION WITHIN THE WORK AREA UNTIL THE CHASE VEHICLE(S) (A) HAS CLEARED THAT LOCATION.
- 9- RADIO COMMUNICATION BETWEEN ALL VEHICLES, INCLUDING LAW ENFORCEMENT (IF USED) AND GROUND CREWS IS REQUIRED.
- 10- LAW ENFORCEMENT WITH EMERGENCY LIGHTS ILLUMINATED CAN BE USED FOR ANY OF THE PILOT VEHICLES. IF LAW ENFORCEMENT IS USED AS ONE OF THE PILOT VEHICLES, THEN THE REMAINING PILOT VEHICLES ARE NOT REQUIRED TO HAVE TMAs OR ARROW BOARDS.
- 11- PILOT VEHICLES SHALL MEET THE REQUIREMENTS OF ARTICLE 1101-5 OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.

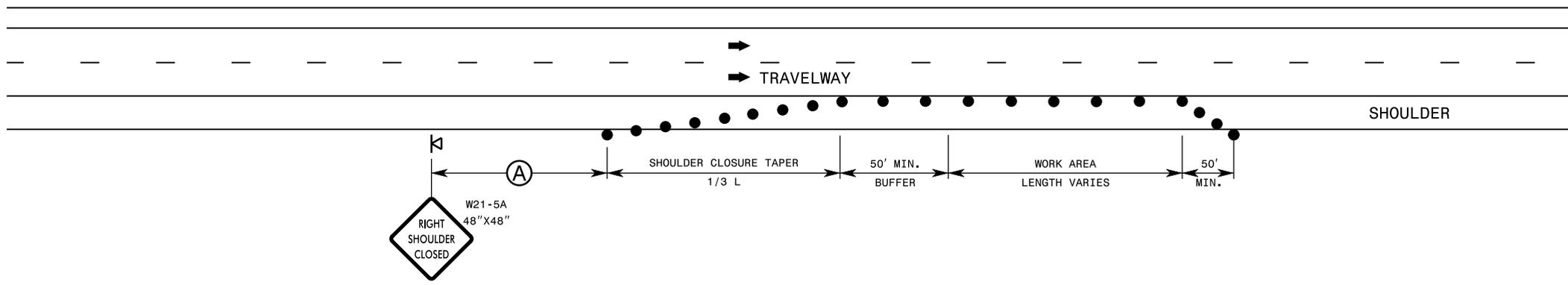
LEGEND

- CHANGEABLE MESSAGE SIGN (CMS)
- CHASE VEHICLE
- PILOT VEHICLE WITH TMA
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW
- LAW ENFORCEMENT

SHOULDER CLOSURE ON DIVIDED FACILITIES USING BARRIER



SHOULDER CLOSURE ON DIVIDED FACILITIES USING CHANNELIZING DEVICES



GENERAL NOTES

- 1- PLACE SHOULDER CLOSURE SIGNS ON THE SAME SIDE AS THE SHOULDER THAT IS CLOSED.
- 2- PLACE DRUMS IN THE SHOULDER TAPER AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE MAXIMUM SPACING OF DRUMS ALONG THE WORK AREA IS EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
- 3- USE STATIONARY SIGNS FOR OPERATIONS IN EFFECT LONGER THAN 72 HOURS.
- 4- REFER TO RSD. 1101.11, SHEETS 1, 3 & 4, FOR "L" DISTANCE, BARRIER FLARE RATES, AND SIGN SPACING.

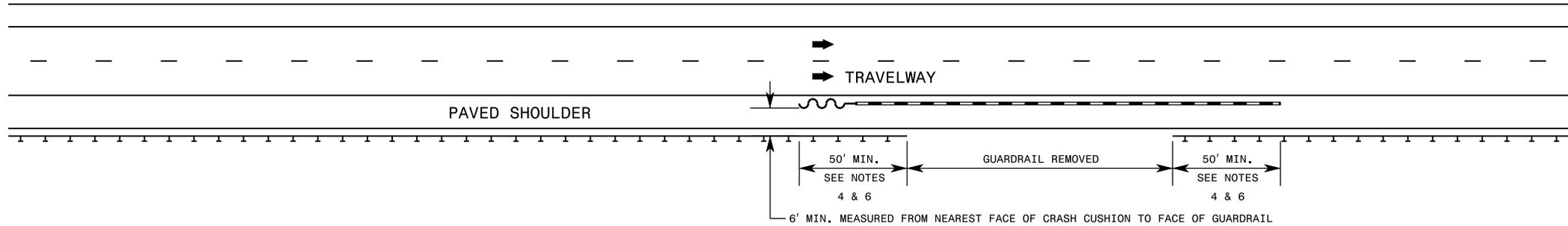
LEGEND	
●	DRUM
T	STATIONARY SIGN
K	PORTABLE SIGN
- -	PORTABLE CONCRETE BARRIER
➔	DIRECTION OF TRAFFIC FLOW
~ ~ ~	TEMPORARY CRASH CUSHION

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

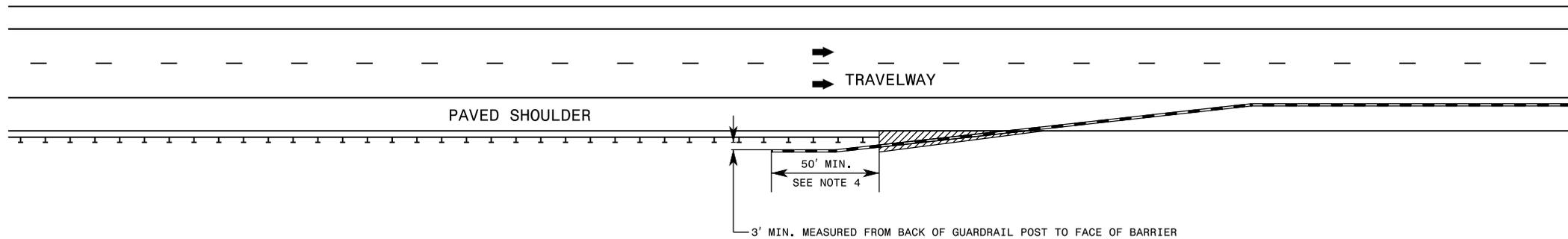
1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY SHOULDER CLOSURES

**SHOULDER CLOSURE ON DIVIDED FACILITIES
WITH GUARDRAIL/PCB OVERLAP**



**SHOULDER CLOSURE ON DIVIDED FACILITIES
PCB BEHIND GUARDRAIL**



GENERAL NOTES

- 1- PLACE SHOULDER CLOSURE SIGNS ON THE SAME SIDE AS THE SHOULDER THAT IS CLOSED.
- 2- REFER TO RSD. 1101.11, SHEETS 1, 3 & 4, FOR "L" DISTANCE, BARRIER FLARE RATES, AND SIGN SPACING.
- 3- THESE STANDARDS SHALL ONLY BE USED WHEN A B-77 TRANSITION IS NOT FEASIBLE, OR AS DETERMINED BY THE ENGINEER.
- 4- 50' MIN OVERLAP REQUIRED WHEN NO APPROVED GUARDRAIL ANCHOR IS PRESENT. IF GUARDRAIL END IS ANCHORED, THEN OVERLAP CAN BE REDUCED TO 10 FEET.
5. DETAILS CAN BE REVERSED FOR LEFT SHOULDER.
6. FOR NON-REDIRECTIVE (GATING) CRASH CUSHION SYSTEMS, THE 50' OF REQUIRED OVERLAP SHALL NOT INCLUDE ANY PORTION OF THE CRASH CUSHION.

LEGEND

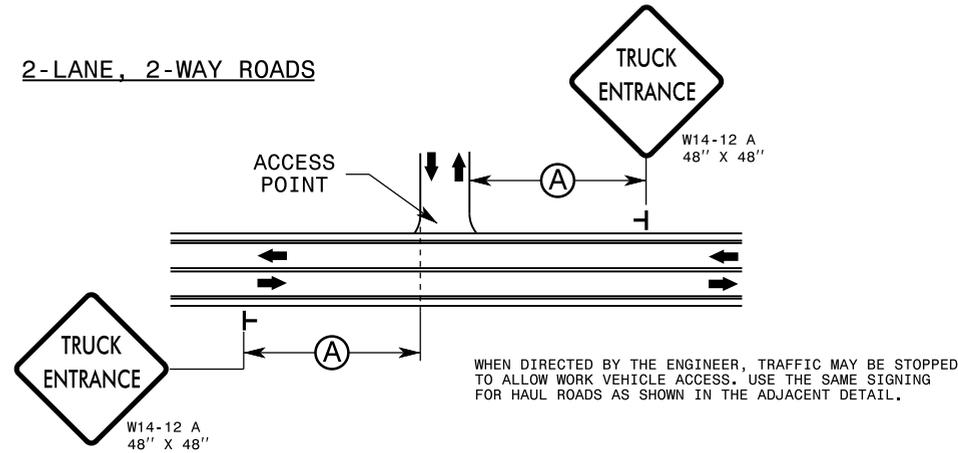
- TEMPORARY PAVEMENT
- EXISTING GUARDRAIL
- PORTABLE CONCRETE BARRIER
- DIRECTION OF TRAFFIC FLOW
- TEMPORARY CRASH CUSHION

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

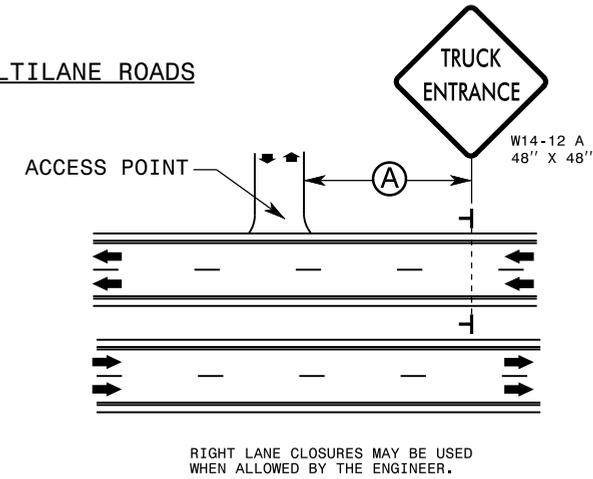
ROADWAY STANDARD DRAWING FOR
TEMPORARY SHOULDER CLOSURES
PCB INSTALLATION ADJACENT TO GUARDRAIL

ROADSIDE ACCESS POINT

2-LANE, 2-WAY ROADS

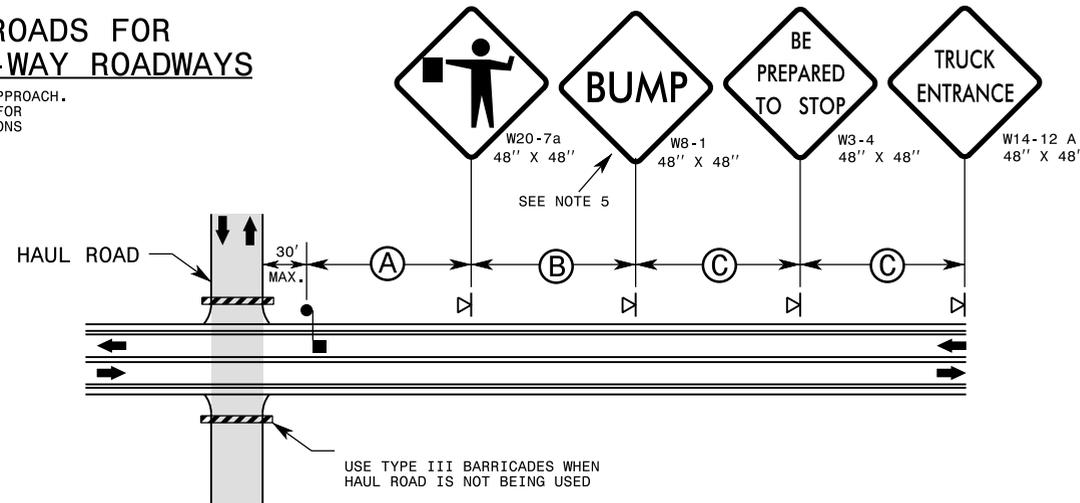


MULTILANE ROADS



HAUL ROADS FOR 2-LANE, 2-WAY ROADWAYS

SIGNS SHOWN FOR ONE APPROACH. SAME SIGNING APPLIES FOR BOTH APPROACH DIRECTIONS



GENERAL NOTES

- 1- MOUNT SIGNS ON BOTH LEFT AND RIGHT SIDES ON DIVIDED ROADWAYS. SIGNS ARE REQUIRED ONLY ON THE RIGHT SIDE OF THE ROADWAY FOR UNDIVIDED ROADWAYS.
- 2- PROVIDE MINIMUM STOPPING SIGHT DISTANCE FOR EACH FLAGGER LOCATION.
- 3- REFER TO RSD. 1101.11, SHEETS 2 & 4, FOR STOPPING SIGHT DISTANCE AND SIGN SPACING.
- 4- UPON COMPLETION OF EACH HAULING OPERATION, REPAIR, SWEEP, AND RESTORE THE ROADWAY TO BE SAFELY TRAVERSABLE AT NORMAL OPERATING SPEEDS.
- 5- "BUMP" SIGNS (W3-1) ARE REQUIRED ONLY IF A BUMP OVER THE ROADWAY EXISTS AS A RESULT OF IMPLEMENTING THE HAUL ROAD. USE FLAGGERS AT ALL TIMES TO STOP TRAFFIC WHEN BUMPS ARE LOCATED ACROSS THE ROADWAY. CONSTRUCT BUMPS TO PROVIDE A SMOOTH TRANSITION FOR TRAFFIC CROSSING THEM. REMOVE BUMPS PRIOR TO ALLOWING TRAFFIC TO RESUME NORMAL OPERATING SPEEDS.
- 6- WHEN NOT SPECIFIED IN THE PLANS OR BY THE ENGINEER, PAYMENT FOR CONVENIENCE WILL NOT BE MADE FOR FLAGGERS.

LEGEND

- TYPE III BARRICADE
- STATIONARY SIGN
- PORTABLE SIGN
- FLAGGER
- DIRECTION OF TRAFFIC FLOW

ROADWAY STANDARD DRAWING FOR

WORK ZONE VEHICLE ACCESSES

HAUL ROAD ACCESS

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STATE OF

NORTH CAROLINA

DEPT. OF TRANSPORTATION

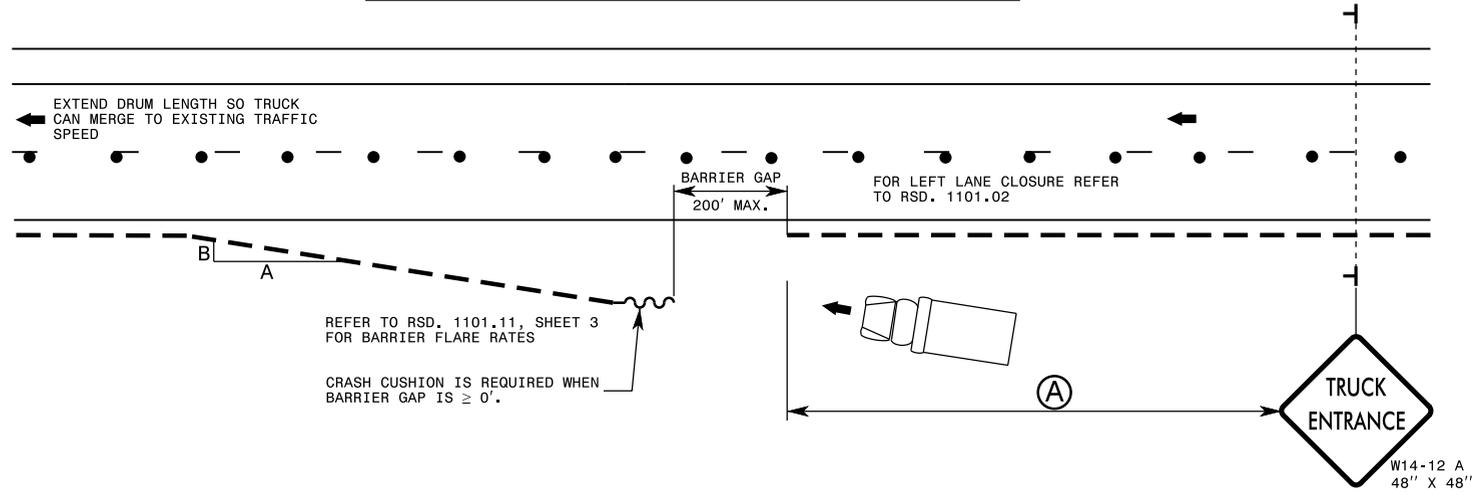
DIVISION OF HIGHWAYS

RALEIGH, N.C.

