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 3 CONSECUTIVE DAYS.
3. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS NECESSARY OR AS DIRECTED.
4. ERECT SIGNS IN ACCORDANCE WITH RSD. 1110.01. PAYMENT FOR WOOD POSTS, 3 LB STEEL U-CANAL 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.

DETAIL A

- USE 5 MPH SPEED LIMIT OR SPEED LIMIT NOT COVERED BY THE REGIONAL TRAFFIC ENGINEER.

DETAIL B

- NOTE: SIGN NOT REQUIRED IF ADVANCE WARNING LIMITS ARE UNDERWAY. IF CONSTRUCTION LIMITS ARE THAT RAMP INTERSECTS AND CONSTRUCTION SIGNS HAVE BEEN PLACED ALONG -Y- LINE, SIGNS SHOULD BE PLACED NEAR TERMINAL, SIGNS SHOULD IF LIMITS ARE NEAR RAMP EXIT RAMPS.

DETAIL C

- WITH ROADWAY WORK ZONE COVERED.

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

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, SLB 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.

LEGEND

- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
TWO-WAY UNDIVIDED (L-LINES)

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

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 3 CONSECUTIVE DAYS.

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

Ⅰ STATIONARY SIGN
← DIRECTION OF TRAFFIC FLOW
### 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 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. Place cones thru the work area at the maximum spacing equal in feet to 2 times the posted speed limit divided by 20.
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 traffic in any one direction 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.

### 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. Do not install more than one (11) 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 pilot car operations.

### General Notes for Temporary Lane Closures

1. Refer to RSD. 1101.11, sheets 1 & 4, for "L" distance and sign spacing.
2. Install lane closures with 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. Place cones thru the work area at the maximum spacing equal in feet to 2 times the posted speed limit divided by 20.
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 traffic in any one direction 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.

### Legend
- **FLAGGER**
- **CONE**
- **PORTABLE SIGN**
- **DIRECTION OF TRAFFIC FLOW**
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. Place cones adjacent to the work area at the maximum spacing equal in feet to 2 times the posted speed limit. Place cones separating opposing traffic at the maximum spacing of 25 feet.

4. 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).

5. TMAs are required when adequate buffer space cannot be attained. Position TMAs to maintain a roll-ahead distance as recommended by the manufacturer.

6. Drums or skinny drums may be used in lieu of cones. Refer to RSD. 1180.01 for skinny drum requirements.

7. Do not exceed a 1 mile lane closure length unless otherwise shown in the TMP or as directed by the engineer.

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 25 ft in advance of the flaggers. For signalized intersections, place signals in the flash mode and use law enforcement.

**GENERAL NOTES**
TEMPORARY LANE CLOSURES

1- IF NECESSARY USE THIS RSD. FOR ONE-WAY CITY TYPE STREETS WHERE SIGNS MAY BE MOUNTED ON BOTH SIDES OF THE ROADWAY.

2- 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).

3- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT.

4- REFER TO RSD. 1101.11, SHEETS 1, 2, & 4, FOR "L" DISTANCE, BUFFER SPACE, AND SIGN SPACING.

5- REFER TO RSD. 1101.02, SHEETS 9 & 10, FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.

6- 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.

7- POSITION THE TMA TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER AND CONTINUOUSLY ADVANCE TMA AS WORK PROGRESSES.

8- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY, UNLESS DIRECTED OTHERWISE BY THE ENGINEER. PLACE CMS APPROXIMATELY 1/2 MILE IN ADVANCE OF THE FIRST W20-5 SIGN. IF TRAFFIC BACKS UP TO WHERE THE CMS IS INITIALLY PLACED, RELOCATE CMS 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP, MONITOR TRAFFIC, AND WHEN NECESSARY, MOVE CMS APPROXIMATELY 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP.

9- DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

GENERAL NOTES

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

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

DIVIDED MULTI-LANE ROADWAY - 1 LANE CLOSED
(ROADWAYS < 60 MPH)

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

SHEET 3 OF 14
1. If necessary use this RSD. for one-way city type streets where signs may be mounted on both sides of the roadway.
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).
3. 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.
4. Refer to RSD. 1101.11, Sheets 1 & 2, for "L" distance and buffer space.
5. Refer to RSD. 1101.02, Sheets 9 & 10, for treatment of lane closures thru interchanges.
6. 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.
7. Position the TMA to maintain a roll-ahead distance as recommended by the manufacturer and continuously advance TMA's as work progresses.
8. Place changeable message sign (CMS) on the outside of the travelway as directed by the engineer. Place CMS approximately 1 mile in advance of anticipated backup. Continue to monitor traffic. Move CMS approximately 1/2 mile in advance of anticipated backup.
9. Do not exceed a 2 mile lane closure length unless otherwise shown in the TMP or as directed by the engineer.

**GENERAL NOTES**

**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

**DEPT. OF TRANSPORTATION**

**RALEIGH, N.C.**

**STATE OF NORTH CAROLINA DIVISION OF TRANSPORTATION**

**State of North Carolina**

**DEPT. OF TRANSPORTATION**
TEMPORARY LANE CLOSURES

1- WEAVE LANE CLOSURES ARE TO BE USED ONLY ON DIVIDED, CONTROLLED ACCESS ROADWAYS, WITH POSTED SPEED LIMITS OF 55 MPH, OR GREATER.

2- PLACE FLASHING ARROW BOARDS (FAB) ON THE SHOULDER (PAVED OR UNPAVED). PLACE FAB WITHIN THE TAPER IF SHOULDER DO NOT EXIST. WILL THE REQUIREMENTS FOR STOPPING DISTANCE AT THE FAB LOCATION. IF NEEDED, EXTEND THE LANE CLOSURE AT THE BUFFER SPACE SUCH THAT STOPPING DISTANCE TO THE BEGINNING OF THE LANE CLOSURE OR FAB IS MET (REFER TO RSD. 1101.11, SHEET 2).

3- THE MAXIMUM SPACING OF DRUMS ALONG THE BUFFER SPACE AND WORK AREA SHALL BE EQUAL IN FEET TO (2) TIMES THE POSTED SPEED LIMIT.

4- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR VALUES OF "L" AND SIGN SPACING INTERVALS.

5- REFER TO RSD. 1101.02, SHEETS 9 & 10, FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.

6- 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.

7- LANE CLOSURE SWITCHES TO BE PERFORMED BY A ROLLING ROADBLOCK OPERATION. (REFER TO RSD 1101.03, SHEET 9)

8- POSITION THE TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER AND CONTINUOUSLY ADVANCE TMAs AS WORK PROGRESSES.

9- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY UNLESS DIRECTED OTHERWISE BY THE ENGINEER. PLACE CMS 1 MILE IN ADVANCE OF THE FIRST VAN-Signs. IF TRAFFIC BACKS UP TO WHERE THE CMS IS INITIALLY PLACED, RELOCATE THE CMS 1 MILE IN ADVANCE OF ANTICIPATED BACKUP. MONITOR TRAFFIC, AND WHEN NECESSARY, MOVE CMS 1 MILE IN ADVANCE OF ANTICIPATED BACKUP.

10- 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.

11- DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
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.

LEGEND

- FLASHING ARROW BOARD
- FLASHING ARROW BOARD (96"x48" MIN.), "CAUTION MODE"
- TRUCK MOUNTED ATTENUATOR (TMA)
- DRUM
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW
GENERAL NOTES

1. REFER TO RSD. 1101.02, SHEET 3.

2. THE FIRST FLASHING ARROW BOARDS ARE NOT REQUIRED ON FACILITIES \( \leq 55 \text{ MPH} \).

LEGEND

- FLASHING ARROW BOARD
- FLASHING ARROW BOARD
  \((96" \times 48" \text{ MIN.}), \text{"CAUTION MODE"}\)
- TRUCK MOUNTED ATTENUATOR (TMA)
- DRUM
- PORTABLE SIGN
- CHANGEABLE MESSAGE SIGN (CMS)
- DIRECTION OF TRAFFIC FLOW
GENERAL NOTES

