

GENERAL NOTES

- (1) IF SHOULDERS DO NOT EXIST THE ARROW PANEL MAY BE PLACED WITHIN THE TAVERN. THE LOCATION OF THE ARROW PANEL SHALL MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE. LANE CLOSURE SHALL BE EXTENDED AT THE BUFFER SPACE, IF NEEDED, SUCH THAT STOPPING SIGHT DISTANCE TO THE ARROW PANEL IS MET. (SEE STD. 1101.11 - SHEET 2)
- (2) THE MAXIMUM SPACING OF CONES IN TAVERN SHALL BE EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE MAXIMUM SPACING OF CONES ALONG THE BUFFER SPACE, AND WORK AREA, SHOULD BE EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
- (3) REFER TO STD. 1101.02 SHEETS 6 AND 7 FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.
- (4) ADVISORY SPEED PANELS (XX MPH, SIGN W13-1) SHALL POSTRAY A SPEED TO MPH LESS THAN THE POSTED SPEED LIMIT, UNLESS A LOWER SPEED IS DETERMINED NECESSARY BY THE ENGINEER.
- (5) LANE CLOSURES SHALL BE INSTALLED WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. LANE CLOSURES SHALL BE SPACED AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- (6) TRUCKS ARE REQUIRED ONLY WHEN A BUFFER SPACE CANNOT BE ATTAINED, OR WHEN DIRECTED BY THE ENGINEER ON THE PLAN, WHEN USED, THEY SHALL BE POSITIONED TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THEIR MANUFACTURER.
- (7) THE FOLLOWING OPTIONS MAY BE USED AS THE FIRST ADVANCE WARNING THE MOTORIST SEES:
 - A. TRUCK MOUNTED ADVANCE WARNING SIGNS (CMS)
 - B. MOVING CHANGEGATE MESSAGE SIGNS (CMS)
 - C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST USE NEXT TO MILLER AND MAKE CIRCLE TO PICK UP SIGN)

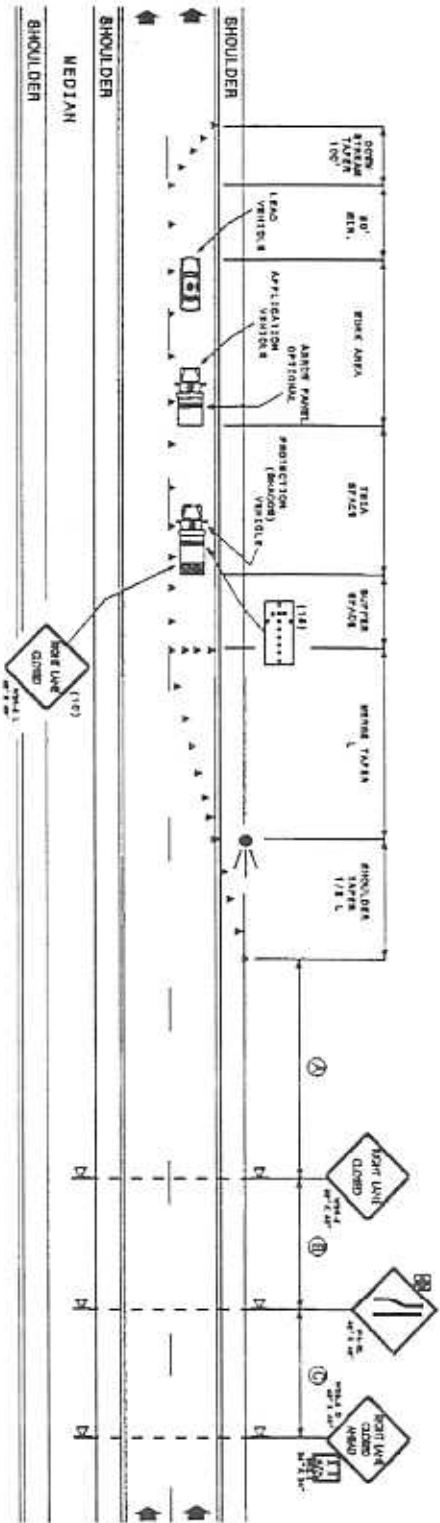
D. STATIONARY QUASIBLE MESSAGE SIGN (CMS)
(MUST USE NEXT TO MILLER AND MAKE CIRCLE TO PICK UP CMS)