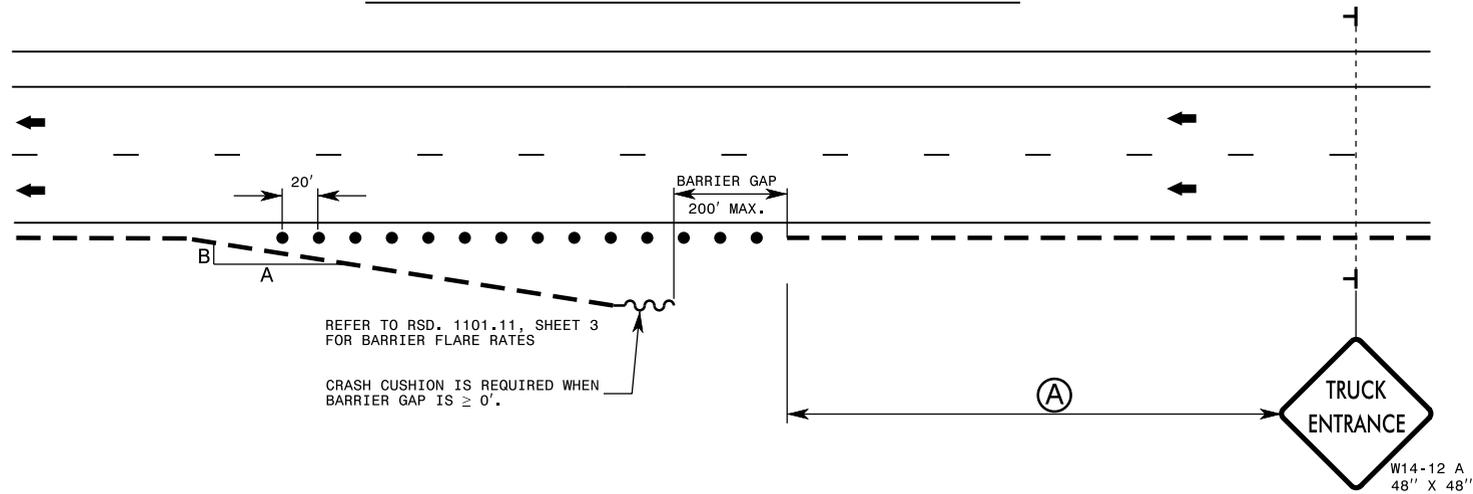
SHEET 1 OF 2

1101.05

DURING LANE CLOSURE



ALL LANES OPEN



GENERAL NOTES

- 1- MOUNT SIGNS ON BOTH LEFT AND RIGHT SIDES ON DIVIDED ROADWAYS. SIGNS ARE REQUIRED ONLY ON THE RIGHT SIDE OF THE ROADWAY FOR UNDIVIDED ROADWAYS.
- 2- REFER TO RSD. 1101.11, SHEETS 2, 3 & 4, FOR STOPPING SIGHT DISTANCE, BARRIER FLARE RATES, AND SIGN SPACING.
- 3- UPON COMPLETION OF EACH HAULING OPERATION, REPAIR, SWEEP, AND RESTORE THE ROADWAY TO BE SAFELY TRAVERSABLE AT NORMAL OPERATING SPEEDS.
- 4- PORTABLE CONCRETE BARRIER AND TEMPORARY CRASH CUSHIONS SHALL ONLY BE INSTALLED ON PAVED SURFACES.

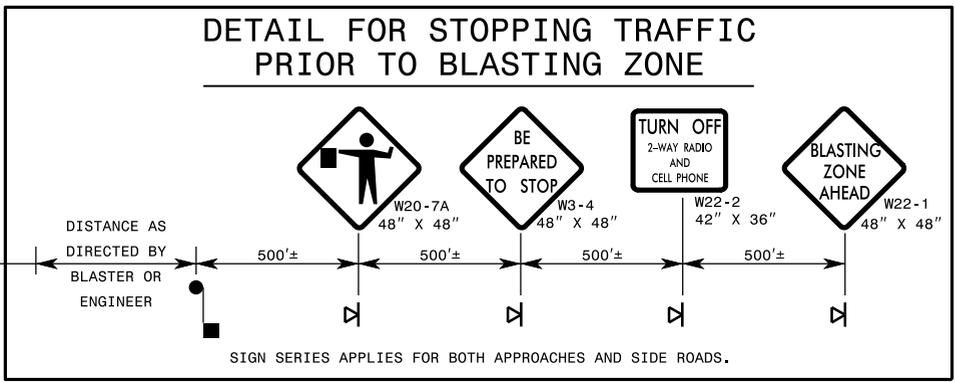
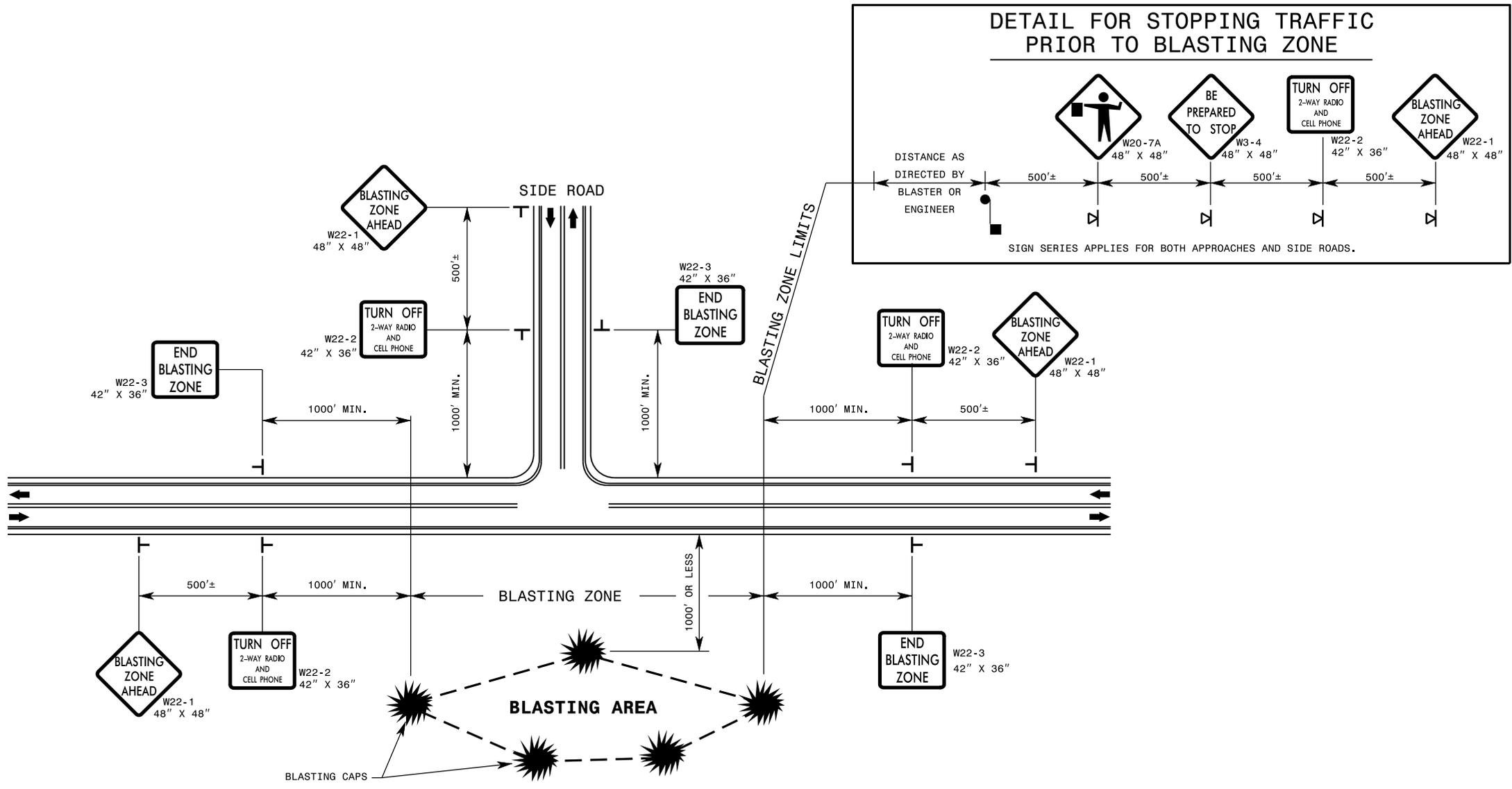
LEGEND	
- - -	PORTABLE CONCRETE BARRIER
~ ~ ~	TEMPORARY CRASH CUSHION
●	DRUM
T	STATIONARY SIGN
←	DIRECTION OF TRAFFIC FLOW

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 RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
WORK ZONE VEHICLE ACCESSES
 MEDIAN ACCESS THROUGH TEMPORARY BARRIER

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ROADWAY STANDARD DRAWING FOR
WARNING SIGNS FOR BLASTING ZONES



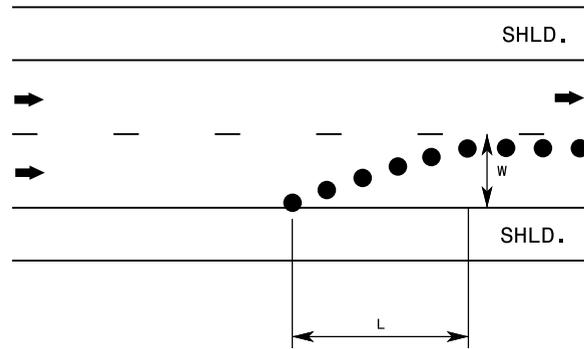
GENERAL NOTES

- 1- USE THE SIGNING SHOWN WHENEVER BLASTING CAPS ARE USED WITHIN 1,000' OF A ROADWAY. MOUNT THE SIGNS ON THE RIGHT AND LEFT SIDES OF DIVIDED MULTILANE ROADWAYS. ERECT THE SAME SIGNING USED ON THE MAINLINE AS USED ON THE SIDE ROAD WHENEVER A SIDE ROAD INTERSECTS THE ROADWAY BETWEEN THE "BLASTING ZONE AHEAD" SIGN AND THE "END BLASTING ZONE" SIGN, OR A SIDE ROAD IS WITHIN 1,000' OF A BLASTING CAP.
- 2- PRIOR TO BLASTING, THE BLASTER IN CHARGE AND THE ENGINEER DETERMINES WHETHER TRAFFIC ENTERING THE BLASTING ZONE WILL BE ENDANGERED BY THE BLASTING OPERATION. IF THERE IS DANGER DO NOT PERMIT TRAFFIC TO PASS THRU THE BLASTING ZONE DURING BLASTING OPERATIONS (REFER TO DETAIL FOR STOPPING TRAFFIC UNLESS A ROAD CLOSURE WITH AN OFF-SITE DETOUR IS SPECIFIED). USE THE SAME SIGN SEQUENCE ON MULTILANE ROADWAYS INCLUDING TWO FLAGGERS; USE PILOT VEHICLES TO BRING TRAFFIC TO A STOP UNLESS OTHER METHODS ARE SPECIFIED IN THE PLANS.
- 3- DETERMINE LOCATIONS WHERE TRAFFIC IS TO BE STOPPED BEFORE PROCEEDING WITH THE BLASTING OPERATION, AND REQUIRE APPROVAL FROM THE ENGINEER. PROVIDE STOPPING SIGHT DISTANCE TO THE FLAGGER(S) (SEE RSD. 1101.11, SHEET 2). DO NOT STOP TRAFFIC FOR PERIODS EXCEEDING 20 MINUTES AT A TIME. DO NOT STOP TRAFFIC AGAIN UNTIL THE QUEUE IS DEPLETED. CLEAR THE ROADWAY OF ANY DEBRIS PRIOR TO ALLOWING TRAFFIC TO PROCEED.
- 4- IF NECESSARY USE PORTABLE SIGNS INSTEAD OF STATIONARY SIGNS FOR SINGLE DAY OPERATIONS.
- 5- SEE RSD 1101.03 SHEET 8 FOR ADDITIONAL NOTES.

LEGEND

- ⊞ PORTABLE SIGN
- ⊞ STATIONARY SIGN
- ← DIRECTION OF TRAFFIC FLOW
- FLAGGER

EXAMPLE OF "L" & "W" DESIGNATIONS



TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS

UPSTREAM TAPER

- MERGING TAPER.....L MINIMUM
- SHIFTING TAPER.....½ L MINIMUM *
- SHOULDER TAPER.....¼ L MINIMUM
- TWO-WAY TRAFFIC TAPER.....50 - 100 FEET MAXIMUM

DOWNSTREAM TAPER.....100 FEET MAXIMUM

TAPER LENGTH

DO NOT INTRODUCE A MERGING OR SHIFTING TAPER WITHIN A CURVE OF THE ROADWAY

*USE FULL L FOR CONTROLLED-ACCESS FACILITIES UNLESS RESTRICTED BY FIELD CONDITIONS AS DETERMINED BY THE TRAFFIC CONTROL SUPERVISOR OR THE ENGINEER.

QUICK REFERENCE - "L" DISTANCE TABLE												
MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)												
POSTED SPEED "S" (MPH)	LATERAL WIDTH "W" (FEET)											
	1	2	3	4	5	6	7	8	9	10	11	12
20	10	15	20	30	35	40	50	55	60	70	75	80
25	15	25	35	45	55	65	75	85	95	105	115	125
30	15	30	45	60	75	90	105	120	135	150	165	180
35	25	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	135	160	190	215	240	270	295	320
45	45	90	135	180	225	270	315	360	405	450	495	540
50	50	100	150	200	250	300	350	400	450	500	550	600
55	55	110	165	220	275	330	385	440	495	550	605	660
60	60	120	180	240	300	360	420	480	540	600	660	720
65	65	130	195	260	325	390	455	520	585	650	715	780
70	70	140	210	280	350	420	490	560	630	700	770	840

GENERAL NOTES

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE MUTCD.
WHERE:

SPEED LIMIT

FORMULA

40 MPH OR LESS

$$L_{MIN} = \frac{W \times S^2}{60}$$

45 MPH OR GREATER

$$L_{MIN} = W \times S$$

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)

W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)

S = EXISTING POSTED SPEED LIMIT PRIOR TO THE IMPLEMENTATION OF A WORK ZONE SPEED LIMIT REDUCTION

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

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ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
"L" DISTANCE AND CHANNELIZING
DEVICE TAPER CRITERIA

DESIGN SPEED (MPH)	MINIMUM SIGHT DISTANCE	MINIMUM LONGITUDINAL BUFFER SPACE (FEET)
	STOPPING SIGHT DISTANCE (FEET)	
30	200	85
35	250	120
40	305	155
45	360	195
50	425	240
55	495	290
60	570	345
65	645	405
70	730	470
75	820	540
80	910	615

GENERAL NOTES

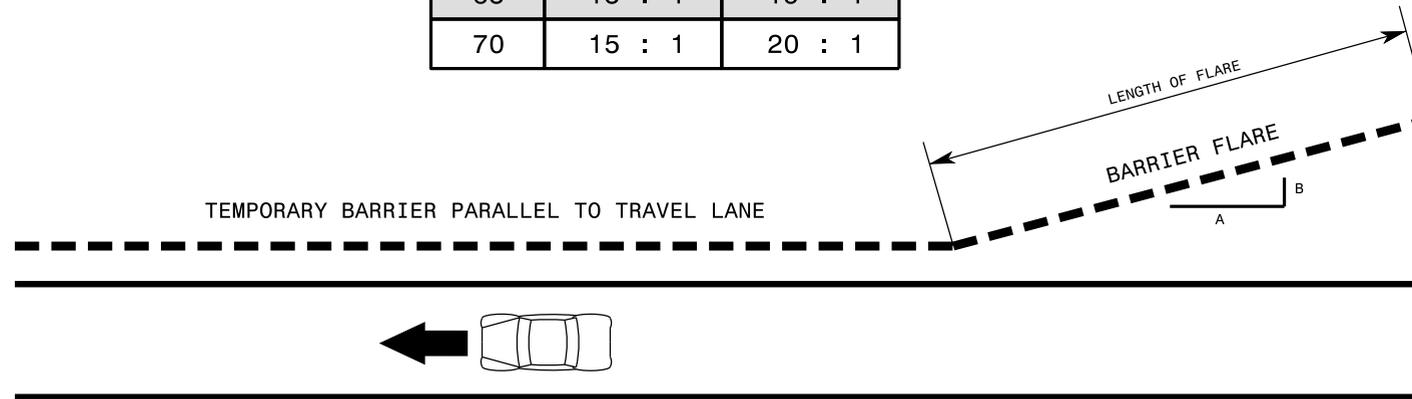
- 1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.
- 2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.
- 3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.