1. IF THE EXISTING ACCELERATION DISTANCE OR A MINIMUM OF 400' ACCELERATION DISTANCE IS UNATTAINABLE, CLOSE THE RAMP.

2. STOP SIGNS SHALL NEVER BE USED IN LIEU OF A R1-2 'YIELD' SIGN AT THE END OF AN ENTRANCE RAMP.

3. USE THE ABOVE DETAILS IN CONJUNCTION WITH A RIGHT LANE CLOSURE AS SHOWN ON RSD 1101.02, SHEET 3.

4. MOUNT SIGNS SHOWN A MINIMUM OF 5' ABOVE THE PAVEMENT ELEVATION.

5. CLOSE THE RIGHT LANE SUFFICIENTLY IN ADVANCE TO STABILIZE MOTOR VEHICLE TRAFFIC FLOW BEFORE THE MERGE AS SHOWN ON RSD 1101.02, SHEET 3.

6. INSTALL W4-5P BELOW THE YIELD AHEAD SIGN (AS SHOWN) TO ALERT MOTORISTS IF THE ACCELERATION DISTANCE HAS BEEN REDUCED.

7. COORDINATE WITH THE ENGINEER FOR LOCATION OF CMS.

STATE OF \nR A L E I G H, N.C.
DIVISION OF HIGHWAYS
DEPT. OF TRANSPORTATION
NORTH CAROLINA

ROADWAY STANDARD DRAWING FOR TEMPORARY LANE CLOSURES THRU ENTRANCE RAMPS

TEMPORARY LANE CLOSURES

NO MERGE AREA

CHANGEABLE MESSAGE SIGN (CMS)

DRUM

PORTABLE SIGN

DIRECTION OF TRAFFIC FLOW
TEMPORARY LANE CLOSURES

RIGHT LANE CLOSURES THRU EXIT RAMPS

GENERAL NOTES

1. USE THE ABOVE DETAIL IN CONJUNCTION WITH A RIGHT LANE CLOSURE AS SHOWN ON SHEET 1.

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 MOUNTING EXIT SIGNS A MINIMUM OF 5 FEET ABOVE THE PAVEMENT ELEVATION.

TEMPORARY LANE CLOSURES

ROADWAY STANDARD DRAWING FOR

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
1. The following options may be used for advance warning signs:
   A. Truck mounted signs
   B. Portable 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 view 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 accommodate 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's 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.

GENERAL NOTES

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 (48"x48" MIN.), "CAUTION MODE"
GENERAL NOTES

1- 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.

2- CMS SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.

3- 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.

4- 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.

5- 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.

6- RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.

7- IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.

8- ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAY ITEMS FOR PAVEMENT MARKING AND MARKERS.

9- 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.

10- 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.

11- 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.

12- 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.
GENERAL NOTES

1- IF NECESSARY 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 "ROAD CLOSED TO THRU TRAFFIC" IN THE EVENT THAT TRAFFIC MUST BE MAINTAINED BEYOND THE DETOUR POINT.

5- DO NOT DISPLAY FRACTIONS OR DECIMALS ON SIGN R11-3 "ROAD CLOSED XX MILES AHEAD".

6- POSITION WING BARRICADES ON THE SHOULDERS AND SLOPE THE STRIPES DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING.

7- USE PORTABLE SIGNS IF ROAD CLOSURE IS TO BE IMPLEMENTED FOR LESS THAN THREE DAYS, OR FOR EMERGENCIES.
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.
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).
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. THE USE OF WIDE PAVEMENT MARKING LINES ARE RECOMMENDED.

4. 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 AND USING LOW SPEED CROSSOVERS DESIGNED FOR AT LEAST 20 MPH BELOW THE POSTED SPEED LIMIT.

2. LIMIT THE DISTANCE BETWEEN TEMPORARY CROSSOVERS TO 1/2 MILE.

3. REFER TO RSD. 1101.02, SHEET 3, FOR RIGHT LANE CLOSURE NOTES.

4. SEPARATE 2-WAY TRAFFIC USING DRUMS OR SKINNY DRUMS.

5. 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.