- (8) TOTAL DISTANCE BETWEEN FIRST AND LAST VEHICLE IN COLUMN SHOULD NOT EXCEED ONE (1) MILE IN LENGTH.
- (9) IF USING GROUND MOUNTED ADVANCE WARNING SIGNS ON STATIONARY CMS, THE TOTAL DISTANCE BETWEEN THE FIRST ADVANCE WARNING SIGN ON CMS AND APPLICATION VEHICLE SHOULD NOT EXCEED 10 MILES AND SIGN W1-20AP SHOULD BEA VACUUMITY IN ROAD NEXT TO MILLER.
- (10) 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 PANEL AND/OR LIGHT SIGN.
- (11) SIGN W20-FL SHOULD BE PLACED ON BACK OF PROTECTION VEHICLE AND SIGN W20-LD ON BACK OF ADVANCE WARNING VEHICLE IN MULTILANE DIVIDED TRAFFIC OR VEHICLES APPROACHING FROM REAR ARE NOTIFIED OF OPERATION.
- (12) RADIO COMMUNICATION BETWEEN VEHICLES IS RECOMMENDED.
- (13) ALL VEHICLES MUST HAVE REDUCED AND/OR LIGHT BARS OPERATING AT ALL TIMES.
- (14) USE OF CMS ARE OPTIONAL WITH ADVANCED WARNING VEHICLES.
- (15) USE A TYPE "9" FLASHING ARROW PANEL, MAIN SIZE 60" X 30"
- (16) DRUMS MAY BE SUBSTITUTED FOR CONES AS DETERMINED BY THE ENGINEER.
- (17) THE LANE CLOSURE MAY BE MODIFIED WITH THE USE OF MORE ADVANCE WARNING VEHICLES EQUIPPED WITH THE PROPER WARNING SIGNS AND LIGHTS ACCOMPANIED BY VARIOUS GROUND MOUNTED CAUTIONARY SIGNS AS DEMAND NECESSARY BY THE ENGINEER.

| ADVANCE WARNING SIGN SPACING CHART | POSTED SPEED LIMIT (MPH) | DISTANCE BETWEEN SIGNS (FEET) |
|------------------------------------|-------------------------------|-------------------------------|
| | 20 | 200 |
| | 30 | 300 |
| | 40-50 | 300 |
| | 60 | 600 |
| | 80 | 800 |
| | CONTROLLED ACCESS ROAD (2.00) | 1000 |
| | | 1500 |
| | | 2500 |

| SPEED | FORMULA | POSTED SPEED (MPH) | BUFFER SPACE (FT) |
|-------------------|----------------------|--------------------|-------------------|
| 40 MPH OR LESS | $L = \frac{S^2}{10}$ | 20 | 200 |
| 45 MPH OR GREATER | $L = 7.5S$ | 30 | 300 |
| | | 40 | 400 |
| | | 60 | 600 |
| | | 80 | 800 |
| | | 100 | 1000 |
| | | 120 | 1200 |
| | | 150 | 1500 |
| | | 200 | 2000 |
| | | 250 | 2500 |
| | | 300 | 3000 |
| | | 400 | 4000 |
| | | 485 | 4850 |

| POSTED SPEED (MPH) | BUFFER SPACE (FT) |
|--------------------|-------------------|
| 20 | 200 |
| 30 | 300 |
| 40 | 400 |
| 50 | 500 |
| 60 | 600 |
| 70 | 700 |
| 80 | 800 |
| 90 | 900 |
| 100 | 1000 |
| 110 | 1100 |
| 120 | 1200 |
| 130 | 1300 |
| 140 | 1400 |
| 150 | 1500 |
| 160 | 1600 |
| 170 | 1700 |
| 180 | 1800 |
| 190 | 1900 |
| 200 | 2000 |
| 210 | 2100 |
| 220 | 2200 |
| 230 | 2300 |
| 240 | 2400 |
| 250 | 2500 |
| 260 | 2600 |
| 270 | 2700 |
| 280 | 2800 |
| 290 | 2900 |
| 300 | 3000 |



