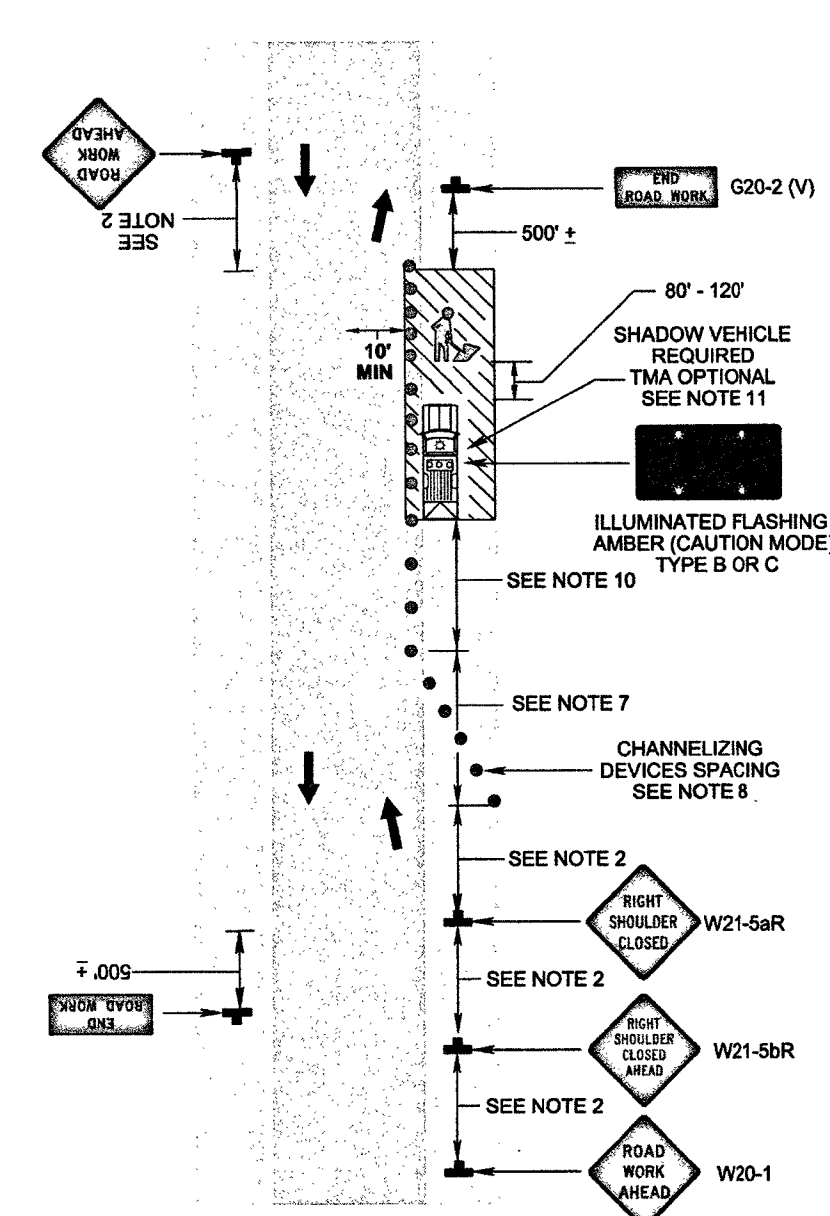


**Typical Traffic Control**  
**Shoulder Operation with Minor Encroachment**  
(Figure TTC-5.2)

**NOTES**

- Standard**
- For required sign assemblies for multi-lane roadways see Note 1, TTC-4.1
  - Sign spacing should be 1300'-1500' for Limited Access Highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.
  - When work takes up part of a lane on a high volume roadway, vehicular traffic volumes, vehicle mix, speed and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment analysis permits a remaining lane width of 10 feet, the lane should be closed. If the closure operation is on a Limited Access Highway, the minimum lane width is 11 feet.
- Option:**
- The ROAD WORK AHEAD (W20-1) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
- Standard:**
- A shadow vehicle with either an arrow board operating in the caution mode, or at least one high-intensity amber rotating, flashing, or oscillating light shall be parked 80' - 120' in advance of the first work crew.
  - Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or oscillating lights.
  - Taper length (L) and channelizing device spacing shall be at the following:
- | Speed Limit (mph) | Lane Width (Feet) |      |      |      | Remarks |
|-------------------|-------------------|------|------|------|---------|
|                   | 9                 | 10   | 11   | 12   |         |
| 25                | 50                | 105  | 115  | 125  | L+SVWD  |
| 30                | 50                | 135  | 150  | 165  | L+SVWD  |
| 35                | 50                | 155  | 175  | 195  | L+SVWD  |
| 40                | 50                | 185  | 205  | 225  | L+SVWD  |
| 45                | 50                | 215  | 235  | 255  | L+SVWD  |
| 50                | 50                | 245  | 265  | 285  | L+SVWD  |
| 55                | 50                | 275  | 295  | 315  | L+SVWD  |
| 60                | 50                | 305  | 325  | 345  | L+SVWD  |
| 65                | 50                | 335  | 355  | 375  | L+SVWD  |
| 70                | 50                | 365  | 385  | 405  | L+SVWD  |
| 75                | 50                | 395  | 415  | 435  | L+SVWD  |
| 80                | 50                | 425  | 445  | 465  | L+SVWD  |
| 85                | 50                | 455  | 475  | 495  | L+SVWD  |
| 90                | 50                | 485  | 505  | 525  | L+SVWD  |
| 95                | 50                | 515  | 535  | 555  | L+SVWD  |
| 100               | 50                | 545  | 565  | 585  | L+SVWD  |
| 105               | 50                | 575  | 595  | 615  | L+SVWD  |
| 110               | 50                | 605  | 625  | 645  | L+SVWD  |
| 115               | 50                | 635  | 655  | 675  | L+SVWD  |
| 120               | 50                | 665  | 685  | 705  | L+SVWD  |
| 125               | 50                | 695  | 715  | 735  | L+SVWD  |
| 130               | 50                | 725  | 745  | 765  | L+SVWD  |
| 135               | 50                | 755  | 775  | 795  | L+SVWD  |
| 140               | 50                | 785  | 805  | 825  | L+SVWD  |
| 145               | 50                | 815  | 835  | 855  | L+SVWD  |
| 150               | 50                | 845  | 865  | 885  | L+SVWD  |
| 155               | 50                | 875  | 895  | 915  | L+SVWD  |
| 160               | 50                | 905  | 925  | 945  | L+SVWD  |
| 165               | 50                | 935  | 955  | 975  | L+SVWD  |
| 170               | 50                | 965  | 985  | 1005 | L+SVWD  |
| 175               | 50                | 995  | 1015 | 1035 | L+SVWD  |
