

SECTION 645 - TRAFFIC CONTROL DEVICES

645.01 Description. This work includes furnishing, installing, maintaining and subsequently removing traffic control devices according to the contract. * The work also includes services from flaggers and special duty police officers. The work shall conform to the latest edition of the MUTCD. |

645.02 Materials. Materials shall conform to the following: |

Signs	712.20
Reflector Marker	712.21
Traffic Delineator	712.46
Preformed Pavement Marking Tape	712.53
Sign Posts	713.11
Fasteners for Signs	713.12

The materials used in constructing barricades shall conform to the following general requirements: |

(A) **Lumber.** Lumber for rails, frames and braces shall be dry, sound, undamaged, well seasoned and free from defect that may impair their strength and durability. *

(B) **Hardware.** Nails shall be galvanized wire nails. The Contractor shall use as many and as large a size as is practicable. *

(C) **Paints.** Paints shall be exterior enamel paint of the best grade or first line as made by accepted manufacturers. |

(D) **Sheet Reflecting Material.** Sheet reflecting material shall conform to Subsection 712.20. |

(E) **Alternate Designs.** The Contractor may use alternate barricade designs such as plastic molded barricades subject to the Engineer's acceptance. The Contractor shall submit shop drawings or catalog cuts for acceptance. *

645.03 Construction Requirements. The Contractor shall furnish, install, and maintain barricades, signs, cones, delineators, lights, flashing signals, and other traffic control devices according to the contract. * The work shall be subject to Subsections 104.04 - Maintenance of Traffic, 104.05 - Construction and Maintenance of Detours, and 107.14 - Barricades and Warning Signs. * If conflict occurs between documents, the more restrictive requirements shall apply. |

TABLE 645-I - FOR TRAFFIC CONTROL PLAN						
POSTED SPEED LIMIT M.P.H.	SIGN SPACING (L) FEET	TAPER LENGTH (T) (FEET)		SPACING OF CONES OR DELINEATORS (FEET) ²		
		W = 12' OR LESS ²	W = GREATER THAN 12 ¹	TAPER	TANGENT	WORK AREA
20	250	200	W x 17	20	20	10
25	250	200	W x 17	25	25	10
30	250	250	W x 20	30	30	10
35	250	250	W x 20	35	35	10
40	500	350	W x 30	40	40	10
45	500	550	W x 45	45	45	10
50	1000	600	W x 50	50	50	10
55	1000	700	W x 55	55	55	10

NOTES: ¹ W = width of lane or offset
² not applicable for two-lane highways

The Engineer may direct the Contractor to provide special duty police officers for the control of traffic within the project limits. The Engineer will establish the number and placement of police officers. *

When directing, flaggers and/or police officers shall be in direct communication with each other. |

The Contractor shall be responsible for minor modifications at such locations as driveways and intersections. The Contractor shall submit the minor modifications for acceptance by the Engineer. Other Contractor-proposed deviation from the Traffic Control Plan(s) (TCP) shall be shown on its TCP. The Contractor shall submit its TCP for acceptance by the Engineer at least ten (10) days before work starts. *

Its TCP includes: *

- (1) signs and their placement, |
- (2) traffic movements shown by arrows, *
- (3) positions of flaggers, |

- (4) barricades, cones, delineators and their placement, and |
- (5) other pertinent information. |

The Engineer may direct the Contractor to provide additional traffic control devices not shown in the contract but deemed necessary for the protection of the work or the safety of the public. |

The Contractor shall place the sign or device farthest from the work area first. The Contractor shall then place the others progressively toward the work area. *|

The Contractor shall extend the cones or delineators to a point where the cones or delineators are visible to approaching traffic. *|

If the Contractor directs one direction of traffic into the opposing traffic lanes, the Contractor shall channelize the opposing traffic out of its lane first before shifting oncoming traffic into the lane. *|

If the Contractor uses signs with messages on both faces, the Contractor shall appropriately cover the inapplicable message to prevent its display. *|

The Contractor shall keep barricades, construction and warning signs, and other traffic control devices in good condition throughout their usage. The Contractor shall repair, repaint, clean or replace the barricades, signs or other devices as ordered by the Engineer and as required to maintain the effectiveness and appearance. The Engineer will be the sole judge in deciding the suitable condition of each barricade, sign, or other traffic control device. *|