PAVEMENT MANAGEMENT OPERATIONS

(OPERATIONS STOPPED 15 MIN. OR LONGER)
INTERSTATE & MULTILANE ROADWAYS

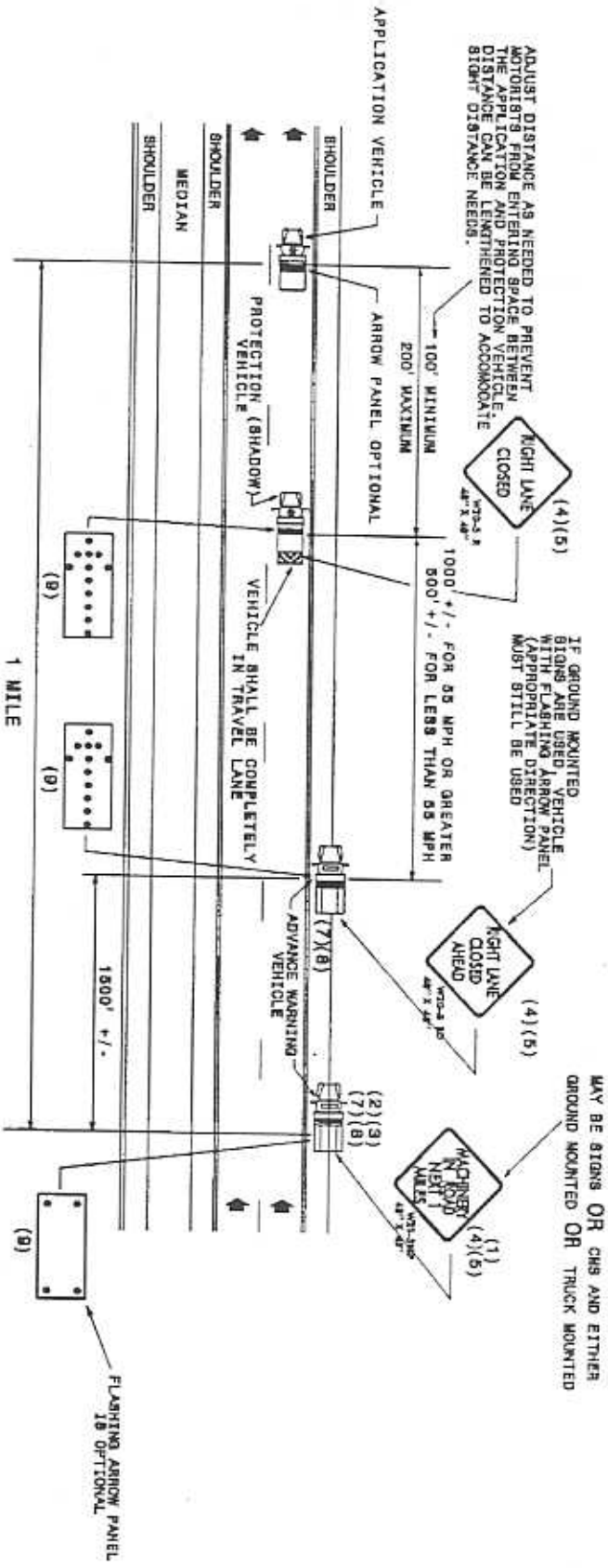
LEGEND

- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW
- TYPE B WARNING LIGHT (FOR NIGHT USE)
- FLASHING ARROW PANEL (TYPE C)
- CONE
- APPLICATION VEHICLE WITH ROTATING SIGNAL
- PROTECTION VEHICLE WITH TRUCK MOUNTED ADVANCE WARNING SIGN AND ROTATING REAR LIGHT (SEE ROADWAY STANDARD NO. 1168-01)
- LEAD VEHICLE
- FLASHING ARROW PANEL, TYPE "9" APPROPRIATE DIRECTION INDICATOR