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ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
BUFFER SPACE & SIGHT DISTANCE

TEMPORARY BARRIER FLARE RATES		
POSTED SPEED LIMIT (MPH)	UNANCHORED (A:B)	ANCHORED (A:B)
≤ 30	7 : 1	8 : 1
35	8 : 1	9 : 1
40	8 : 1	10 : 1
45	10 : 1	12 : 1
50	11 : 1	14 : 1
55	12 : 1	16 : 1
60	14 : 1	18 : 1
65	15 : 1	19 : 1
70	15 : 1	20 : 1



GENERAL NOTES

- 1- REFER TO THE LATEST EDITION OF THE ROADSIDE DESIGN GUIDE.
- 2- A BARRIER IS CONSIDERED FLARED WHEN IT IS NOT PARALLEL TO THE EDGE OF THE TRAVELWAY.

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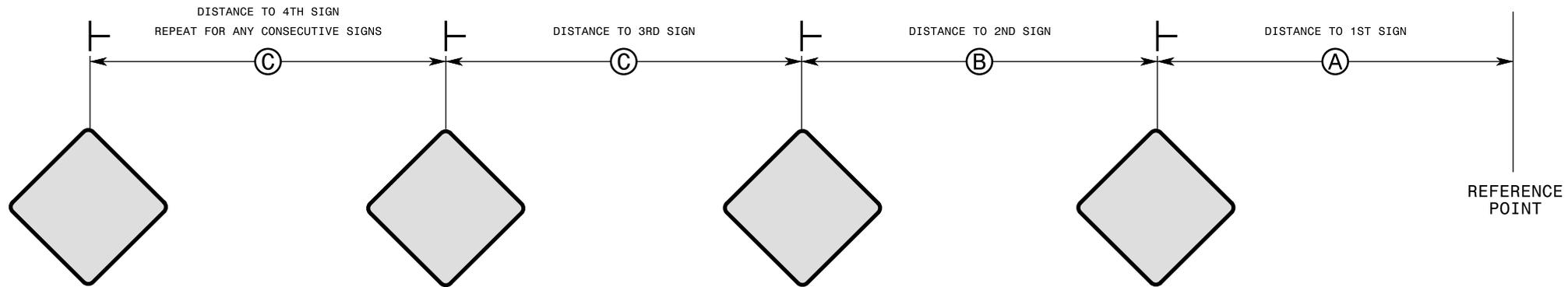
ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
TEMPORARY BARRIER FLARE RATES

SHEET 3 OF 4

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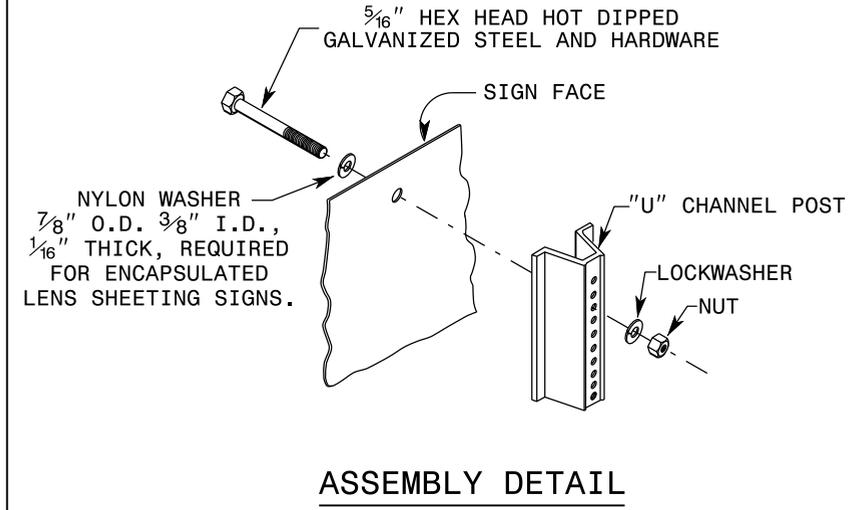
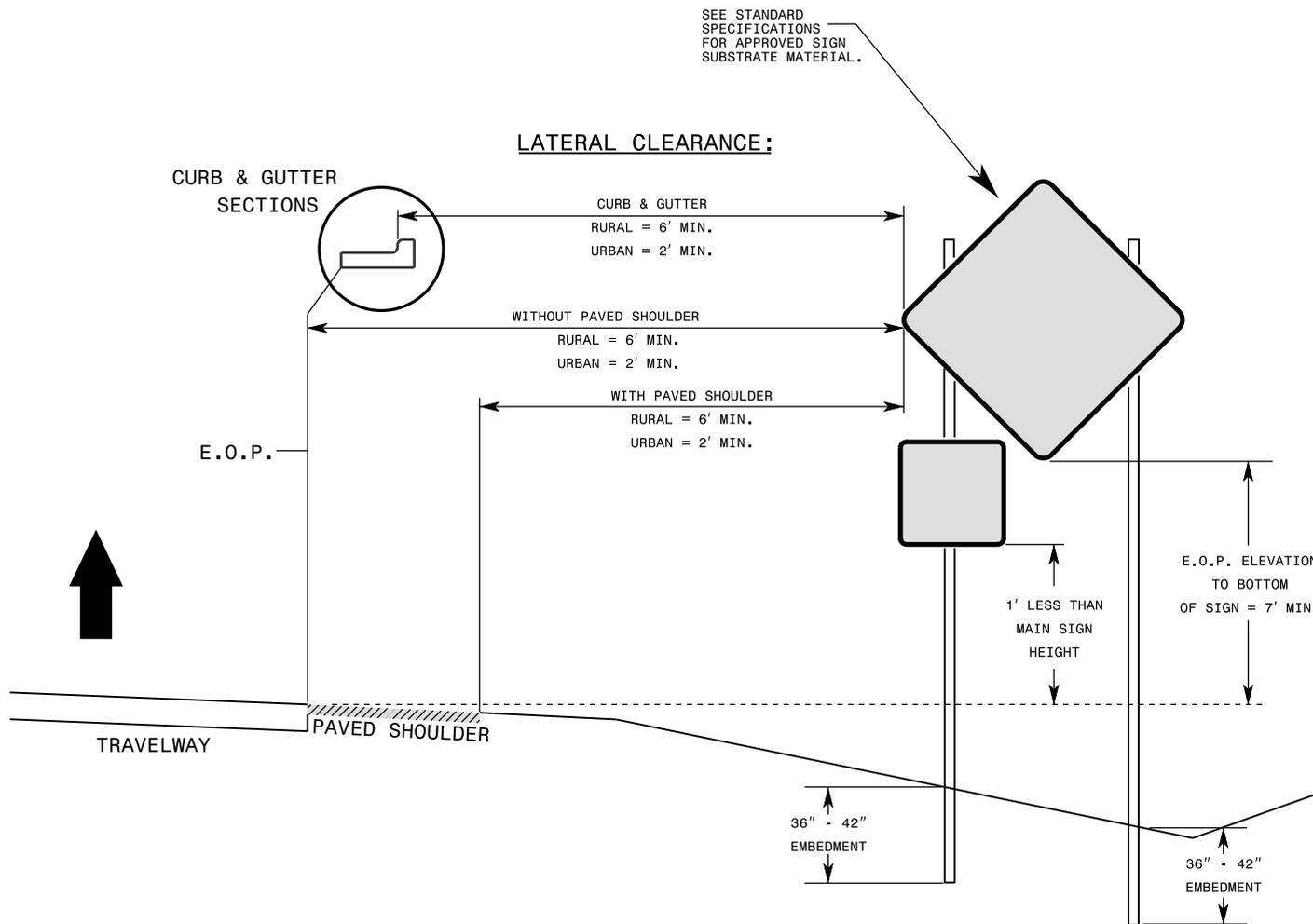
ADVANCE WARNING SIGN SPACING CHART			
POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET) ±		
	(A)	(B)	(C)
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROADS (≥ 55)	1000	1500	2700

STATIONARY OR PORTABLE SIGNS



GENERAL NOTES

- 1- REFER TO THE LATEST EDITION OF THE MUTCD.
- 2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.
- 3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.



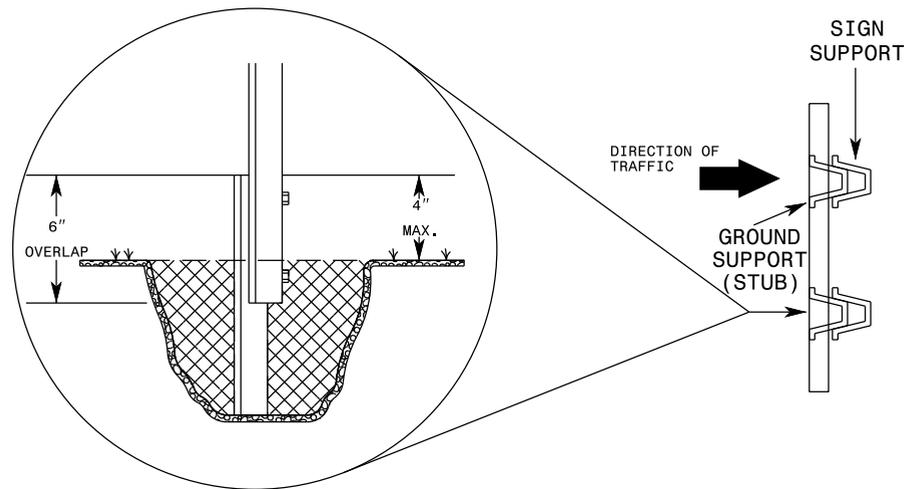
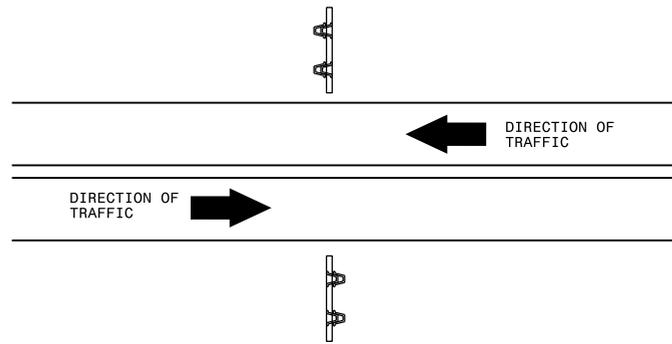
GENERAL NOTES

- 1- DIMENSIONS SHOWN ARE MINIMUM VALUES. WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS THAT DETRACT FROM THEIR VISIBILITY, MOUNT THE SIGNS AT AN APPROPRIATE HEIGHT SUCH THAT THEY ARE CLEARLY VISIBLE TO APPROACHING TRAFFIC.
- 2- MOUNT SIGNS THAT ARE LARGER THAN 10 SQUARE FEET IN AREA ON TWO OR MORE WOOD OR U-CHANNEL SUPPORTS. PERFORATED SQUARE TUBING SUPPORT SYSTEMS MAY SUPPORT LARGER AREAS ON A SINGLE SUPPORT. FOLLOW MANUFACTURER'S RECOMMENDATIONS. THESE SYSTEMS SHALL BE NCDOT APPROVED.
- 3- REFER TO STANDARD SPECIFICATION 1089-1 FOR WORK ZONE SIGNS.
- 4- REFER TO STANDARD SPECIFICATION 1089-2 FOR WORK ZONE SIGN SUPPORTS.
- 5- REFER TO RSD. 903.20 FOR WOOD POSTS.
- 6- REFER TO STANDARD SPECIFICATION 903-1 FOR WOOD SUPPORTS.

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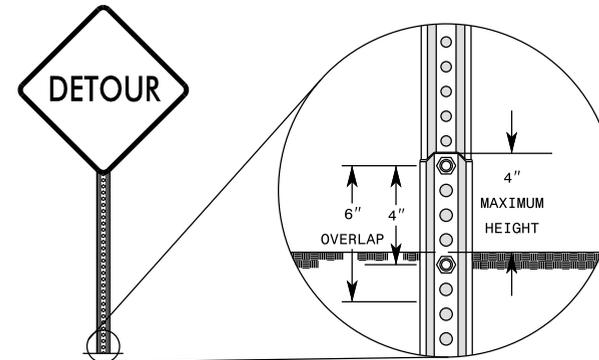
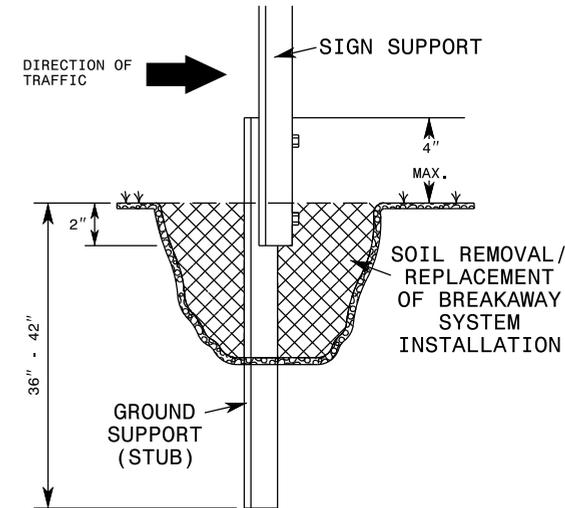
ROADWAY STANDARD DRAWING FOR
STATIONARY WORK ZONE SIGNS
MOUNTING HEIGHT & LATERAL CLEARANCE



INSTALL THE GROUND SUPPORT (STUB) BETWEEN THE SIGN SUPPORT AND THE APPROACHING TRAFFIC IN THE ADJACENT TRAVEL LANE.