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
- DIRECTION OF TRAFFIC FLOW

STATE OF NORTH CAROLINA
DEPARTMENT OF TRAFFIC
DIVISION OF HIGHWAYS
RALEIGH, N.C.
GENERAL NOTES

1. USE STATIONARY SIGNS FOR OPERATIONS THAT WILL REMAIN IN EFFECT LONGER THAN 3 CONSECUTIVE DAYS.

2. IF NECESSARY, USE FLAGGERS OR LAW ENFORCEMENT TO DIRECT TRAFFIC AT RAMP TERMINAL AS DIRECTED BY THE PLANS OR THE ENGINEER.

3. IF RAMP TERMINAL IS SIGNALIZED, PLACE SIGNALS IN FLASH MODE AND USE LAW ENFORCEMENT TO DIRECT TRAFFIC.

4. DISPLAY CHANGEABLE MESSAGE SIGN (CMS) MESSAGES AS SHOWN OR AS DEEMED NECESSARY BY THE ENGINEER.

5. REFER TO NOTES ON RSD 1101.02, SHEET 3.
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 REOPENING 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.
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 (CMS), 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.

GENERAL NOTES

LEGEND

- CHANGEABLE MESSAGE SIGN (CMS)
- PILOT VEHICLE WITH TMA
- FLASHING ARROW BOARD (96"x48" MIN.), "CAUTION MODE"
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW
- LAW ENFORCEMENT
TEMPORARY SHOULDER CLOSURES

SHOULDER CLOSURE ON CONTROLLED ACCESS FACILITIES

SHOULDER CLOSURE ON DIVIDED FACILITIES

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 3 DAYS.

4. REFER TO RSD. 1101.11, SHEETS 1, 3 & 4, FOR "L" DISTANCE, BARRIER FLARE RATES, AND SIGN SPACING.

LEGEND

- DRUM
- STATIONARY SIGN
- PORTABLE SIGN
- PORTABLE CONCRETE BARRIER
- DIRECTION OF TRAFFIC FLOW
- TEMPORARY CRASH CUSHION
ROADSIDE ACCESS POINT

2-LANE, 2-WAY ROADS

ACCESS POINT

TRUCK ENTRANCE

MULTILANE ROADS

ACCESS POINT

HAUL ROADS FOR 2-LANE, 2-WAY ROADWAYS

SIGN 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, SWEET, 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

STATIONARY SIGN
PORTABLE SIGN
DIRECTION OF TRAFFIC FLOW
**DURING LANE CLOSURE**

Detail shown for left side, same principle applies for right side accesses.

Extend drum length so truck can merge to existing traffic speed.

- Designate drum length so truck can merge to existing traffic speed.

Refer to RSD. 1101-11, Sheet 3 for barrier flare rates.

CRASH CUSHION IS REQUIRED WHEN BARRIER GAP IS 0'.

**ALL Lanes Open**

Detail shown for left side, same principle applies for right side accesses.

Extend drum length so truck can merge to existing traffic speed.

Refer to RSD. 1101-11, Sheet 3 for barrier flare rates.

CRASH CUSHION IS REQUIRED WHEN BARRIER GAP IS 0'.

**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.

**LEGEND**

- Portable concrete barrier
- Temporary crash cushion
- Drum
- Stationary sign
- Direction of traffic flow
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 ON THE MAINLINE AS SHOWN 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 DETERMINE 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 IS SPECIFIED). USE PILOT VEHICLES TO BRING TRAFFIC TO A STOP OPTING 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.