DRAWING NUMBER 1 OF 4
IMPLEMENTATION DATE: 02-01-02
REVISION DATE: 01-14-02

GENERAL NOTES

- (1) THE FOLLOWING OPTIONS MAY BE USED AS THE FIRST ADVANCE WARNING THE MOTORISTS SEE:
 - A. TRUCK MOUNTED ADVANCE WARNING SIGNS
 - B. MOVING CHANGEABLE MESSAGE SIGN (CMS)
 - C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST USE NEXT 10 MILES AND MAKE CIRCLE TO PICK UP SIGN)
 - D. STATIONARY CHANGEABLE MESSAGE SIGN (CMS) (MUST USE NEXT 10 MILES AND MAKE CIRCLE TO PICK UP CMS)
- (2) TOTAL DISTANCE BETWEEN FIRST AND LAST VEHICLE IN CARRYAW SHOULD NOT EXCEED ONE (1) MILE IN LENGTH.
- (3) IF USING GROUND MOUNTED ADVANCE WARNING SIGNS OR STATIONARY CMS, THE TOTAL DISTANCE BETWEEN THE FIRST ADVANCE WARNING SIGN OR CMS AND APPLICATION VEHICLE SHOULD NOT EXCEED 10 MILES AND SIGN MESSAGE SHOULD READ "MACHINERY IN ROAD NEXT 10 MILES".
- (4) 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 PANEL AND/OR LIGHT BAR.
- (5) SIGN AND LIGHT SHOULD BE PLACED ON BACK OF PROTECTION VEHICLE AND SIGN SHOULD BE ON BACK OF PROTECTION VEHICLE IN MULTILANE DIVIDED TRAFFIC SO VEHICLES APPROACHING FROM REAR ARE NOTIFIED OF OPERATION.
- (6) RADIO COMMUNICATION BETWEEN VEHICLES IS RECOMMENDED.
- (7) ALL VEHICLES MUST HAVE BEACONS AND/OR LIGHT BARS OPERATING AT ALL TIMES.
- (8) USE OF CMS'S ARE OPTIONAL WITH ADVANCED WARNING VEHICLES.
- (9) USE A TYPE "B" FLASHING ARROW PANEL.
 - B MIN. SIZE 60" X 30"
- (10) A LANE CLOSURE MAY BE USED IN THE EVENT THE ENGINEER FEELS ONE IS WARRANTED (I.E. CORING OPERATION, EXTREME HIGH VOLUMES, ETC.). REFER TO THE HIGHWAY DESIGN BRANCH STANDARD DRAWINGS AND/OR SHEET 1 OF 4 OF THE PAVEMENT MANAGEMENT OPERATIONS FOR LANE CLOSURE SET UPG.



LEGEND

- PORTABLE SIGN
- ⇨ DIRECTION OF TRAFFIC FLOW
- APPLICATION VEHICLE WITH MOVING MESSAGE
- PROTECTION VEHICLE WITH TRUCK MOUNTED ADVANCE WARNING SIGN (TRUCK MOUNTED ADVANCE WARNING SIGN STANDARD NO. 1108.01)
- ADVANCE WARNING VEHICLE WITH MOVING MESSAGE SIGN
- FLASHING ARROW PANEL, TYPE "B"
- FLASHING ARROW PANEL, TYPE "A"
- FLASHING ARROW PANEL, TYPE "B" (INDICATED)

PAVEMENT MANAGEMENT OPERATIONS

(OPERATIONS STOPPED 0-15 MIN.)

INTERSTATE & MULTILANE DIVIDED ROADWAYS

DRAWING NUMBER 2 OF 4

IMPLEMENTATION DATE: 02-01-02

REVISION DATE: 01-14-02

GENERAL NOTES

- (1) LANE CLOSURES SHALL BE INSTALLED WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. LANE CLOSURES SHALL BE REMOVED AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- (2) THE MAXIMUM SPACING OF CONES THRU THE WORK AREA SHALL BE EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
- (3) LANE CLOSURES SHALL BE EXTENDED AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER. (REFER TO STD. DWG. 1101-11-SHEET 2)
- (4) TRAFFIC SHOULD NOT BE STOPPED IN ANY ONE DIRECTION FOR MORE THAN 5 MINUTES AT A TIME.
- (5) PILOT CARS SHALL BE USED WHEN DIRECTED BY THE ENGINEER.
- (6) FLAGGERS SHALL BE USED TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. FLAGGERS UTILIZED AT INTERSECTIONS SHALL BE ACCOMPANIED BY FLAGGER AHEAD SIGNS (W20-7A) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER WHERE INTERSECTIONS ARE SIGNALIZED. SIGNALS SHOULD BE PLACED IN THE FLASH MODE.

- (7) ALL VEHICLES MUST HAVE BEACONS AND/OR LIGHT BARS OPERATING AT ALL TIMES
- (8) RADIO COMMUNICATION BETWEEN VEHICLES AND/OR FLAGGERS IS RECOMMENDED
- (9) CONES MAY BE OMITTED TO DELINEATE WORK ZONE IF DEEMED UNDESIRABLE BY THE ENGINEER
- (10) USE A TYPE "B" FLASHING ARROW PANEL
PANEL TYPE MIN. SIZE 60" X 30"
- (11) SIGN W-777 TO BE USED IN TWO-LANE, TWO-WAY OPERATIONS ONLY.