GENERAL NOTES

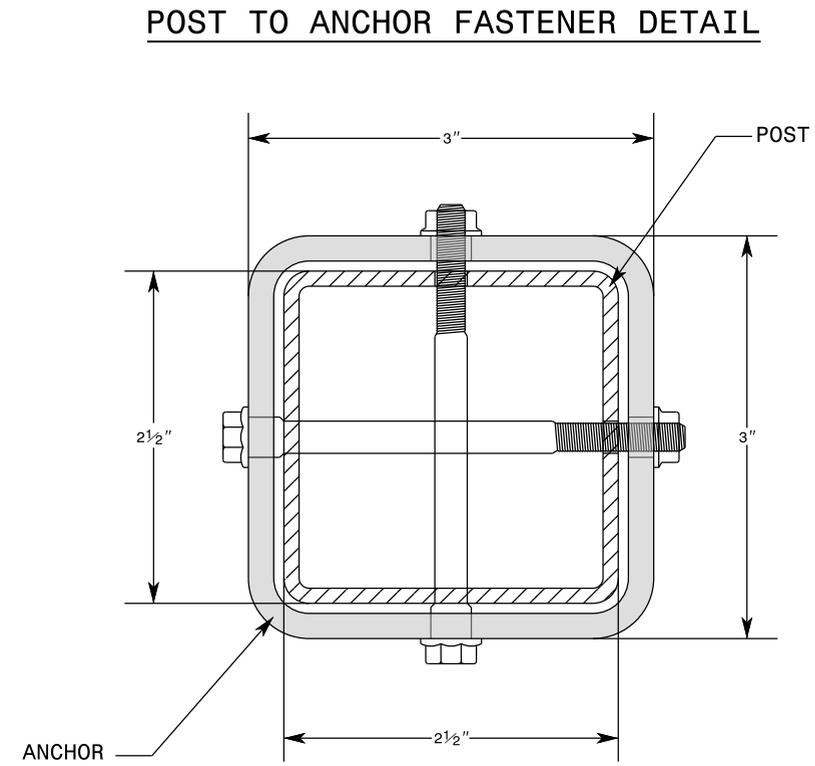
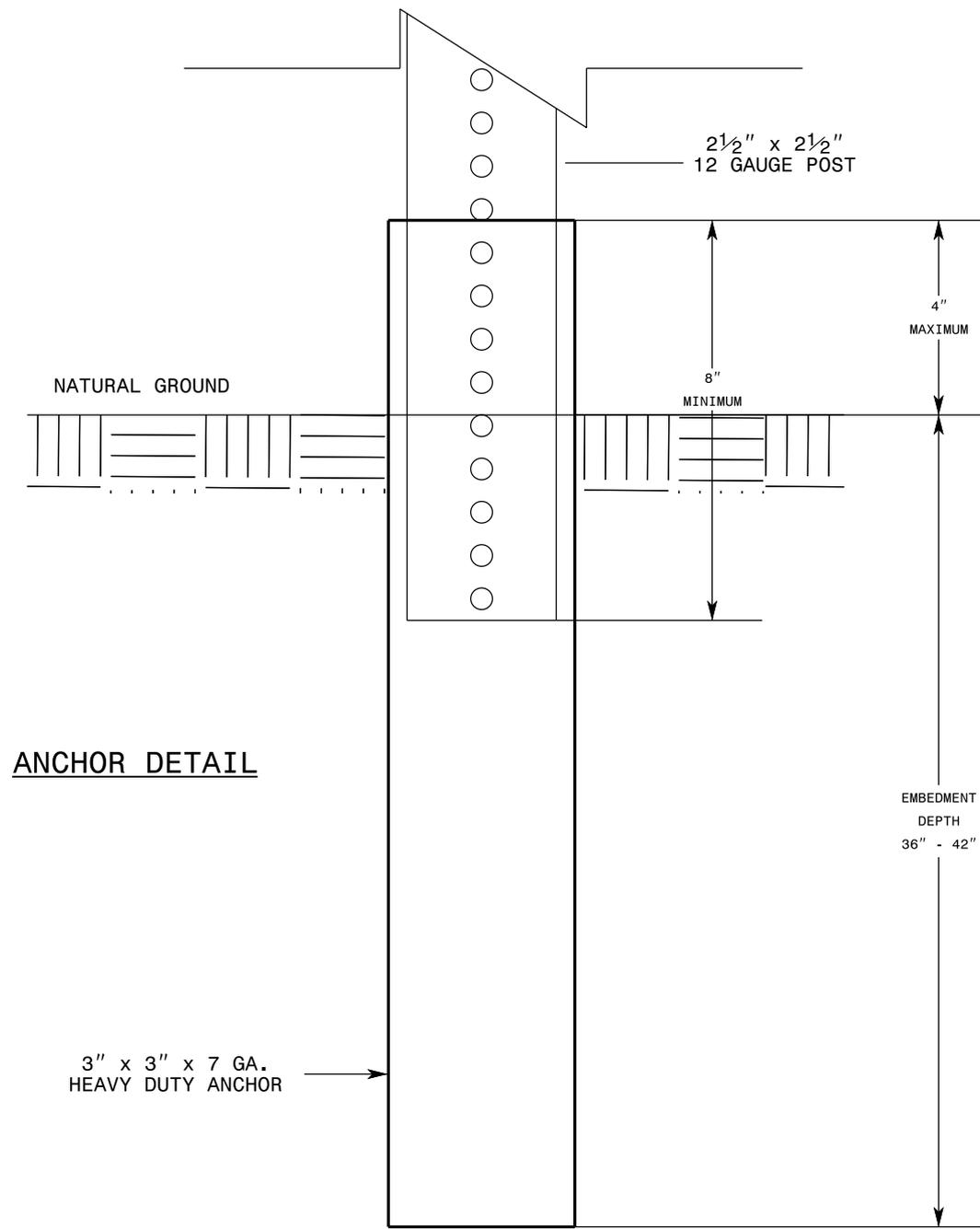
- 1- ALL TRAFFIC CONTROL DEVICES, INCLUDING BREAKAWAY SYSTEMS FOR GROUND MOUNTED SIGN SUPPORTS, SHALL BE APPROVED BY THE DEPARTMENT.
- 2- INSTALL THE BREAKAWAY SYSTEM TO FUNCTION PROPERLY IN ACCORDANCE WITH THE DIRECTION OF TRAFFIC ADJACENT TO THE SIGN.
- 3- FOR PERFORATED SQUARE TUBING BREAKAWAY SYSTEMS, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR ANCHOR EMBEDMENT DEPTHS AND POST ATTACHMENT REQUIREMENTS.



BOLTS MUST BE 4" APART. THE GROUND SUPPORT (STUB) SHALL NOT EXTEND HIGHER THAN 4" ABOVE THE GROUND. ATTACH THE SIGN SUPPORT TO THE BACK OF THE GROUND SUPPORT (STUB) WITH THE APPROPRIATE HARDWARE PROVIDED BY THE MANUFACTURER OF THE BREAKAWAY SYSTEM. OVERALL LENGTH OF THE BREAKAWAY SYSTEM IS 6".

3 LB. U-CHANNEL SPLICING REQUIREMENTS

- 1- WHEN SIGN IS REMOVED AT THE END OF PROJECT, REMOVE THE GROUND SUPPORT (STUB).
- 2- WHEN SPLICING A U-CHANNEL SUPPORT, INSTALL THE GROUND SUPPORT (STUB) APPROXIMATELY 36" TO 42" INTO THE GROUND WHILE LEAVING NO MORE THAN 4" ABOVE THE EXISTING GROUND ELEVATION. REMOVE ENOUGH SOIL FROM AROUND THE GROUND SUPPORT (STUB) TO PERMIT ACCESS TO THE HOLES FOR THE BREAKAWAY SYSTEM. ONCE THE BREAKAWAY SYSTEM IS TIGHTENED, REPLACE THE SOIL AND TAMP.
- 3- OVERALL LENGTH OF THE BREAKAWAY SYSTEM IS 6". BOLTS MUST BE 4" APART. ATTACH THE SIGN SUPPORT TO THE BACK OF THE GROUND SUPPORT (STUB) WITH THE APPROPRIATE HARDWARE SUPPLIED BY THE MANUFACTURER OF THE BREAKAWAY SYSTEM.
- 4- INSTALL U-CHANNEL BREAKAWAY SYSTEMS SO THE GROUND SUPPORT (STUB) IS INSTALLED ON THE APPROACH SIDE OF TRAFFIC WHILE THE SIGN SUPPORT IS ATTACHED/SPLICED BEHIND THE GROUND SUPPORT (STUB).



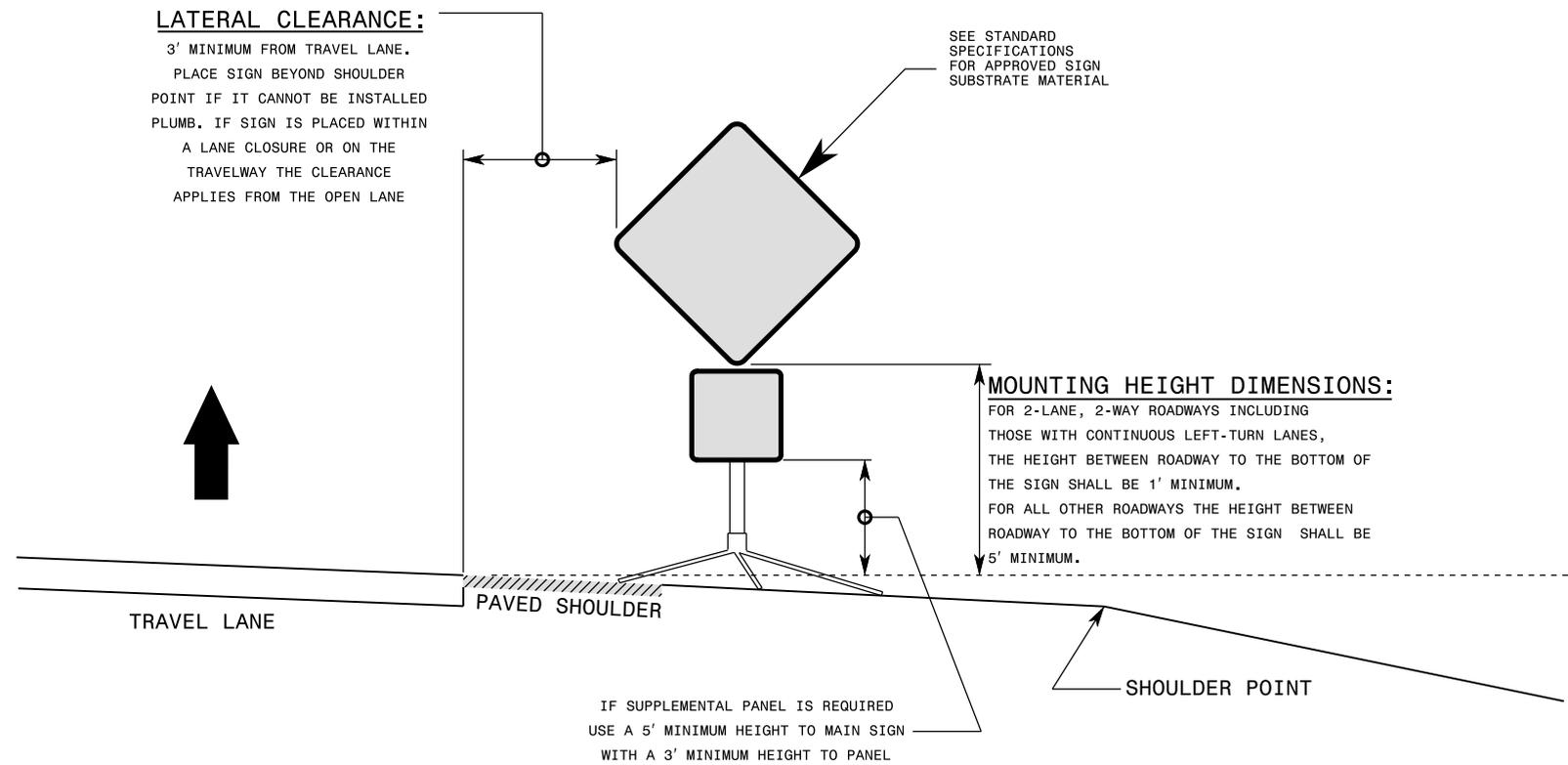
GENERAL NOTES

- 1- POSTS SHALL BE 2 1/2" X 2 1/2" 12 GAUGE STEEL.
- 2- ANCHORS SHALL BE 3" X 3" 7 GAUGE STEEL.
- 3- CONNECTIONS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

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ROADWAY STANDARD DRAWING FOR
STATIONARY WORK ZONE SIGNS
PERFORATED SQUARE STEEL TUBING



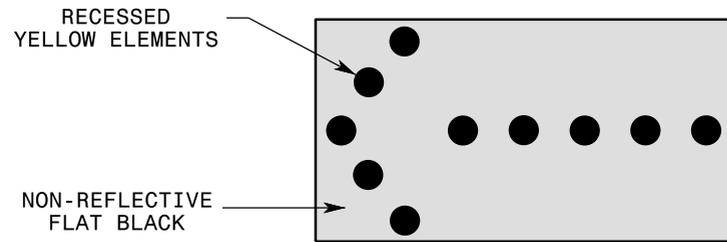
GENERAL NOTES

- 1- DIMENSIONS SHOWN ARE MINIMUM VALUES. MOUNT SIGNS SO THEY WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC EVEN WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS.
- 2- USE PORTABLE WORK ZONE SIGNS AND STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER.
- 3- ALL PORTABLE WORK ZONE SIGNS AND STANDS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

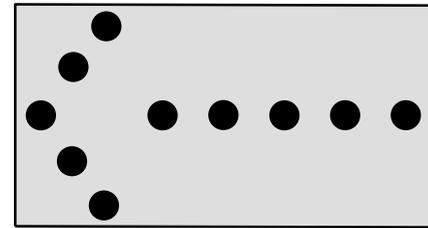
FLASHING ARROW BOARD MODES

FLASHING ARROW BOARD TYPE			
PANEL TYPE	MINIMUM SIZE (W x H INCHES)	MINIMUM LEGIBILITY DISTANCE (MILES)	MINIMUM NUMBER OF ELEMENTS
C	96 X 48	1	15

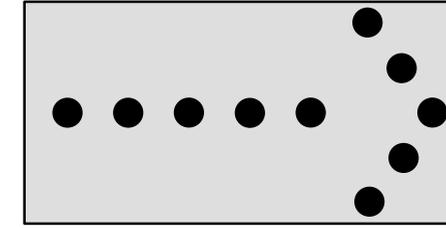
TYPICAL FLASHING ARROW BOARD



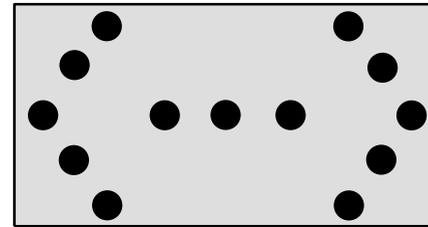
FLASHING ARROW
RIGHT LANE CLOSURE



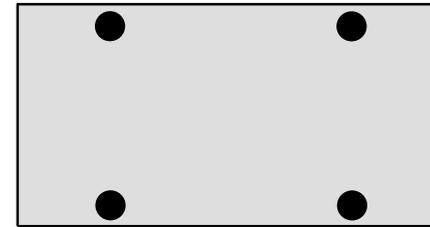
FLASHING ARROW
LEFT LANE CLOSURE



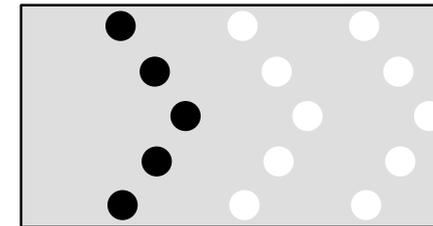
FLASHING DOUBLE ARROW
CENTER LANE CLOSURE



FLASHING
CAUTION MODE



MOVING CHEVRON



ONE CHEVRON WILL BE LIT ON THE BOARD AT A TIME, MOVING TOWARD THE DIRECTION OF OPEN TRAFFIC

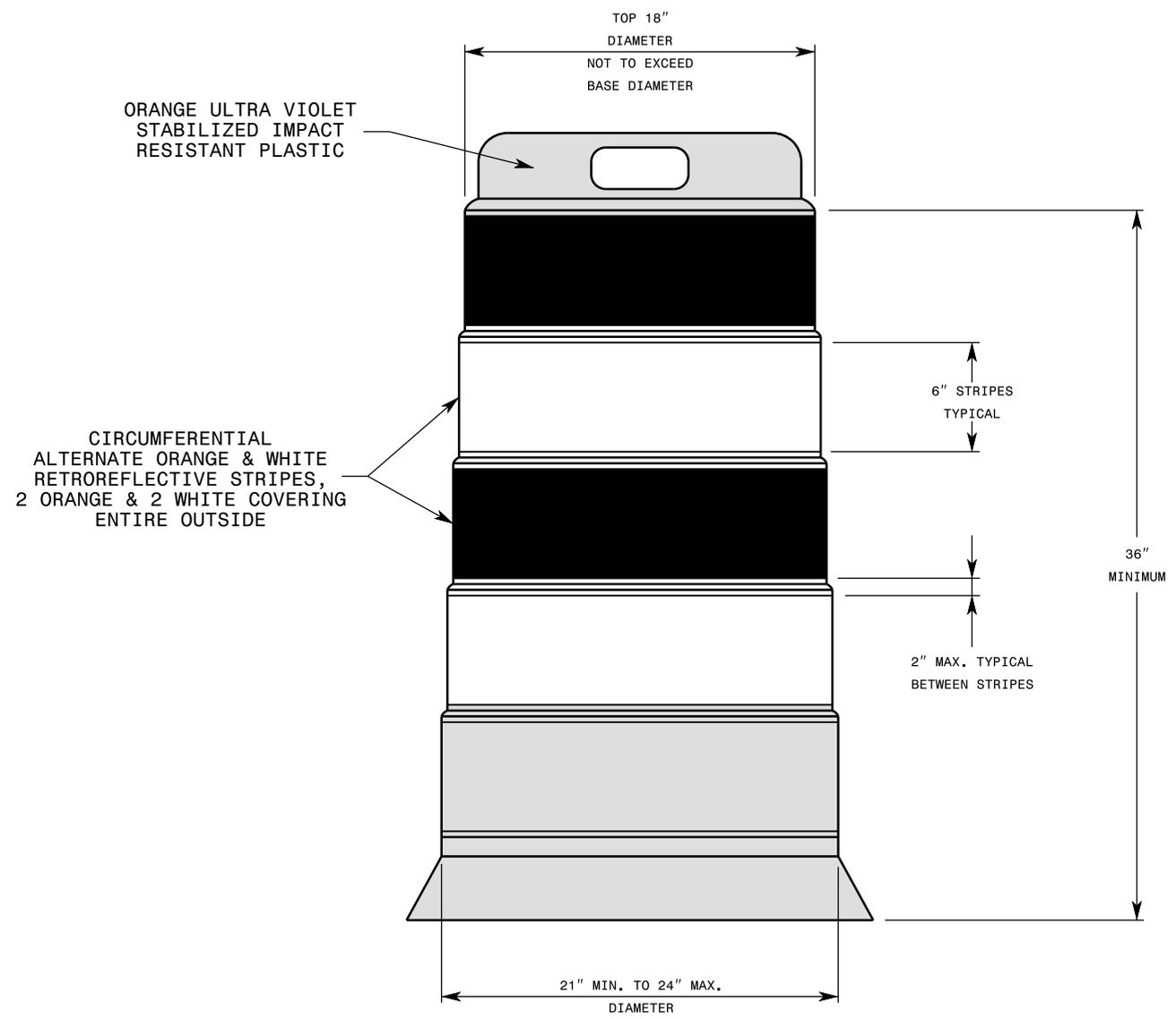
GENERAL NOTES

- 1- DO NOT USE STRAIGHT-LINE CAUTION OR STATIC CHEVRON DISPLAYS.
- 2- USE A MINIMUM MOUNTING HEIGHT OF 7 FEET FROM GROUND LEVEL TO THE BOTTOM OF THE PANEL FOR TRAILER-MOUNTED ARROW BOARDS, EXCEPT ON VEHICLE-MOUNTED PANELS WHICH SHOULD BE AS HIGH AS PRACTICAL.
- 3- USE ARROW BOARD ELEMENTS CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL RATED LAMP VOLTAGE. USE FULL LAMP VOLTAGE DURING THE DAY, AND USE THE DIMMED MODE AT NIGHT.
- 4- DO NOT USE ARROW BOARDS IN FLASHING ARROW MODE ON A 2-LANE, 2-WAY ROADWAY DURING A ONE LANE OPERATION, NOR ON MULTILANE ROADWAYS WHEN SHIFTING ALL TRAFFIC LANES LATERALLY.
- 5- ALL FLASHING ARROW BOARDS MUST BE LISTED ON THE THE DEPARTMENT'S APPROVED PRODUCTS LIST.