| 180               | 50                | 1025 | 1045 | 1065 | L+SVWD  |
| 185               | 50                | 1055 | 1075 | 1095 | L+SVWD  |
| 190               | 50                | 1085 | 1105 | 1125 | L+SVWD  |
| 195               | 50                | 1115 | 1135 | 1155 | L+SVWD  |
| 200               | 50                | 1145 | 1165 | 1185 | L+SVWD  |
| 205               | 50                | 1175 | 1195 | 1215 | L+SVWD  |
| 210               | 50                | 1205 | 1225 | 1245 | L+SVWD  |
| 215               | 50                | 1235 | 1255 | 1275 | L+SVWD  |
| 220               | 50                | 1265 | 1285 | 1305 | L+SVWD  |
| 225               | 50                | 1295 | 1315 | 1335 | L+SVWD  |
| 230               | 50                | 1325 | 1345 | 1365 | L+SVWD  |
| 235               | 50                | 1355 | 1375 | 1395 | L+SVWD  |
| 240               | 50                | 1385 | 1405 | 1425 | L+SVWD  |
| 245               | 50                | 1415 | 1435 | 1455 | L+SVWD  |
| 250               | 50                | 1445 | 1465 | 1485 | L+SVWD  |
| 255               | 50                | 1475 | 1495 | 1515 | L+SVWD  |
| 260               | 50                | 1505 | 1525 | 1545 | L+SVWD  |
| 265               | 50                | 1535 | 1555 | 1575 | L+SVWD  |
| 270               | 50                | 1565 | 1585 | 1605 | L+SVWD  |
| 275               | 50                | 1595 | 1615 | 1635 | L+SVWD  |
| 280               | 50                | 1625 | 1645 | 1665 | L+SVWD  |
| 285               | 50                | 1655 | 1675 | 1695 | L+SVWD  |
| 290               | 50                | 1685 | 1705 | 1725 | L+SVWD  |
| 295               | 50                | 1715 | 1735 | 1755 | L+SVWD  |
| 300               | 50                | 1745 | 1765 | 1785 | L+SVWD  |
| 305               | 50                | 1775 | 1795 | 1815 | L+SVWD  |
| 310               | 50                | 1805 | 1825 | 1845 | L+SVWD  |
| 315               | 50                | 1835 | 1855 | 1875 | L+SVWD  |
| 320               | 50                | 1865 | 1885 | 1905 | L+SVWD  |
| 325               | 50                | 1895 | 1915 | 1935 | L+SVWD  |
| 330               | 50                | 1925 | 1945 | 1965 | L+SVWD  |
| 335               | 50                | 1955 | 1975 | 1995 | L+SVWD  |
| 340               | 50                | 1985 | 2005 | 2025 | L+SVWD  |
| 345               | 50                | 2015 | 2035 | 2055 | L+SVWD  |
| 350               | 50                | 2045 | 2065 | 2085 | L+SVWD  |
| 355               | 50                | 2075 | 2095 | 2115 | L+SVWD  |
| 360               | 50                | 2105 | 2125 | 2145 | L+SVWD  |
| 365               | 50                | 2135 | 2155 | 2175 | L+SVWD  |
| 370               | 50                | 2165 | 2185 | 2205 | L+SVWD  |
| 375               | 50                | 2195 | 2215 | 2235 | L+SVWD  |
| 380               | 50                | 2225 | 2245 | 2265 | L+SVWD  |
| 385               | 50                | 2255 | 2275 | 2295 | L+SVWD  |
| 390               | 50                | 2285 | 2305 | 2325 | L+SVWD  |
| 395               | 50                | 2315 | 2335 | 2355 | L+SVWD  |
| 400               | 50                | 2345 | 2365 | 2385 | L+SVWD  |
| 405               | 50                | 2375 | 2395 | 2415 | L+SVWD  |
| 410               | 50                | 2405 | 2425 | 2445 | L+SVWD  |
| 415               | 50                | 2435 | 2455 | 2475 | L+SVWD  |
| 420               | 50                | 2465 | 2485 | 2505 | L+SVWD  |
| 425               | 50                | 2495 | 2515 | 2535 | L+SVWD  |