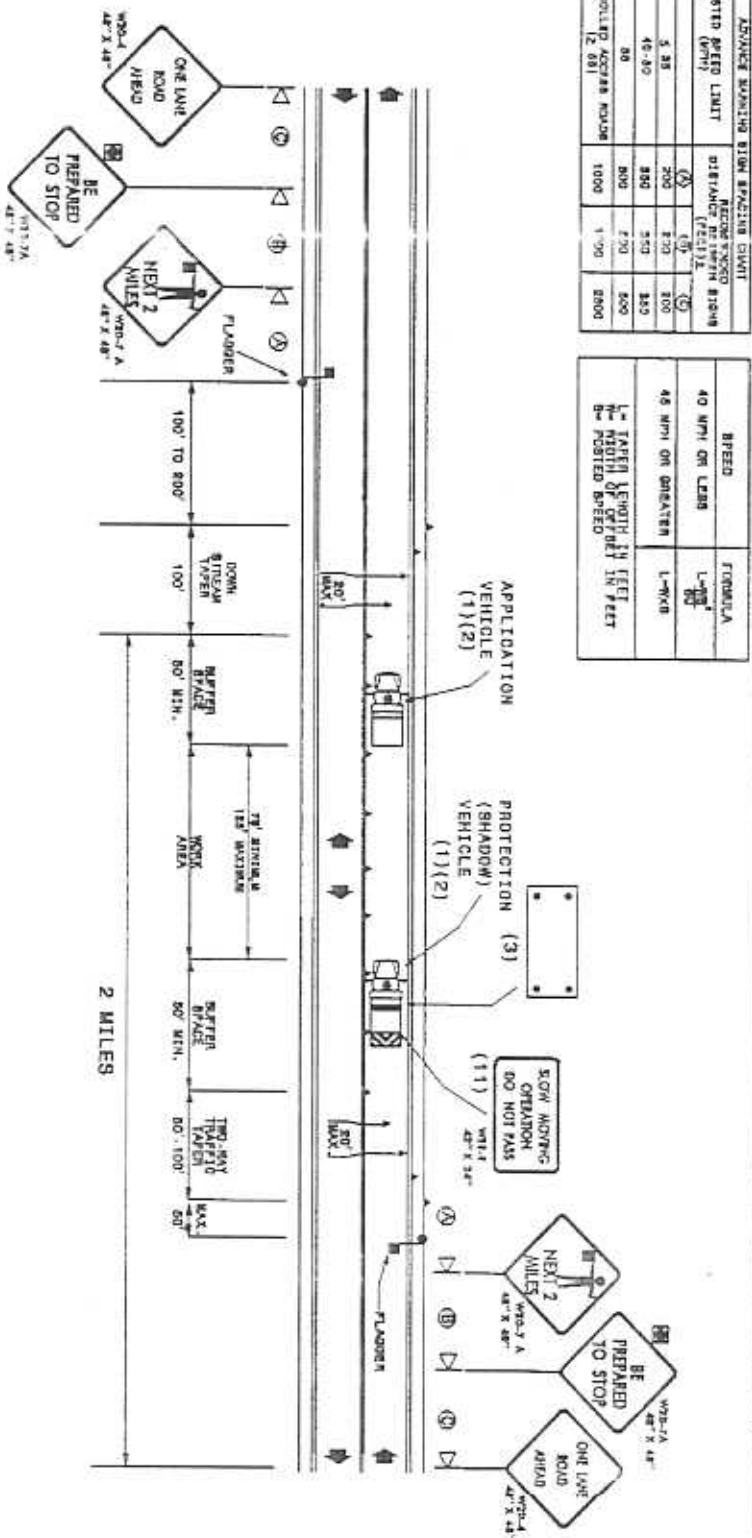
LEGEND

- PORTABLE SIGN
- DIRECTION OR TRAFFIC FLOW
- TYPE B FLASHING LIGHT (FOR NIGHT USE)
- APPLICATION VEHICLE WITH ROTATING BEACON
- PROTECTION VEHICLE WITH TRUCK AND/OR LIGHT BAR AND BEACON (SEE STANDARD DRAWING 1109-01)
- FLASHING ARROW PANEL, TYPE "B"
- CONE
- FLAGGER