3. DETERMINE LOCATIONS WHERE TRAFFIC IS TO BE STOPPED BEFORE PROCEEDING WITH THE BLASTING ZONE. 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.
EXAMPLE OF "L" & "W" DESIGNATIONS

TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS TAPER LENGTH

UPSTREAM TAPER ...........................................L MINIMUM
SHIFTING TAPER ...........................................1/2 L MINIMUM
SHOULDER TAPER ...........................................L MAXIMUM
TWO WAY TRAFFIC TAPER .................................50 - 100 FEET MAXIMUM

DOWNSTREAM TAPER ......................................100 FEET MAXIMUM

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


c

<table>
<thead>
<tr>
<th>POSTED SPEED &quot;S&quot; (MPH)</th>
<th>LATERAL WIDTH &quot;W&quot; (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>10 15 20 30 35 40 50 55 60 70 75 80</td>
</tr>
<tr>
<td>25</td>
<td>15 25 35 45 55 65 75 85 95 105 115 125</td>
</tr>
<tr>
<td>30</td>
<td>15 30 45 60 75 90 105 120 135 150 165 180</td>
</tr>
<tr>
<td>35</td>
<td>25 45 65 85 105 125 145 165 185 205 225 245</td>
</tr>
<tr>
<td>40</td>
<td>30 55 80 110 135 160 190 215 240 270 295 320</td>
</tr>
<tr>
<td>45</td>
<td>45 90 135 180 225 270 315 360 405 450 495 540</td>
</tr>
<tr>
<td>50</td>
<td>50 100 150 200 250 300 350 400 450 500 550 600</td>
</tr>
<tr>
<td>55</td>
<td>55 110 165 220 275 330 385 440 495 550 605 660</td>
</tr>
<tr>
<td>60</td>
<td>60 120 180 240 300 360 420 480 540 600 680 720</td>
</tr>
<tr>
<td>65</td>
<td>65 130 195 260 325 390 455 520 585 650 715 760</td>
</tr>
<tr>
<td>70</td>
<td>70 140 210 280 350 420 490 560 630 700 770 840</td>
</tr>
</tbody>
</table>

GENERAL NOTES

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

\[ L_{\text{MIN}} = \frac{W \times S^2}{60} \]

- SPEED LIMIT
  - 40 MPH OR LESS
  - 45 MPH OR GREATER

\[ L = \text{MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)} \]
\[ W = \text{WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)} \]
\[ S = \text{POSTED SPEED LIMIT, OR OFF-PEAK 85 PERCENTILE SPEED IN MPH PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH} \]

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.
### Traffic Control Design Tables

#### Minimum Sight Distance

<table>
<thead>
<tr>
<th>Design Speed (MPH)</th>
<th>Stopping Sight Distance (Feet)</th>
<th>Passing Sight Distance (Feet)</th>
<th>Minimum Longitudinal Buffer Space (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>200</td>
<td>1080</td>
<td>85</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
<td>1280</td>
<td>120</td>
</tr>
<tr>
<td>40</td>
<td>300</td>
<td>1470</td>
<td>155</td>
</tr>
<tr>
<td>45</td>
<td>360</td>
<td>1625</td>
<td>195</td>
</tr>
<tr>
<td>50</td>
<td>425</td>
<td>1835</td>
<td>240</td>
</tr>
<tr>
<td>55</td>
<td>495</td>
<td>1985</td>
<td>290</td>
</tr>
<tr>
<td>60</td>
<td>570</td>
<td>2135</td>
<td>345</td>
</tr>
<tr>
<td>65</td>
<td>645</td>
<td>2285</td>
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</tr>
<tr>
<td>70</td>
<td>730</td>
<td>2480</td>
<td>470</td>
</tr>
<tr>
<td>75</td>
<td>820</td>
<td>2580</td>
<td>540</td>
</tr>
<tr>
<td>80</td>
<td>910</td>
<td>2680</td>
<td>615</td>
</tr>
</tbody>
</table>

#### 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.**

4. **Use of minimum passing sight distance table in traffic control plan applications includes providing sight distance requirements for placement of pavement marking passing/no-passing zones for 2-lane, 2-way roadways.**
### Temporary Barrier Flare Rates