| 430               | 50                | 2525 | 2545 | 2565 | L+SVWD  |
| 435               | 50                | 2555 | 2575 | 2595 | L+SVWD  |
| 440               | 50                | 2585 | 2605 | 2625 | L+SVWD  |
| 445               | 50                | 2615 | 2635 | 2655 | L+SVWD  |
| 450               | 50                | 2645 | 2665 | 2685 | L+SVWD  |
| 455               | 50                | 2675 | 2695 | 2715 | L+SVWD  |
| 460               | 50                | 2705 | 2725 | 2745 | L+SVWD  |
| 465               | 50                | 2735 | 2755 | 2775 | L+SVWD  |
| 470               | 50                | 2765 | 2785 | 2805 | L+SVWD  |
| 475               | 50                | 2795 | 2815 | 2835 | L+SVWD  |
| 480               | 50                | 2825 | 2845 | 2865 | L+SVWD  |
| 485               | 50                | 2855 | 2875 | 2895 | L+SVWD  |
| 490               | 50                | 2885 | 2905 | 2925 | L+SVWD  |
| 495               | 50                | 2915 | 2935 | 2955 | L+SVWD  |
| 500               | 50                | 2945 | 2965 | 2985 | L+SVWD  |
| 505               | 50                | 2975 | 2995 | 3015 | L+SVWD  |
| 510               | 50                | 3005 | 3025 | 3045 | L+SVWD  |
| 515               | 50                | 3035 | 3055 | 3075 | L+SVWD  |
| 520               | 50                | 3065 | 3085 | 3105 | L+SVWD  |
| 525               | 50                | 3095 | 3115 | 3135 | L+SVWD  |
| 530               | 50                | 3125 | 3145 | 3165 | L+SVWD  |
| 535               | 50                | 3155 | 3175 | 3195 | L+SVWD  |
| 540               | 50                | 3185 | 3205 | 3225 | L+SVWD  |
| 545               | 50                | 3215 | 3235 | 3255 | L+SVWD  |
| 550               | 50                | 3245 | 3265 | 3285 | L+SVWD  |
| 555               | 50                | 3275 | 3295 | 3315 | L+SVWD  |
| 560               | 50                | 3305 | 3325 | 3345 | L+SVWD  |
| 565               | 50                | 3335 | 3355 | 3375 | L+SVWD  |
| 570               | 50                | 3365 | 3385 | 3405 | L+SVWD  |
| 575               | 50                | 3395 | 3415 | 3435 | L+SVWD  |
| 580               | 50                | 3425 | 3445 | 3465 | L+SVWD  |
| 585               | 50                | 3455 | 3475 | 3495 | L+SVWD  |
| 590               | 50                | 3485 | 3505 | 3525 | L+SVWD  |
| 595               | 50                | 3515 | 3535 | 3555 | L+SVWD  |
| 600               | 50                | 3545 | 3565 | 3585 | L+SVWD  |
| 605               | 50                | 3575 | 3595 | 3615 | L+SVWD  |
| 610               | 50                | 3605 | 3625 | 3645 | L+SVWD  |
| 615               | 50                | 3635 | 3655 | 3675 | L+SVWD  |
| 620               | 50                | 3665 | 3685 | 3705 | L+SVWD  |
| 625               | 50                | 3695 | 3715 | 3735 | L+SVWD  |
| 630               | 50                | 3725 | 3745 | 3765 | L+SVWD  |
| 635               | 50                | 3755 | 3775 | 3795 | L+SVWD  |
| 640               | 50                | 3785 | 3805 | 3825 | L+SVWD  |
| 645               | 50                | 3815 | 3835 | 3855 | L+SVWD  |
| 650               | 50                | 3845 | 3865 | 3885 | L+SVWD  |
| 655               | 50                | 3875 | 3895 | 3915 | L+SVWD  |
| 660               | 50                | 3905 | 3925 | 3945 | L+SVWD  |
| 665               | 50                | 3935 | 3955 | 3975 | L+SVWD  |
| 670               | 50                | 3965 | 3985 | 4005 | L+SVWD  |
| 675               | 50                | 3995 | 4015 | 4035 | L+SVWD  |