| POSTED SPEED LIMIT (MPH) | MINIMUM BUFFER SPACE (FEET) | FORMULA |
|-------------------------------|-----------------------------|-------------------|
| 5-35 | 40 | 40 MPH OR LESS |
| 40-40 | 200 | 45 MPH OR GREATER |
| 45-50 | 200 | |
| 50 | 200 | |
| 55 | 200 | |
| 60 | 200 | |
| 65 | 200 | |
| 70 | 200 | |
| 75 | 200 | |
| 80 | 200 | |
| 85 | 200 | |
| 90 | 200 | |
| 100 | 200 | |
| CONTROLLED ACCESS ROAD (2.05) | 1-750 | 1-750 |

| SPEED | FORMULA |
|-------------------|---------|
| 40 MPH OR LESS | L-40' |
| 45 MPH OR GREATER | L-75' |

| POSTED SPEED (MPH) | BUFFER SPACE (FT) |
|--------------------|-------------------|
| 25 | 35 |
| 30 | 55 |
| 35 | 75 |
| 40 | 120 |
| 45 | 200 |
| 50 | 275 |
| 55 | 315 |
| 60 | 375 |
| 65 | 415 |
| 70 | 485 |



PAVEMENT MANAGEMENT OPERATIONS

(OPERATIONS STOPPED 15 MIN. OR LONGER)

TWO-LANE, TWO-WAY ROADWAYS






DRAWING NUMBER 3 OF 4
 IMPLEMENTATION DATE: 02-01-02
 REVISION DATE: 01-14-02

GENERAL NOTES

- (1) THE FOLLOWING OPTIONS MAY BE USED AS THE FIRST ADVANCE WARNING THE MOTORISTS SEE:
 - A. TRUCK MOUNTED ADVANCE WARNING SIGNS
 - B. MOVING CHANGEABLE MESSAGE SIGN (CMS)
 - C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST USE 'NEXT 10 MILES' AND MAKE CIRCLE TO PICK UP SIGNS)
 - D. GROUND MOUNTED CHANGEABLE MESSAGE SIGN (CMS) (MUST USE 'NEXT 10 MILES' AND MAKE CIRCLE TO PICK UP CMS)
- (2) TOTAL DISTANCE BETWEEN FIRST AND LAST VEHICLE IN CARAVAN SHOULD NOT EXCEED ONE (1) MILE IN LENGTH.
- (3) IF USING GROUND MOUNTED ADVANCE WARNING SIGNS OR STATIONARY CMS THE TOTAL DISTANCE BETWEEN THE FIRST ADVANCE WARNING SIGN OR CMS AND APPLICATION VEHICLE SHOULD NOT EXCEED 10 MILES AND SIGN W21-38BP SHOULD READ 'MACHINERY IN ROAD NEXT 10 MILES'.
- (4) SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S VIEW OF THE FLASHING ARROW PANEL AND/OR LIGHT BAR.
- (5) SIGN W20-18BP OR R4-7A SHOULD BE PLACED ON FRONT OF THE APPLICATION VEHICLE AND SIGN W21-38BP ON BACK OF THE ADVANCE WARNING VEHICLE IN TWO-LANE TWO-WAY TRAFFIC OR VEHICLES APPROACHING FROM FRONT AND REAR ARE NOTIFIED OF OPERATION.
- (6) IF A LEAD VEHICLE IS ADDED TO OPERATION IT SHOULD HAVE THE SAME ADVANCE WARNING SIGNS AS THE APPLICATION VEHICLE SHOWN BELOW.
- (7) RADIO COMMUNICATION BETWEEN VEHICLES IS RECOMMENDED.
- (8) ALL VEHICLES MUST HAVE BEACONS AND/OR LIGHT BARS OPERATING AT ALL TIMES.
- (9) USE OF CMS'S ARE OPTIONAL WITH ADVANCED WARNING VEHICLES.
- (10) USE A TYPE "B" FLASHING ARROW PANEL.