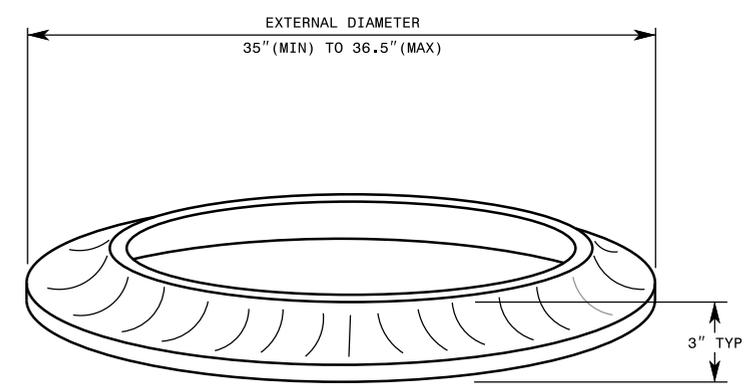
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ROADWAY STANDARD DRAWING FOR
FLASHING ARROW BOARDS



TIRE BALLAST



ALL RUBBER COLLARS MUST BE BLACK IN COLOR AND FREE OF ANY COLORED PAINT

BALLAST COLLAR SHOULD HAVE GOOD CONTACT WITH THE BARREL FLANGE AND BALLAST OUTER EDGE MUST LAY FLAT WITH ROAD SURFACE

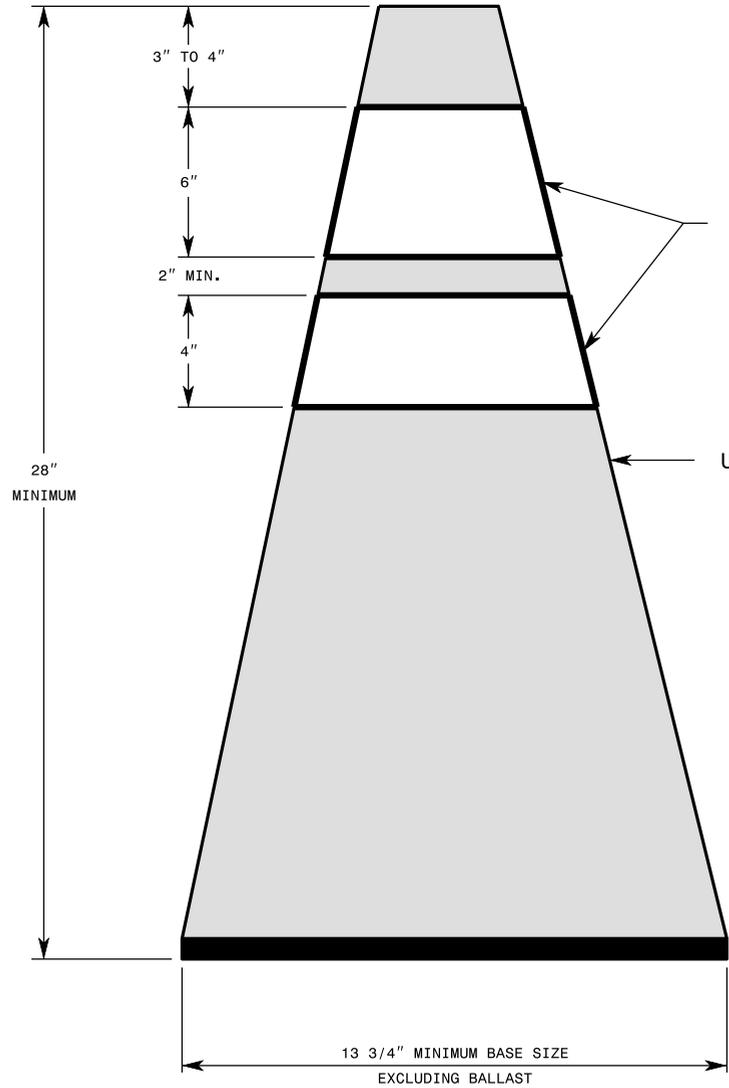
DRUMS THAT USE TIRE BALLASTS ARE MANUFACTURED SPECIFICALLY FOR THAT PURPOSE. DO NOT USE TIRE BALLASTS WITH OTHER DRUM DESIGNS.

GENERAL NOTES

- 1- BALLASTING SHALL BE ACHIEVED BY THE SAND BAG, TIRE-SIDEWALL, OR PREFORMED WEIGHTED BASE METHODS. USE THE TIRE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.
- 2- IF NECESSARY PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE DRUM SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.
- 3- ALL DRUMS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCT LIST.
- 4- REFER TO THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR ADDITIONAL INFORMATION.

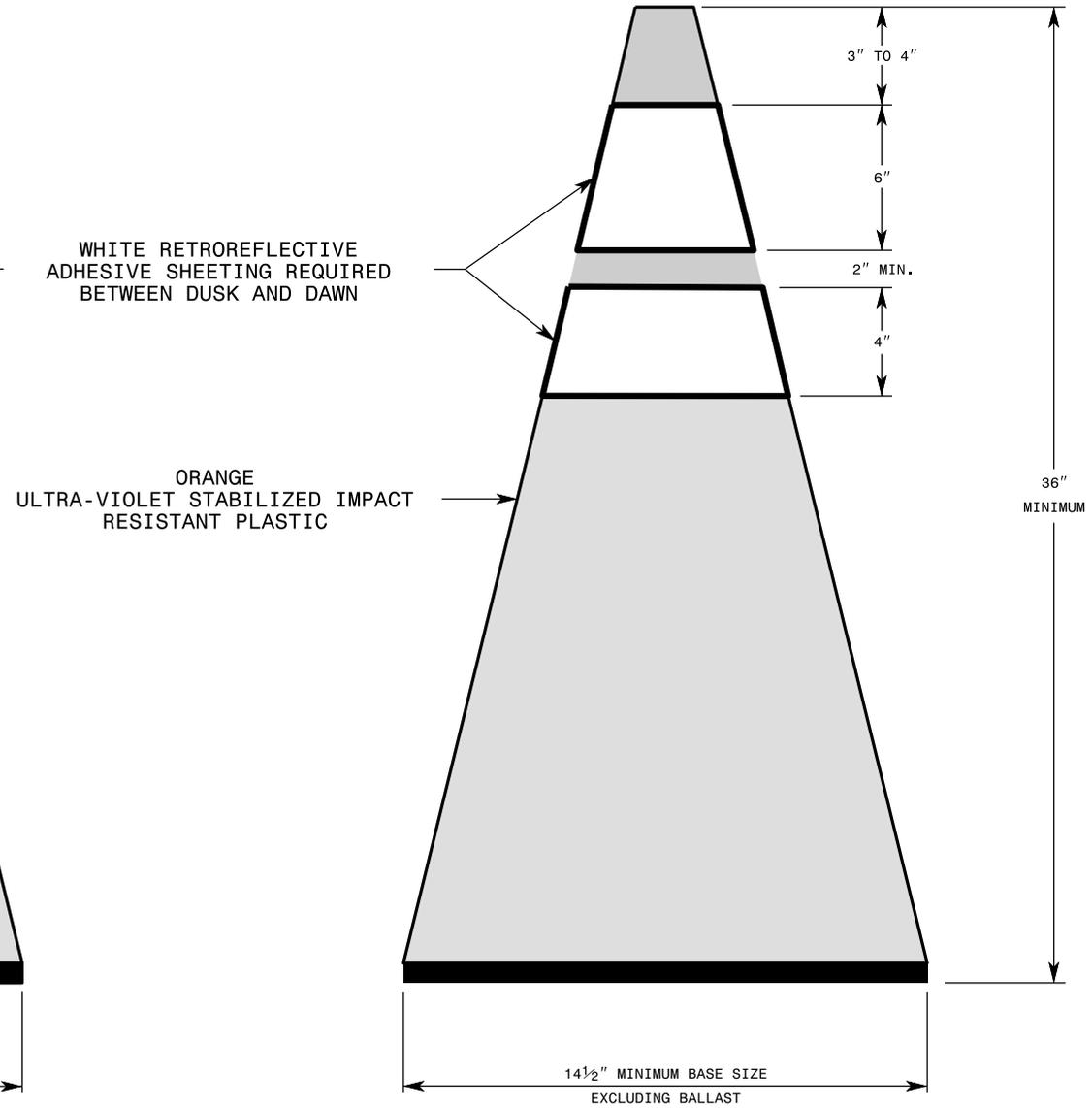
28 INCH CONE

(MINIMUM SIZE CONE FOR ALL CLASSES OF ROADS EXCEPT FREEWAYS AND INTERSTATES)



36 INCH CONE

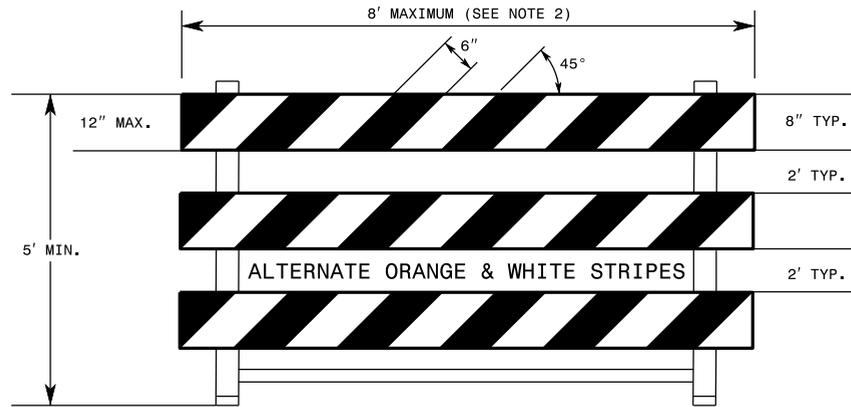
(REQUIRED FOR FREEWAYS AND INTERSTATES)



GENERAL NOTES

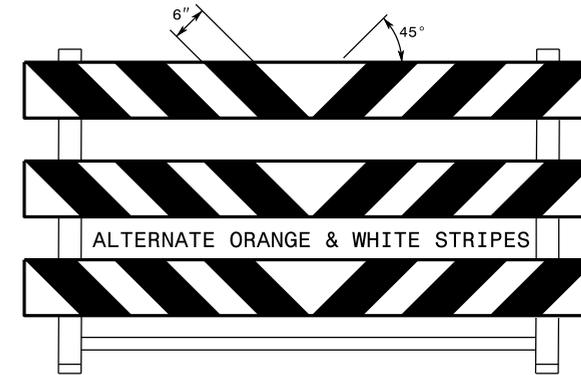
- 1- ACHIEVE BALLASTING BY USING SPECIAL WEIGHTED BASES SUCH AS SAND BAG RINGS, DOUBLING CONES, OR BASES THAT CAN BE FILLED WITH BALLAST. SEVENTY PERCENT OF THE WEIGHT OF THE CONE MUST BE IN THE BASE. USE BALLAST'S THAT DO NOT PRESENT A HAZARD WHEN STRUCK.
- 2- ALL CONES MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

TYPE III BARRICADE



TYPE III BARRICADE

END-OF-ROADWAY APPLICATIONS



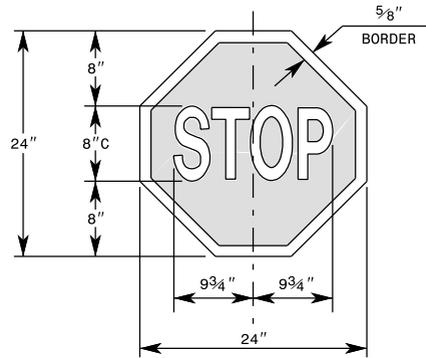
GENERAL NOTES

- 1- HORIZONTAL RAILS FOR BARRICADES MAY BE CONSTRUCTED OF APPROVED COMPOSITE, HOLLOW/ CORRUGATED EXTRUDED RIGID POLYOLEFIN, HIGH DENSITY POLYETHYLENE, OR OTHER NCDOT APPROVED MATERIAL.
- 2- BARRICADE SHALL BE LIMITED TO A MAXIMUM LENGTH OF 8 FT UNLESS NCDOT APPROVED.
- 3- ONLY NCDOT APPROVED COMPOSITE AND ROLL-UP SIGNS MAY BE MOUNTED ON THE BARRICADE RAILS. MOUNT SIGNS TO BARRICADE RAILS TO ENSURE SIGN WILL NOT BECOME DETACHED UNDER NORMAL WIND AND TRAFFIC CONDITIONS.
- 4- SIGNS SHALL BE MOUNTED A MINIMUM OF 1 FOOT FROM THE GROUND TO THE BOTTOM OF THE SIGN UNLESS SIGN R11-3 IS REQUIRED BY THE PLANS OR DIRECTED BY THE ENGINEER.
- 5- ASSEMBLY OF THE GENERIC BARRICADES MUST BE SELF CERTIFIED BY THE ASSEMBLER.
- 6- BARRICADES USED TO CLOSE A ROADWAY SHALL EXTEND ACROSS THE ENTIRE ROADWAY. WHERE LOCAL TRAFFIC MUST BE MAINTAINED, THEY MAY BE PLACED IN A STAGGERED PATTERN.
- 7- STRIPES ON WORK ZONE BARRICADE RAILS SHALL BE ALTERNATE ORANGE AND WHITE RETROREFLECTIVE STRIPES, SLOPED DOWNWARD TOWARDS THE SIDE WHICH TRAFFIC IS TO PASS OR TURN IN DETOURING. WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.
- 8- USE RED AND WHITE STRIPES FOR PERMANENT BARRICADES.
- 9- ALL BARRICADES MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.
- 10- PLACE SANDBAGS OR OTHER APPROVED BALLASTING METHODS ON THE FEET OF THE FRAME. DO NOT PLACE SANDBAGS ON TOP OF A STRIPED RAIL OR STABILIZER BAR. DO NOT BALLAST BARRICADES BY HEAVY OBJECTS SUCH AS ROCKS, CHUNKS OF CONCRETE OR OTHER ITEMS THAT WOULD CAUSE DAMAGE IF THE BARRICADE IS STRUCK BY A VEHICLE.