<table>
<thead>
<tr>
<th>Posted Speed Limit (MPH)</th>
<th>Unanchored (A:B)</th>
<th>Anchored (A:B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 30</td>
<td>7 : 1</td>
<td>8 : 1</td>
</tr>
<tr>
<td>35</td>
<td>8 : 1</td>
<td>9 : 1</td>
</tr>
<tr>
<td>40</td>
<td>8 : 1</td>
<td>10 : 1</td>
</tr>
<tr>
<td>45</td>
<td>10 : 1</td>
<td>12 : 1</td>
</tr>
<tr>
<td>50</td>
<td>11 : 1</td>
<td>14 : 1</td>
</tr>
<tr>
<td>55</td>
<td>12 : 1</td>
<td>16 : 1</td>
</tr>
<tr>
<td>60</td>
<td>14 : 1</td>
<td>18 : 1</td>
</tr>
<tr>
<td>65</td>
<td>15 : 1</td>
<td>19 : 1</td>
</tr>
<tr>
<td>70</td>
<td>15 : 1</td>
<td>20 : 1</td>
</tr>
</tbody>
</table>

**General Notes**

1. Refer to the 2011 roadside design guide or the latest edition.
2. A barrier is considered flared when it is not parallel to the edge of the travelway.
### Advance Warning Sign Spacing Chart

<table>
<thead>
<tr>
<th>Posted Speed Limit (MPH)</th>
<th>Recommended Distance Between Signs (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 35</td>
<td>200 200 200</td>
</tr>
<tr>
<td>40-50</td>
<td>350 350 350</td>
</tr>
<tr>
<td>55</td>
<td>500 500 500</td>
</tr>
<tr>
<td>Controlled Access Roads (≤ 55)</td>
<td>1000 1500 2700</td>
</tr>
</tbody>
</table>

### General Notes

1. Refer to 2009 MUTCD or the latest edition.

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 NCHRP 350 COMPLIANT AND 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.
**1.** All traffic control devices, including breakaway systems for ground mounted sign supports, comply with all NCHRP Report 350 requirements and 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.

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**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.** 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).**
STATIONARY WORK ZONE SIGNS

1110.01

PERFORATED SQUARE STEEL TUBING

1- POSTS SHALL BE 2½” x 2½” 12 GAUGE STEEL.
2- ANCHORS SHALL BE 3” x 3” 7 GAUGE STEEL.
3- CONNECTIONS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

GENERAL NOTES

NATURAL GROUND

3” x 3” x 7 GA.
HEAVY DUTY ANCHOR

POST TO ANCHOR FASTENER DETAIL

MAXIMUM

MINIMUM

DEPTH

EMBEDMENT

36" - 42"

POST

ANCHOR

3½"
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. ALL PORTABLE SIGNS AND STANDS MUST MEET OR EXCEED THE REQUIREMENTS OF NCHRP 350 FOR CATEGORY II DEVICES. 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

<table>
<thead>
<tr>
<th>PANEL TYPE</th>
<th>MINIMUM SIZE (W x H INCHES)</th>
<th>MINIMUM LEGIBILITY DISTANCE (MILES)</th>
<th>MINIMUM NUMBER OF ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>96 x 48</td>
<td>1</td>
<td>15</td>
</tr>
</tbody>
</table>

TYPICAL FLASHING ARROW BOARD

- Recessed yellow elements
- Non-reflective flat black

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 department’s approved products list.
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.
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 BALLASTS THAT DO NOT PRESENT A HAZARD WHEN STRUCK.

2. ALL CONES MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.
GENERAL NOTES

1- HORIZONTAL RAILS FOR 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 NCHRP 350 CRASH TESTED FOR CATEGORY II DEVICES AND 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 SIGNS R11-3 OR R11-4 ARE REQUIRED BY THE PLANS OR DIRECTED BY THE ENGINEER.

5- BARRICADE MUST BE NCHRP 350 FOR CATEGORY II DEVICES AND NCDOT APPROVED WITH STABILIZER BAR OR ADEQUATE LATERAL BRACING.

6- ASSEMBLY OF THE GENERIC BARRICADES MUST BE SELF CERTIFIED BY THE ASSEMBLER.

7- 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.

8- 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 TOWARDS THE CENTER OF THE BARRICADE OR BARRICADES.

9- USE RED AND WHITE STRIPES FOR PERMANENT BARRICADES.