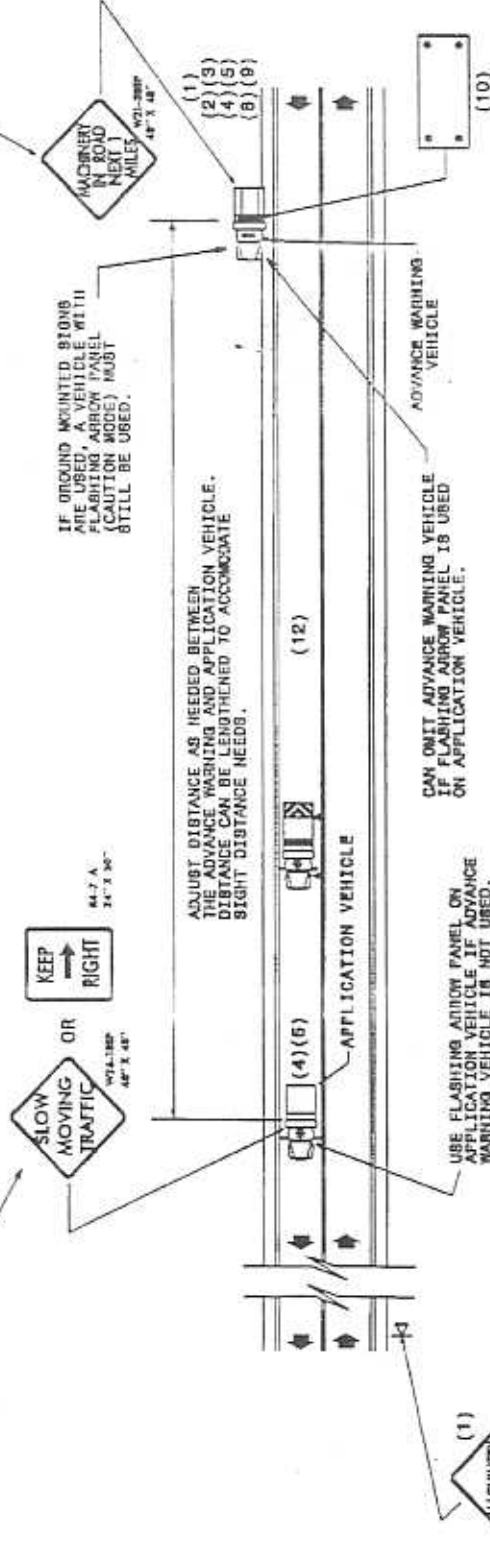
| | |
|------------|-----------|
| PANEL TYPE | MIN. SIZE |
| A | 60" X 30" |
| B | 60" X 30" |
- (11) WHEN PAVEMENT TESTING INCLUDES A CORING OPERATION, USE LANE CLOSURES FOUND IN THE HIGHWAY DESIGN BRANCH ROADWAY STANDARD DRAWINGS.
- (12) WHEN IT BECOMES APPARENT TO THE CORING OPERATION FOREMAN TRAFFIC IS EXPERIENCING DIFFICULTY GETTING AROUND THE OPERATION, THE PILOT CAR METHOD SHOULD BE USED TO DIRECT TRAFFIC.

LEGEND

-  PORTABLE SIGN
-  DIRECTION OF TRAFFIC FLOW
-  APPLICATION VEHICLE WITH ROTATING BEACON
-  ADVANCE WARNING VEHICLE WITH MOUNTED SIGN
-  FLASHING ARROW PANEL, TYPE "B"

SIGN SHOULD BE ATTACHED TO THE BACK OF THE FLASHING ARROW PANEL. IF A FLASHING ARROW PANEL IS NOT USED ON THE APPLICATION VEHICLE SIGN SHOULD BE ATTACHED TO THE BACK OF THE TRUCK CAB IN SUCH A MANNER AS NOT TO OBSTRUCT THE DRIVER'S VISION.

MAY BE SIGNS OR CMS AND EITHER GROUND MOUNTED OR TRUCK MOUNTED



IF GROUND MOUNTED SIGNS ARE USED, A VEHICLE WITH FLASHING ARROW PANEL (CAUTION MODE) MUST STILL BE USED.

ADJUST DISTANCE AS NEEDED BETWEEN THE ADVANCE WARNING AND APPLICATION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMMODATE SIGHT DISTANCE NEEDS.

CAN OMIT ADVANCE WARNING VEHICLE IF FLASHING ARROW PANEL IS USED ON APPLICATION VEHICLE.

USE FLASHING ARROW PANEL ON APPLICATION VEHICLE IF ADVANCE WARNING VEHICLE IS NOT USED.

PAVEMENT MANAGEMENT OPERATIONS
 (OPERATIONS STOPPED 0-15 MIN.)
TWO-LANE TWO-WAY ROADWAYS