The Contractor shall remove or cover regulatory and warning signs within the construction zone that conflicts with the TCP as ordered by the Engineer. The Contractor shall restore the signs upon completion of the work. *|

--The Contractor shall remove or cover construction and warning signs promptly if the message is not applicable or not in use. *|

At the end of each day's work, the Contractor shall remove traffic control devices that are no longer needed for the safe and free passage of public traffic. The Engineer will decide which traffic control devices that the Contractor shall remove. *|

The Contractor shall remove traffic control devices if the Contractor completes the work and no longer needs the devices. The Contractor shall remove the traffic control devices in the reverse order of installation, starting closest to the work area and continuing away from the area. *|

(A) Barricades

(1) **General.** The Contractor shall construct the barricades according to the contract. *

Barricades shall be in good condition. The Contractor shall submit barricades for acceptance by the Engineer for use within the project limits. Barricade application and installation shall be according to the contract and as ordered by the Engineer. *

The Contractor shall provide sand bags or other accepted weights if required or ordered by the Engineer. The Contractor shall not place sand bags or other accepted weights on the striped barricade rail. *

The Contractor shall require steady burn and/or flashing lamps on selected barricades used during hours of darkness. Locations shall be according to the contract and ordered by the Engineer. The Contractor shall attach the lamps on the barricade ends closest to the traveled way and shall be visible to the motorist. *

The Contractor may use the accepted barricades for temporary detours, construction phasing, or other temporary traffic control work. *

The Contractor may use the accepted barricades used in temporary detours or construction phasing for permanent locations according to the contract. *

Upon completion of the construction work, the Contractor shall leave the barricades in place, relocate the barricades, or remove and dispose the barricades according to the contract or ordered by the Engineer. Barricades left in place or relocated to new permanent locations shall become the property of the State. Barricades removed and dispose of shall become the property of the Contractor. *

(2) **Painting.** The Contractor shall give wooden rails, frames and braces one (1) prime coat and two (2) finish coats of new white exterior enamel paint. The Contractor may leave rail faces that the Contractor will reflectorize unpainted or ordered by the Engineer. *

(3) **Reflectorization.** The Contractor shall reflectorize barricade rails and the attachment of reflective sheeting according to the contract or ordered and accepted by the Engineer. *

The Contractor shall reflectorize both vertical faces of each barricade rail according to the contract. *

The Contractor shall reflectorize wooden rails with the following:

(a) Reflective sheeting according to Subsection 712.20(C)(4) *
- Type III or IV Retroreflective Sheeting (High Intensity) and
backed with a twenty-six (26) gage galvanized steel sheet, or

(b) A hardened aluminum backed retroreflective sheeting
according to Subsection 712.20(C)(5) - Hardened Aluminum *
Backed Retroreflective Sheeting.

(4) **Color.** Rails, frames and braces shall be white. The front and back faces of barricade rails shall have six (6) inch wide alternate colored and white stripes sloping downward toward the traveled way at an angle of forty-five (45) degrees with the vertical. The colored stripes shall be either orange or red according to the following requirements:

(a) The Contractor shall use orange and white stripes in the following conditions: *

1. Construction work.
2. Detours.
3. Maintenance work.

(b) The Contractor shall use red and white stripes in the following conditions: *

1. On roadways with no outlet such as dead-ends, cul-de-sacs.
2. Ramps or lanes closed for operational purposes.
3. Permanent or semi-permanent closure or termination of a roadway.

(5) **Maintenance.** The Contractor shall keep the barricades in good condition throughout their usage during construction. *

(6) The Contractor shall repair, repaint, clean or replace the barricades required and ordered by the Engineer to maintain their effectiveness and appearance.

The Contractor shall immediately replace lost, stolen or damaged barricades, lamps, sand bags and other approved weights.

The Contractor shall clean and repair the barricades used during construction phasing, temporary detours or other temporary traffic control work before relocating to permanent locations according to the contract or ordered by the Engineer.

The Engineer will not make payment for repair work, repainting, or cleaning of barricades. The Engineer shall decide the suitable condition of each barricade and when each barricade needs repairing, repainting, or cleaning.