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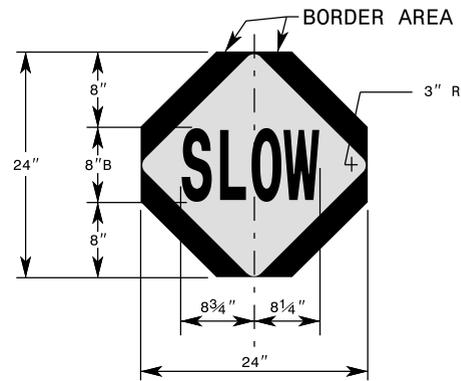
ROADWAY STANDARD DRAWING FOR BARRICADES TYPE-III

STOP/SLOW PADDLE



STOP:

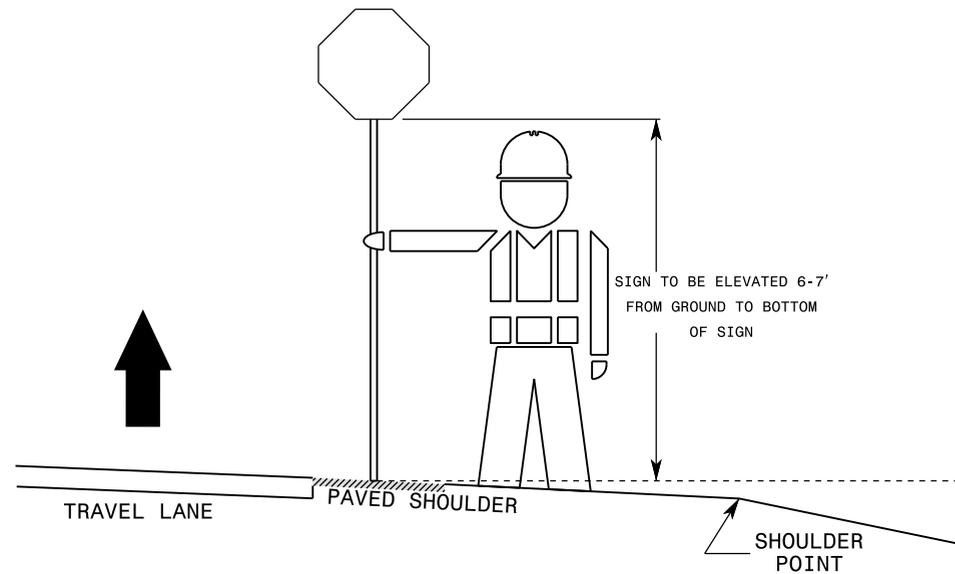
LEGEND-WHITE REFLECTORIZED
 BORDER-WHITE REFLECTORIZED
 BACKGROUND-RED REFLECTORIZED



SLOW:

LEGEND-BLACK REFLECTORIZED
 BORDER AREA-BLACK REFLECTORIZED
 BACKGROUND-ORANGE REFLECTORIZED

FLAGGER AND PADDLE PLACEMENT

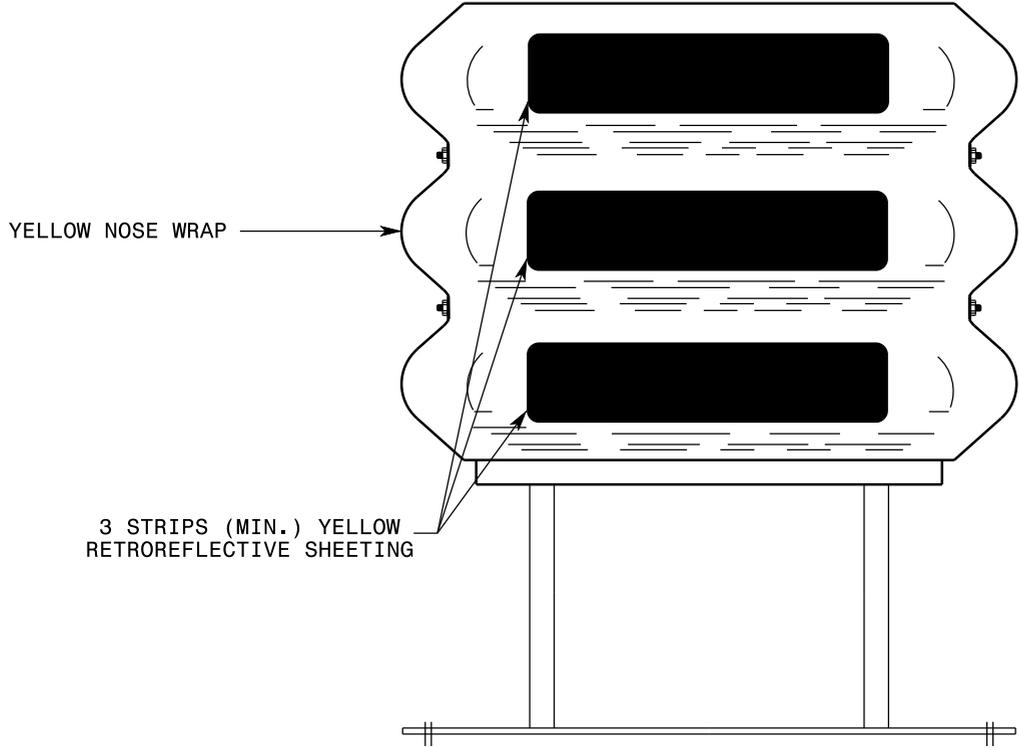


GENERAL NOTES

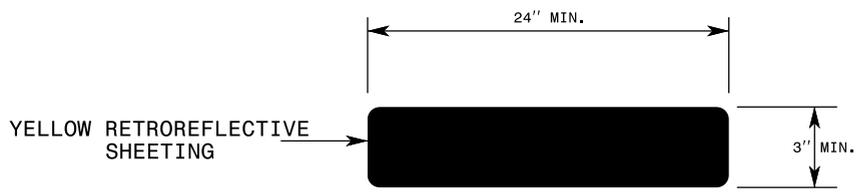
- 1- USE HAND SIGNALING DEVICES SUCH AS STOP-SLOW PADDLES, FLASHLIGHTS TO CONTROL TRAFFIC. USE STOP-SLOW PADDLES AS THE PRIMARY DEVICE.
- 2- FABRICATE STOP-SLOW PADDLES FROM SHEET METAL OR OTHER LIGHT SEMI RIGID MATERIAL. PROVIDE A RIGID HANDLE OF SUFFICIENT LENGTH SO THE PADDLE IS HELD AT 6-7' ABOVE GROUND LEVEL.
- 3- PROVIDE STOPPING SIGHT DISTANCE TO EACH FLAGGER STATION. REFER TO RSD. 1101.11, SHEET 2.
- 4- ILLUMINATE FLAGGER STATIONS DURING NIGHT OPERATIONS.
- 5- FOLLOW FLAGGER QUALIFICATIONS AND METHODS OF HAND-SIGNALING PROCEDURES IN ACCORDANCE WITH PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 6- ALL FLAGGERS MUST BE CERTIFIED BY AN NCDOT APPROVED TRAINING RESOURCE.

YELLOW RETROREFLECTIVE SHEETING

FRONT VIEWS OF CRASH CUSHION



DETAIL OF YELLOW RETROREFLECTIVE SHEETING

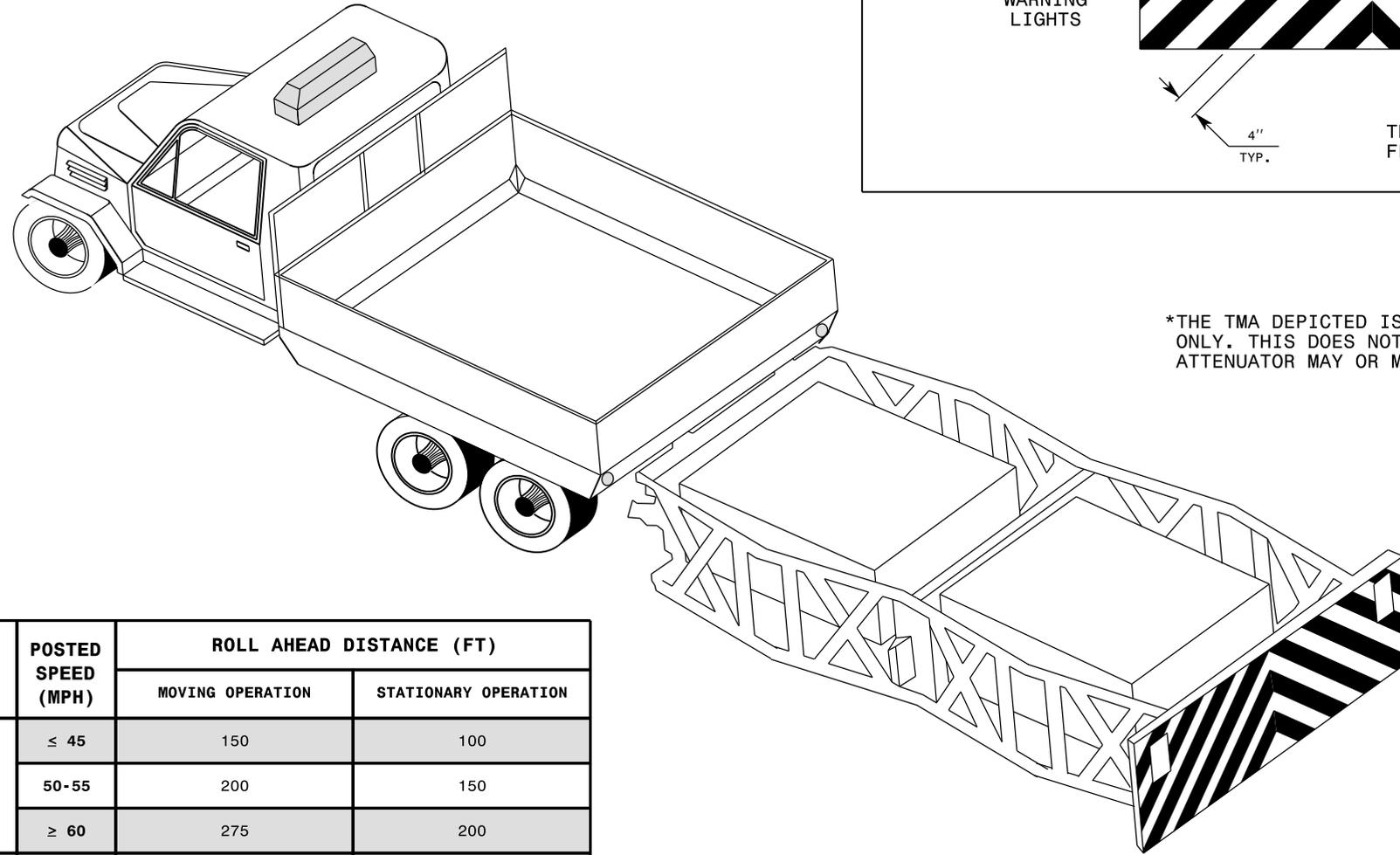


GENERAL NOTES

1- FULL SOLID YELLOW RETROREFLECTIVE SHEETING MAY BE USED AS AN ALTERNATIVE TO STRIPS.

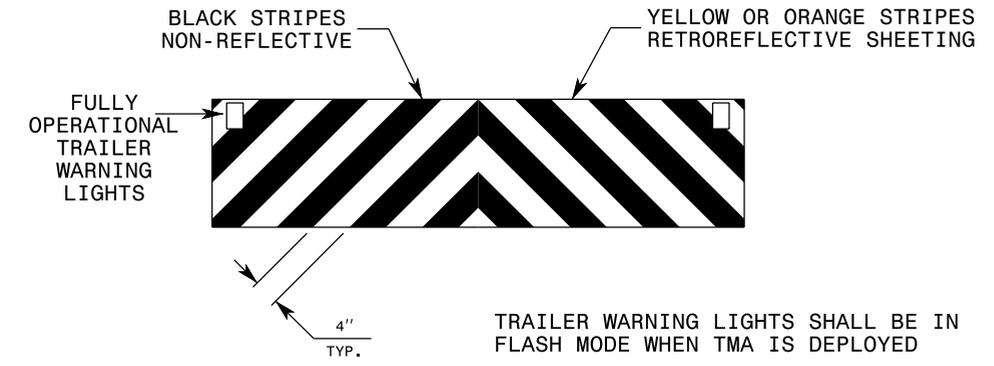
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
TEMPORARY CRASH CUSHION
REFLECTIVE END TREATMENT



TMA DELINEATION

ENTIRE END OF ATTENUATOR SHALL BE DELINEATED



TRAILER WARNING LIGHTS SHALL BE IN FLASH MODE WHEN TMA IS DEPLOYED

*THE TMA DEPICTED IS FOR DEMONSTRATIVE PURPOSES ONLY. THIS DOES NOT IMPLY A SPECIFIC TYPE OF ATTENUATOR MAY OR MAY NOT BE USED.

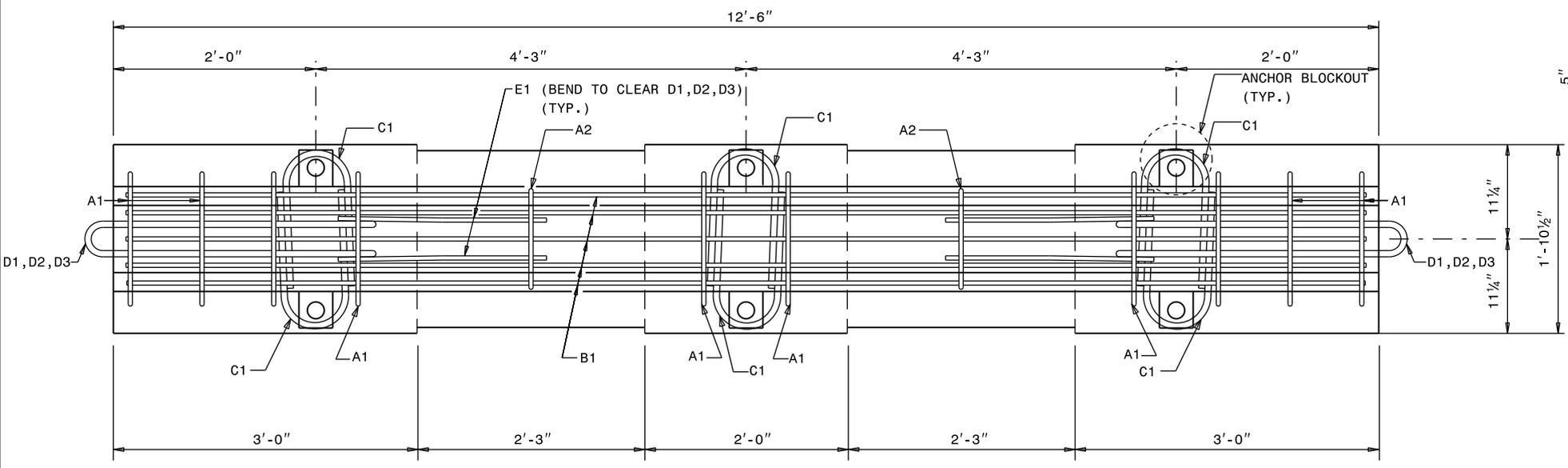
CURB WEIGHT OF HOST VEHICLE (LBS)	POSTED SPEED (MPH)	ROLL AHEAD DISTANCE (FT)	
		MOVING OPERATION	STATIONARY OPERATION
10000	≤ 45	150	100
	50-55	200	150
	≥ 60	275	200
15000	≤ 45	100	75
	50-55	175	100
	≥ 60	225	150
24000	≤ 45	100	50
	50-55	150	75
	≥ 60	175	100

GENERAL NOTES FOR TMA REQUIREMENTS

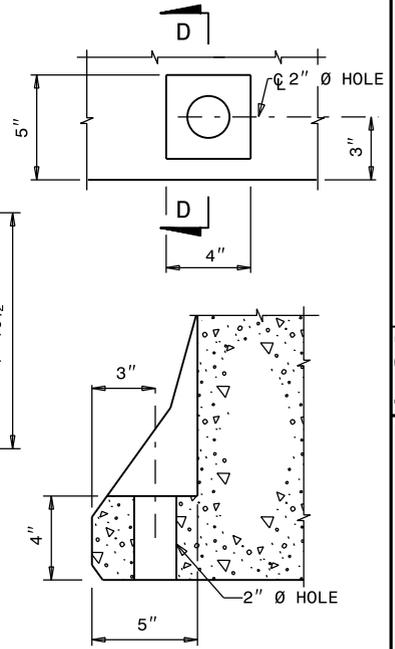
- 1- WHEN A TMA IS USED FOR A SHADOW VEHICLE, CONTACT THE TMA MANUFACTURER FOR SPECIFIC TRUCK REQUIREMENTS.
- 2- TMA MAY EITHER BE TRUCK MOUNTED OR TRAILER MOUNTED.
- 3- ALL TMAs MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCT LIST.
- 4- ROLL AHEAD DISTANCES OBTAINED FROM TRANSPORTATION RESEARCH RECORD 1304.