10- ALL BARRICADES MUST BE LISTED ON THE DEPARTMENT’S APPROVED PRODUCTS LIST.

11- PLACE MANUFACTURER’S NAME AND FEDERAL HIGHWAY ADMINISTRATION’S NCHRP 350 APPROVAL LETTER NUMBER ON BARRICADE FRAME.

12- 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.
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.

NOTE: FOR OPERATIONS THAT ARE RESTRICTED FROM DUSK TO DAWN ONLY, USE REFLECTORIZED LEGENDS, BORDERS AND BACKGROUNDS.
YELLOW RETROREFLECTIVE SHEETING

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

*The TMA depicted is for demonstrative purposes only. This does not imply a specific type of attenuator may or may not be used.

FULLY OPERATIONAL TRAILER WARNING LIGHTS

YELLOW STRIPES RETROREFLECTIVE SHEETING

TMA DELINEATION

Entire end of attenuator shall be delineated non-reflective black stripes.

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

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR TRUCK MOUNTED ATTENUATOR

1-18

1-18
GENERAL NOTES

1. THE DRAINAGE/LIFT SLOT SHOWN IS A MODIFICATION OF THE LIFT OPENINGS. ALL OTHER DESIGN CRITERIA SUCH AS REINFORCEMENT BARS ETC. ARE THE SAME AS SHOWN ON THE STANDARD DRAWING.

2. BARRIER WITH DRAINAGE/LIFT SLOT IS INTENDED TO BE USED IN AREAS WHERE ROADWAY SURFACE WATER RUNOFF CAUSES EXCESS PUDDLING ADJACENT TO THE TEMPORARY BARRIER. INSTALL THE BARRIER AS SHOWN IN THE PLANS, OR AS DIRECTED BY THE ENGINEER.

3. DRAINAGE/SLOT CAN BE USED WITH ANCHORED "PORTABLE CONCRETE BARRIER".
ROADWAY STANDARD DRAWING FOR PORTABLE CONCRETE BARRIER ANCHORED

NOTE: REFER TO STD. DWG. 1170.01-SHEET 4 FOR METHODS OF ANCHORING TEMPORARY BARRIER.

DETAIL OF SLOT

AFTER CASTING, THE DIAMETER OF THE SLOT CAN VARY BETWEEN 1" AND 1-1/8".
PORTABLE CONCRETE BARRIER

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.
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 BARRIER 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. Use ballast as specified by the manufacturer. Do not place ballast on top of the drum. Place ballast in the base of the drum. Do not place ballast on the base of the drum.

2. Ballast will be a minimum of 15 pounds.

3. All skinny drums must be listed on the department's approved products list.

4. Refer to standard specifications for roads and instructions for additional requirements.

5. All skinny drums must be listed on the department's approved products list.

GENERAL NOTES:

- Typical ballast will be a minimum of 15 pounds.
- Ballast will be non-reflective color and not over 2" in height.
- Non-reflective surfaces. Show the letters and numbers using a 2-3" material. Place the name of the agency, contractor, or supplier on top of the drum.
- Use ballast as specified by the manufacturer. Do not place ballast on non-reflective color and not over 2" in height.

TYPICAL BALLAST:

- Typical ballast will be a minimum of 15 pounds.
- Ballast will be non-reflective color and not over 2" in height.
- Non-reflective surfaces. Show the letters and numbers using a 2-3" material. Place the name of the agency, contractor, or supplier on top of the drum.
- Use ballast as specified by the manufacturer. Do not place ballast on non-reflective color and not over 2" in height.

PRODUCTS LIST:

- All skinny drums must be listed on the department's approved products list.
- Refer to standard specifications for roads and instructions for additional requirements.
- Use ballast as specified by the manufacturer. Do not place ballast on non-reflective color and not over 2" in height.
- Non-reflective surfaces. Show the letters and numbers using a 2-3" material. Place the name of the agency, contractor, or supplier on top of the drum.
- Use ballast as specified by the manufacturer. Do not place ballast on non-reflective color and not over 2" in height.

ROADWAY STANDARD DRAWING FOR SKINNY DRUMS