| 680               | 50                | 4025 | 4045 | 4065 | L+SVWD  |
| 685               | 50                | 4055 | 4075 | 4095 | L+SVWD  |
| 690               | 50                | 4085 | 4105 | 4125 | L+SVWD  |
| 695               | 50                | 4115 | 4135 | 4155 | L+SVWD  |
| 700               | 50                | 4145 | 4165 | 4185 | L+SVWD  |
| 705               | 50                | 4175 | 4195 | 4215 | L+SVWD  |
| 710               | 50                | 4205 | 4225 | 4245 | L+SVWD  |
| 715               | 50                | 4235 | 4255 | 4275 | L+SVWD  |
| 720               | 50                | 4265 | 4285 | 4305 | L+SVWD  |
| 725               | 50                | 4295 | 4315 | 4335 | L+SVWD  |
| 730               | 50                | 4325 | 4345 | 4365 | L+SVWD  |
| 735               | 50                | 4355 | 4375 | 4395 | L+SVWD  |
| 740               | 50                | 4385 | 4405 | 4425 | L+SVWD  |
| 745               | 50                | 4415 | 4435 | 4455 | L+SVWD  |
| 750               | 50                | 4445 | 4465 | 4485 | L+SVWD  |
| 755               | 50                | 4475 | 4495 | 4515 | L+SVWD  |
| 760               | 50                | 4505 | 4525 | 4545 | L+SVWD  |
| 765               | 50                | 4535 | 4555 | 4575 | L+SVWD  |
| 770               | 50                | 4565 | 4585 | 4605 | L+SVWD  |
| 775               | 50                | 4595 | 4615 | 4635 | L+SVWD  |
| 780               | 50                | 4625 | 4645 | 4665 | L+SVWD  |
| 785               | 50                | 4655 | 4675 | 4695 | L+SVWD  |
| 790               | 50                | 4685 | 4705 | 4725 | L+SVWD  |
| 795               | 50                | 4715 | 4735 | 4755 | L+SVWD  |
| 800               | 50                | 4745 | 4765 | 4785 | L+SVWD  |
| 805               | 50                | 4775 | 4795 | 4815 | L+SVWD  |
| 810               | 50                | 4805 | 4825 | 4845 | L+SVWD  |
| 815               | 50                | 4835 | 4855 | 4875 | L+SVWD  |
| 820               | 50                | 4865 | 4885 | 4905 | L+SVWD  |
| 825               | 50                | 4895 | 4915 | 4935 | L+SVWD  |
| 830               | 50                | 4925 | 4945 | 4965 | L+SVWD  |
| 835               | 50                | 4955 | 4975 | 4995 | L+SVWD  |
| 840               | 50                | 5000 | 5000 | 5000 | L+SVWD  |
- Channelizing Device Spacing**
- | Location   | Speed Limit (mph) | Location Spacing | Speed Limit (mph) | Location Spacing |
|------------|-------------------|------------------|-------------------|------------------|
| Transition | 20' - 40'         | Freeway          | 0' - 35'          | 35' ±            |
- \*Construction access spacing may be increased to this distance, but shall not exceed one access per 1/4 mile.
- On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.**
- The buffer space length The buffer space length shall be as shown in Table 611-3 on Page 611-5 for the posted speed limit.**
- A track-mounted attenuator (TMA) shall be used on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.**
- When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.**
- 1: Revision 1 - 4/1/2015  
2: Revision 2 - 9/1/2019

**Shoulder Operation with Minor Encroachment**  
(Figure TTC-5.2)



1: Revision 1 - 4/1/2015  
2: Revision 2 - 9/1/2019

**TRAFFIC MANAGEMENT PLAN NOTES:**

1. GIVEN THE MINIMAL WORK THAT IS REQUIRED WITHIN THE PUBLIC RIGHT OF WAY OF DUNAHOO DRIVE, THIS IS DEFINED AS A CATEGORY 1 PROJECT INsofar AS TRAFFIC CONTROL REQUIREMENTS. THE ANTICIPATED WORK ELEMENTS WITHIN THE PUBLIC RIGHT OF WAY ARE:
  - 1.1. MINOR EXCAVATION TO