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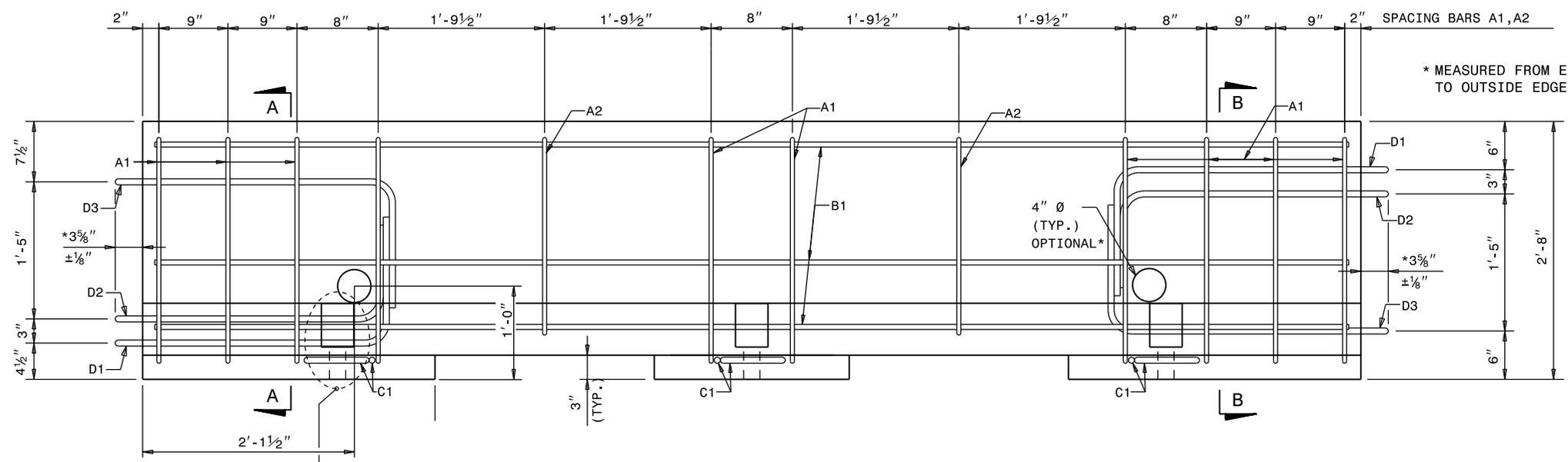
ROADWAY STANDARD DRAWING FOR
PORTABLE CONCRETE BARRIER
MASH APPROVED F-SHAPE K-WALL



PLAN VIEW



SECTION D-D
ANCHOR BLOCKOUT DETAIL



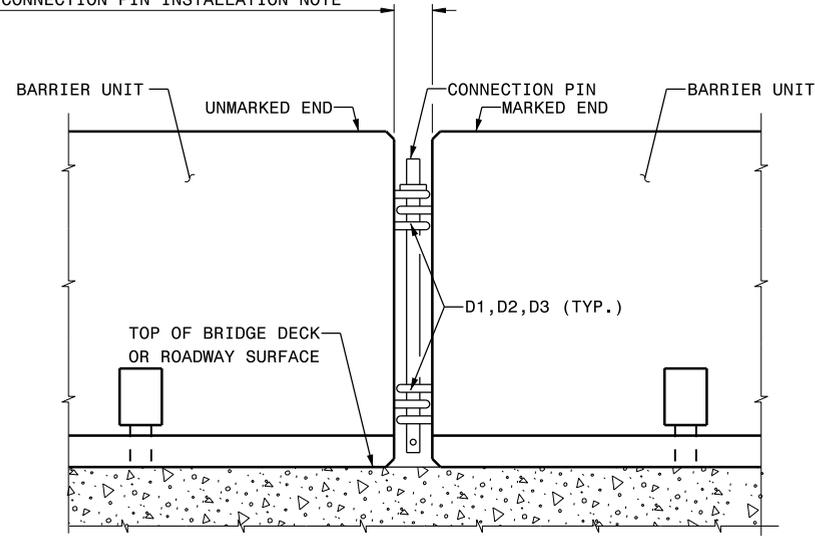
ELEVATION VIEW

ANCHOR BLOCKOUT
(BOTH SIDES) (TYP.)

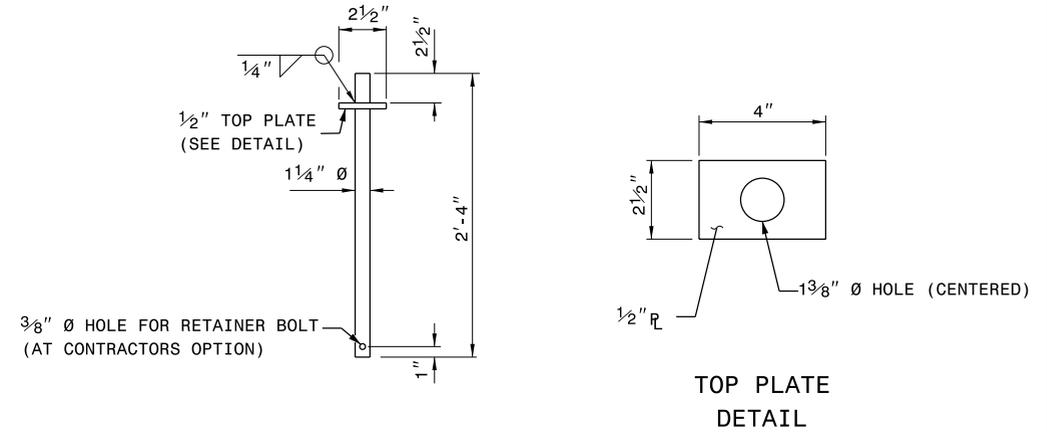
* MEASURED FROM END OF BARRIER UNIT
TO OUTSIDE EDGE OF BARS D1, D2, D3.

CROSS REFERENCES:
FOR SECTION A-A AND SECTION B-B SEE SHEET 2.

SEE CONNECTION PIN INSTALLATION NOTE



ELEVATION DETAIL OF CONNECTION BETWEEN BARRIER UNITS



CONNECTION PIN DETAIL

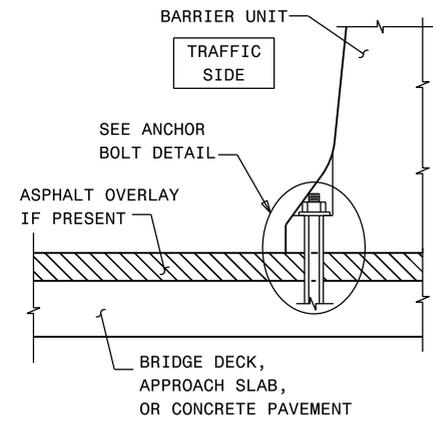
GENERAL NOTES

- 1- **HANDLING:** DO NOT LIFT OR MOVE THE BARRIER UNITS BY USING BARS 6D THAT EXTEND FROM THE ENDS OF THE UNITS.
- 2- **CONNECTION PIN ASSEMBLY:** USE STEEL FOR CONNECTION PIN AND TOP PLATE ASSEMBLIES IN ACCORDANCE WITH ASTM A36 OR ASTM A709 GRADE 36. WELD IN ACCORDANCE WITH THE AWS D1.1 STRUCTURAL WELDING CODE - STEEL. AT THE CONTRACTOR'S OPTION, A 3/8" DIAMETER HOLE MAY BE PROVIDED AT THE BOTTOM OF THE CONNECTION PIN, AS SHOWN, FOR THE INSTALLATION OF A VANDAL RESISTANCE BOLT.
- 3- **CONNECTION PIN INSTALLATION:** INITIALLY SET BARRIER UNITS BY USING A 3 5/8" WOODEN BLOCK BETWEEN ENDS OF ADJACENT UNITS. INSTALL CONNECTION PIN BETWEEN ADJACENT BARRIER UNITS AS SHOWN, THEN PULL NEWLY PLACED BARRIER UNIT AWAY FROM ADJACENT BARRIER UNIT TO REMOVE SLACK BETWEEN CONNECTION PIN AND BARS 6D (EXCEPT AS SHOWN ON SHEET 4). DO NOT USE BARRIER UNITS UNCONNECTED.
- 4- **REUSE OF CONNECTION PINS AND STAKES:** CONNECTION PINS AND STAKES MAY BE REUSED IF THEY HAVE THE STRUCTURAL INTEGRITY OF NEW PINS.

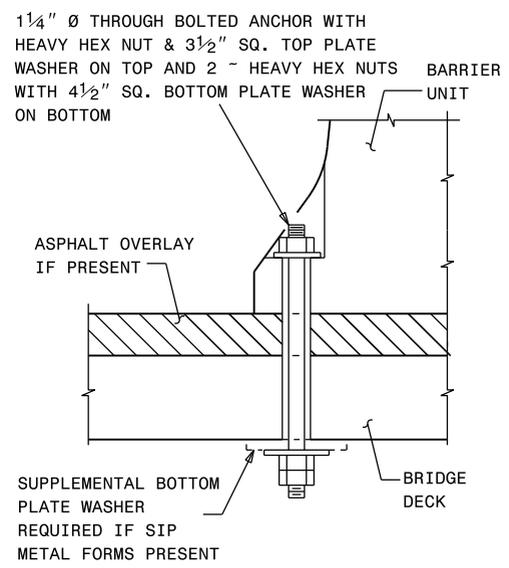
ROADWAY STANDARD DRAWING FOR
PORTABLE CONCRETE BARRIER
 MASH APPROVED F-SHAPE K-WALL

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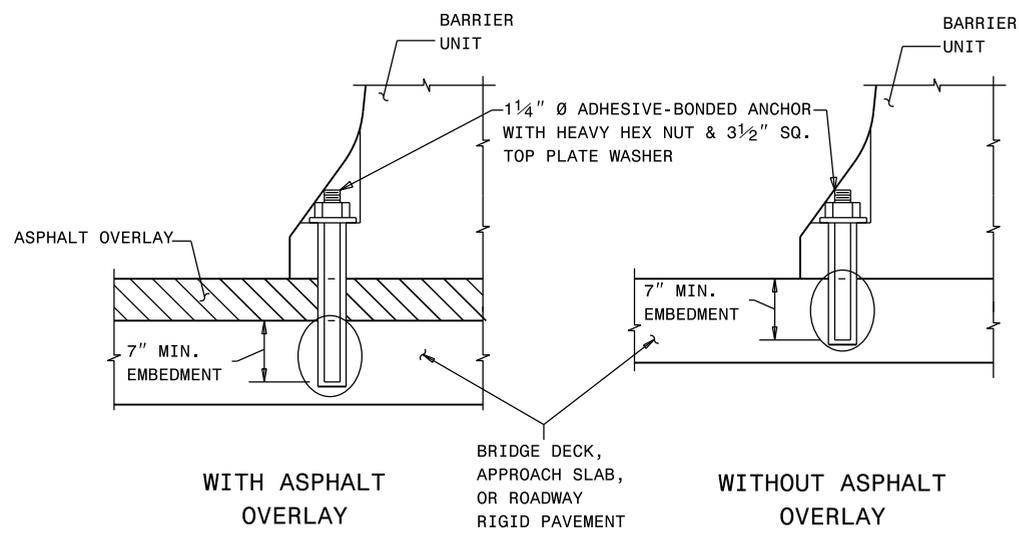
STATE OF
 NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.



TYPICAL SECTION

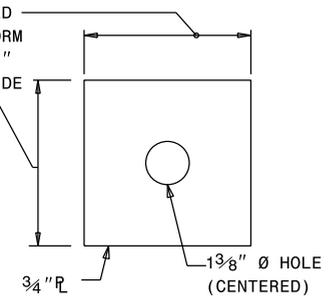


THROUGH BOLTED ANCHOR

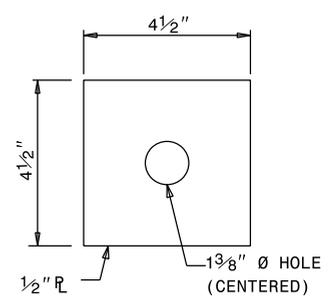


ADHESIVE BONDED ANCHOR INSTALLATION

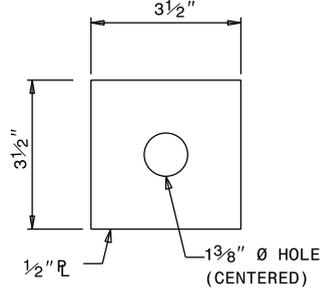
DIMENSION AS REQUIRED TO SPAN SIP METAL FORM CORRUGATIONS PLUS 1/2 inch MIN. OVERLAP EACH SIDE



SUPPLEMENTAL BOTTOM PLATE WASHER DETAIL



BOTTOM PLATE WASHER DETAIL



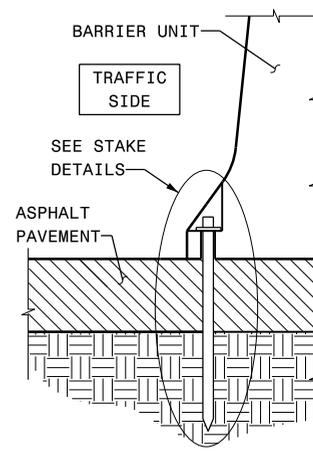
TOP PLATE WASHER DETAIL

DECK AND BARRIER WASHERS

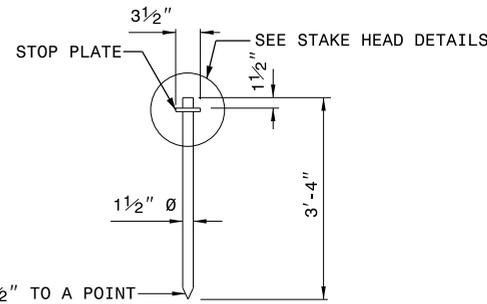
GENERAL NOTES FOR BOLTED INSTALLATIONS

- 1- LIMITATION OF USE: THIS INSTALLATION TECHNIQUE CAN ONLY BE USED ON RIGID PAVEMENT AND CONCRETE BRIDGE DECKS AS SHOWN. ANCHOR BOLTS MUST NOT BE INSTALLED ON BOTH SIDES OF THE BARRIER UNITS. DO NOT BOLT DOWN BARRIER UNITS ACROSS BRIDGE FINGER OR MODULAR EXPANSION JOINTS.
- 2- ANCHOR BOLTS, NUTS AND WASHERS: WHEN USING ADHESIVE-BONDED ANCHOR BOLTS, USE FULLY THREADED RODS IN ACCORDANCE WITH ASTM F 1554 GRADE 36. INSTALL ANCHOR BOLTS FOR THROUGH BOLTING IN ACCORDANCE WITH ASTM A 307 OR ASTM F 1554 GRADE 36. INSTALL NUTS IN ACCORDANCE WITH ASTM A 563 OR ASTM A 194. INSTALL FLAT WASHERS IN ACCORDANCE WITH ASTM F 436 AND PLATE WASHERS IN ACCORDANCE WITH ASTM A 36 OR ASTM A 709 GRADE 36.
- 3- INSTALL THREE (3) ANCHOR BOLTS PER BARRIER UNIT ON THE TRAFFIC SIDE OF THE BARRIER UNITS AS SHOWN, EXCEPT FOR TRANSITION INSTALLATIONS. INSTALL ANCHOR BOLTS AND NUTS SO THAT THE MAXIMUM EXTENSION BEYOND THE FACE OF THE BARRIER UNITS IS 1/2 inch. SNUG TIGHTEN THE NUTS ON THE ANCHOR BOLTS. FOR THROUGH BOLTED INSTALLATIONS, SNUG TIGHTEN THE DOUBLE NUTS ON THE UNDERSIDE OF THE DECK AGAINST EACH OTHER TO MINIMIZE THE POTENTIAL FOR LOOSENING.
- 4- OMIT ONE (1) ANCHOR BOLT WITHIN A SINGLE BARRIER UNIT IF A CONFLICT EXISTS BETWEEN THE ANCHOR BOLT LOCATION AND A BRIDGE DECK EXPANSION JOINT OR DRAIN. THE ADJACENT BARRIER UNITS MUST EACH BE INSTALLED WITH THE STANDARD THREE (3) ANCHOR BOLTS.

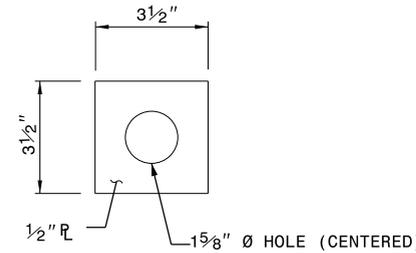
OMIT ONE (1) ANCHOR BOLT WITHIN A SINGLE BARRIER UNIT AS SHOWN IN THE TREATMENT AT BRIDGE DECK EXPANSION JOINT SCHEMATIC IF THE BARRIER UNIT STRADDLES A BRIDGE DECK EXPANSION JOINT. THE ADJACENT BARRIER UNITS MUST EACH BE INSTALLED WITH THE STANDARD THREE (3) ANCHOR BOLTS.
- 5- DO NOT DRILL HOLES INTO PRESTRESSED CONCRETE BRIDGE DECK PANELS.
- 6- DRILL ANCHOR HOLES IN CONCRETE WITH A PNEUMATIC DRILL.
- 7- ONCE REMOVED, COMPLETELY FILL ANCHOR HOLES WITH AN APPROVED, NON-SHRINK, NON-METALLIC GROUT, OR AS DIRECTED BY THE ENGINEER.



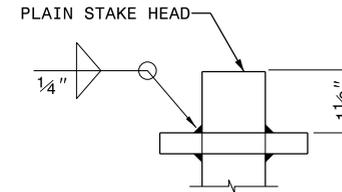
TYPICAL SECTION



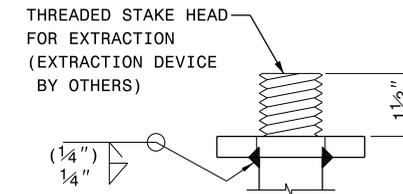
STAKE DETAIL



STOP PLATE DETAIL



PLAIN STAKE HEAD DETAIL



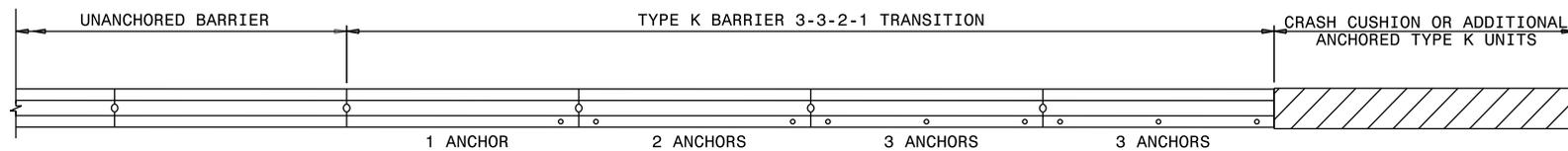
OPTIONAL EXTRACTION STAKE HEAD DETAIL

GENERAL NOTES FOR STAKED INSTALLATION ON ASPHALT

- 1- THIS INSTALLATION TECHNIQUE CAN ONLY BE USED ON ASPHALT PAVEMENT AS SHOWN. STAKES MUST NOT BE INSTALLED ON BOTH SIDES OF THE BARRIER UNITS.
- 2- PROVIDE STEEL FOR STAKE ASSEMBLIES IN ACCORDANCE WITH ASTM A 36 OR ASTM A 709 GRADE 36. WELD IN ACCORDANCE WITH THE AWS D1.1 STRUCTURAL WELDING CODE - STEEL. INSTALL THREE (3) STAKES ON THE TRAFFIC SIDE OF THE BARRIER UNITS AS SHOWN, EXCEPT FOR TRANSITION INSTALLATIONS. INSTALL STAKES SO THAT THE STOP PLATE IS SNUG AGAINST THE BOTTOM OF THE ANCHOR BLOCKOUT.
- 3- PRIOR TO INSTALLATION OF STAKES VERIFY LOCATIONS OF ALL ADJACENT BURIED UTILITIES, DRAINAGE STRUCTURES, PIPES, ETC. IF CONFLICTS BETWEEN STAKE LOCATIONS AND BURIED ELEMENTS EXIST, A MAXIMUM OF TWO (2) STAKES WITHIN A SINGLE BARRIER UNIT MAY BE OMITTED IF THE ADJACENT BARRIER UNITS ARE INSTALLED WITH THE STANDARD THREE (3) STAKES.

LEGEND:

DOT INDICATES NUMBER AND POSITION OF BOLTS OR STAKES



3-3-2-1 ANCHORAGE TRANSITION DETAIL

GENERAL NOTES

- 1- TYPE K ANCHORED TO UNANCHORED TRANSITIONS: USE THE 3-3-2-1 ANCHORAGE TRANSITION DETAIL WHEN TRANSITIONING UNANCHORED AND ANCHORED UNITS OR WHEN CONNECTING UNANCHORED RUNS TO CRASH CUSHIONS, AS SHOWN IN THIS INDEX.
- 2- THIS DETAIL DOES NOT APPLY WHEN ATTACHING ANCHORED MASH APPROVED F-SHAPE K-WALL TO A CRASH CUSHION.

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ROADWAY STANDARD DRAWING FOR
PORTABLE CONCRETE BARRIER
MASH APPROVED F-SHAPE K-WALL
ANCHORED TO UNANCHORED TRANSITION

SHEET 6 OF 7

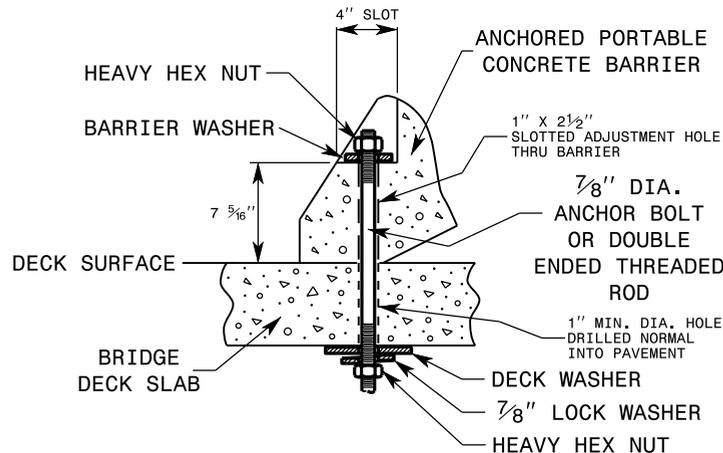
1170.01

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THRU-THE-DECK ANCHOR METHOD

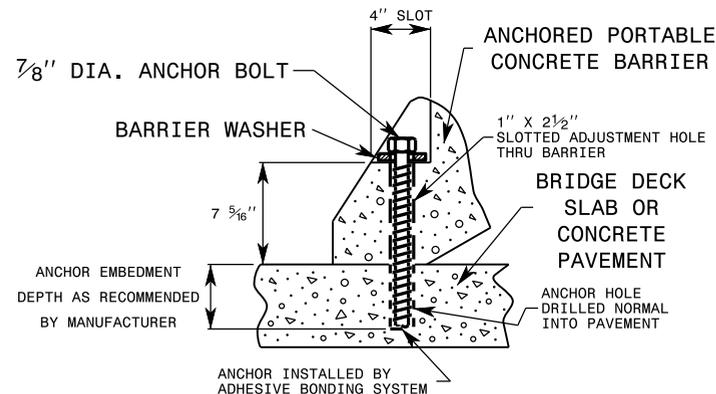
BRIDGE DECKS

METHOD TO BE USED ON OLD BRIDGE DECKS ONLY AT TIMES WHEN SPECIFIED IN THE PLANS, OR WHEN DIRECTED BY THE ENGINEER.



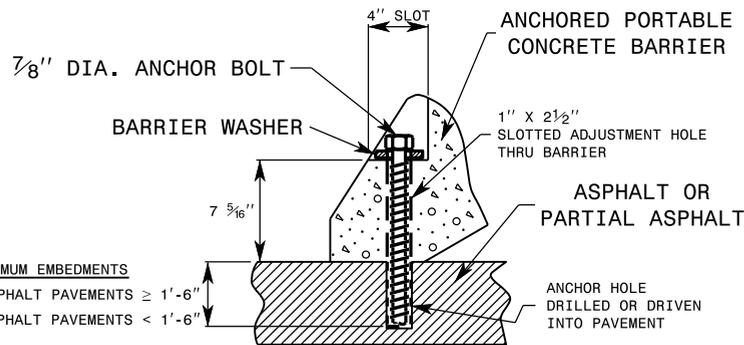
ADHESIVE BONDING SYSTEM ANCHOR METHOD

BRIDGE DECKS AND PORTLAND CEMENT CONCRETE PAVEMENTS



ANCHOR BOLT METHOD

BITUMINOUS PAVEMENTS



MINIMUM EMBEDMENTS

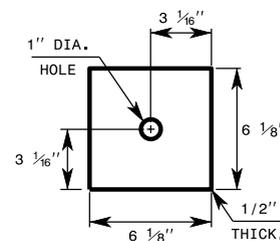
1'-6" FOR ASPHALT PAVEMENTS ≥ 1'-6"
2'-0" FOR ASPHALT PAVEMENTS < 1'-6"

NOTE: THESE EMBEDMENT DEPTHS ARE TYPICAL FOR MOST APPLICATIONS. HOWEVER, DUE TO VARYING ASPHALT CONDITIONS, THEY MAY NOT BE ADEQUATE FOR ALL CASES.

DECK & BARRIER WASHERS

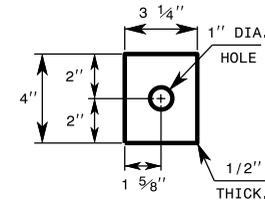
DECK WASHER

THRU-THE-DECK METHOD ONLY



BARRIER WASHER

ALL APPLICATIONS



GENERAL NOTES

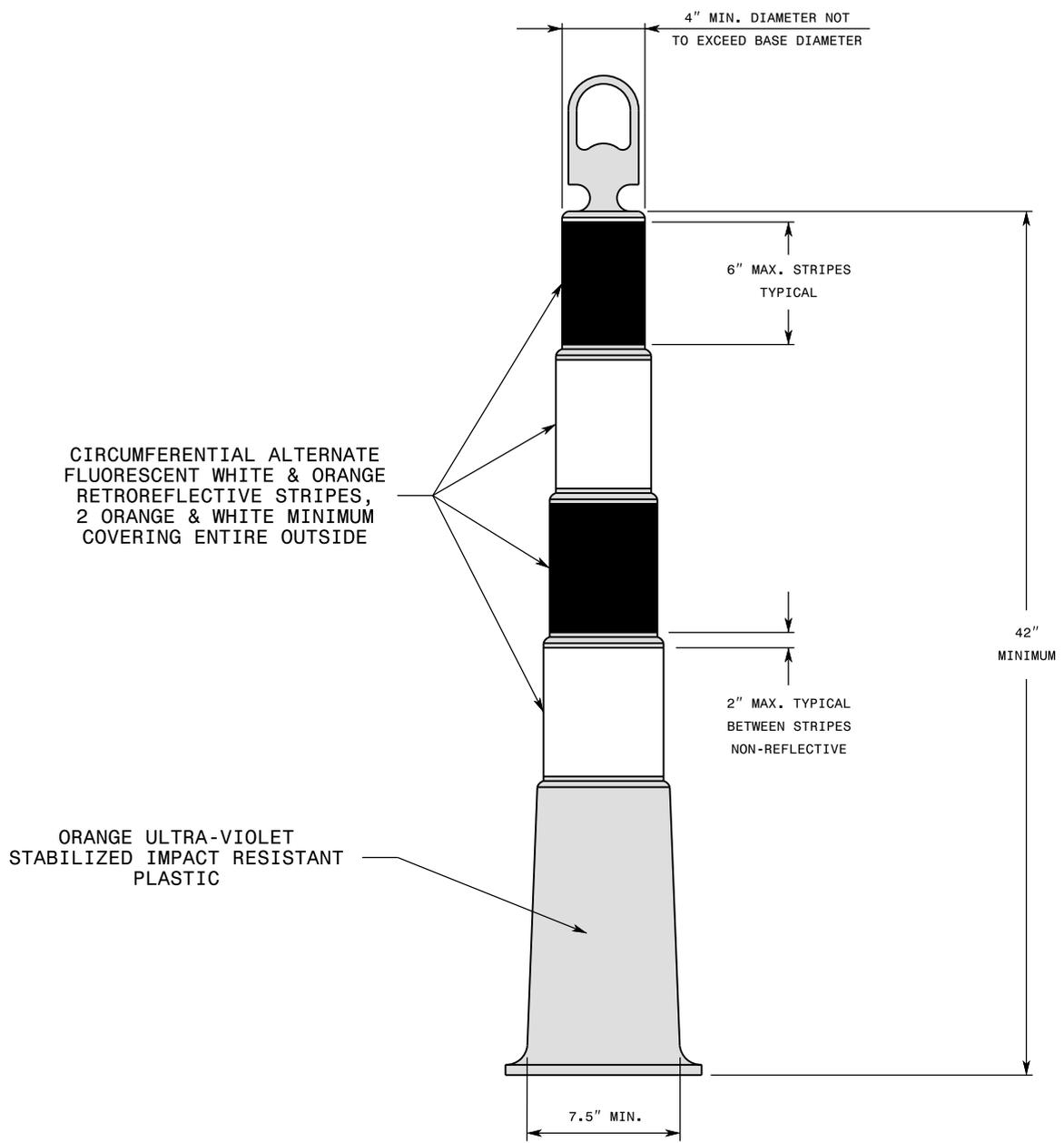
- 1- BARRIER CAN ONLY BE ANCHORED ON ASPHALT OR CONCRETE SURFACES.
- 2- BARRIER CAN ONLY BE PLACED ON ASPHALT OR CONCRETE SURFACES UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
- 3- EACH 10 FT. SECTION OF BARRIER REQUIRES 2 ANCHOR ASSEMBLIES ON THE SIDE OF TRAFFIC WHEN INSTALLED ON CONCRETE, AND 4 ANCHOR ASSEMBLIES WHEN INSTALLED ON ASPHALT.
- 4- EXPANSION ANCHORS WILL NOT BE PERMITTED FOR USE ON BRIDGE DECKS.
- 5- DO NOT DRILL HOLES INTO PRESTRESSED CONCRETE BRIDGE DECK PANELS.
- 6- USE ASTM A325 HIGH STRENGTH GALVANIZED ANCHOR BOLTS.

- 7- DRILL ANCHOR HOLES IN CONCRETE WITH A PNEUMATIC DRILL.
- 8- FOR BARRIER SECTIONS THAT EXTEND ACROSS CONCRETE JOINTS, DO NOT ANCHOR ON BOTH SIDES OF THE JOINT, OMIT THE ANCHOR CLOSEST TO THE JOINT.
- 9- TIGHTEN ANCHORS "SNUG TIGHT". TURN THREADED RODS AT LEAST 1 FULL THREAD EXTENDING ABOVE THE NUT. DO NOT PROTRUDE THE TOP OF THE ANCHOR ABOVE THE SIDE OF THE BARRIER.
- 10- COAT ANCHORS USED WITH THE ADHESIVE BONDING ANCHORING SYSTEM WITH A DEBONDING AGENT SO THE ANCHORS CAN BE EASILY REMOVED. DO NOT REDUCE THE STRENGTH OF THE ANCHOR SYSTEM WITH THE DEBONDING AGENT.
- 11- ONCE REMOVED, COMPLETELY FILL ANCHOR HOLES WITH AN APPROVED, NON-SHRINK, NON-METALLIC GROUT, OR AS DIRECTED BY THE ENGINEER.

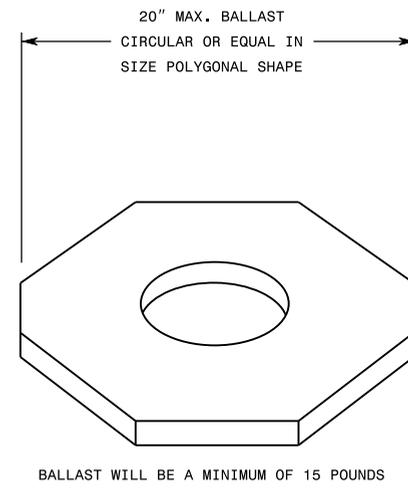
1-24

ROADWAY STANDARD DRAWING FOR

SKINNY DRUMS



TYPICAL BALLAST



GENERAL NOTES

- 1- USE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.
- 2- IF NECESSARY, PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.
- 3- REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR ADDITIONAL REQUIREMENTS.
- 4- ALL SKINNY DRUMS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.