(B) Traffic Delineators. The Contractor shall install traffic delineators to show the temporary alignment of detour roads according to the contract or ordered by the Engineer. The Contractor shall provide sand bags and other weights if required to prevent displacement.

The Contractor shall submit to the Engineer eight (8) sets of shop drawings or catalogue cuts for acceptance before ordering the traffic delineators.

The Contractor shall maintain the traffic delineators and keep the traffic delineators clean and in good repair. The Contractor shall replace lost, stolen or damaged traffic delineators immediately.

At the end of a detour phase, the Contractor shall relocate the traffic delineators and keep the traffic delineators clean and in good condition to the next detour phase. At the end of the construction period, the Contractor shall leave in place or remove the traffic delineators according to the contract or ordered by the Engineer. The traffic delineators will become the property of the Contractor when no longer required on the project.

645.04 Method of Measurement. If the proposal specifies "Traffic Control", the Engineer will measure the work shown on the applicable TCP, the accepted Contractor's TCP, according to the contract, or ordered by the Engineer on a force account basis.

If the proposal does not specify "Traffic Control", the Engineer will not measure such work including maintenance and removal operations.

If the proposal specifies "Additional Police Officers and/or Traffic Control Devices", the Engineer will measure additional police officers and/or traffic control devices according to the contract and as ordered by the Engineer on a force account basis. The Engineer will also measure maintenance and removal operations for additional devices on a force account basis.

If the proposal specifies "Type _____ Barricade", the Engineer will measure barricades per each furnished, installed and maintained.

If the proposal specifies "Type _____ Barricade with Lamp", the Engineer will measure the barricade with lamp on a force account basis.

If the proposal does not specify "Type _____ Barricade" and "Type _____ Barricade with Lamp", the Engineer will not measure such work. *|
*|

The Engineer will not measure barricades furnished and paid for under a separate proposal item such as detours and traffic control and subsequently repaired or cleaned for permanent installation. *|

The Engineer will measure traffic delineator per each complete in place. *|

The Engineer will measure the replacement of installed traffic delineators that are lost, stolen or damaged and not due to the Contractor's negligence and the relocating of traffic delineators to the next detour phase on a force account basis. The replacement shall be for the cost of materials only. *|
*|

If the proposal specifies "Additional Police Officers and/or Additional Traffic Control Devices", the Engineer will measure legal notices required by the Engineer on a force account basis. *|
*|

645.05 Basis of Payment. If the proposal specifies "Traffic Control", the Engineer will pay for the accepted work shown on the applicable TCP, the accepted Contractor's TCP, according to the contract, or ordered by the Engineer on a force account basis. *|
*|

If the proposal does not specify "Traffic Control", the Engineer will not pay for such work including maintenance and removal operations. The Engineer will consider "Traffic Control" incidental to the various contract item. *|
*|

If the proposal specifies "Additional Police Officers and/or Traffic Control Devices", the Engineer will pay for the additional police officers and/or traffic control devices according to the contract and as ordered by the Engineer on a force account basis. The Engineer will also pay for the maintenance and removal operations for additional devices on a force account basis. *|
*|

The Engineer will compute the actual amount paid for force account work according to Subsection 109.04 - Extra and Force Account Work. The amount may be more or less than the estimated amount in the proposal. *|
*|

If the proposal specifies "Type _____ Barricade" and/or "Type _____ Barricade with Lamp", the Engineer will pay for the accepted quantities of barricades per each furnished, installed and maintained. The price shall be full compensation for constructing; delivering, erecting; relocating; furnishing and installing sand bags and other accepted weights; and furnishing labors, equipments, materials, tools and incidentals necessary to complete the work. *|
*|

If the proposal does not specify "Type _____ Barricade" and "Type _____ Barricade with Lamp", the Engineer will not pay for the barricades separately. The Engineer will consider them incidental to the various contract items. *|
*|

The Engineer will pay for the accepted quantities of traffic delineators *|
 at the contract unit price per each. The price shall be full compensation for *|
 furnishing; installing; cleaning; maintaining correct placement; removing when *|
 required; furnishing and installing sand bags or other accepted weights; and *|
 furnishing labors, equipments, tools, materials and incidentals necessary to *|
 complete the work. *|

The Engineer will pay for the replacement of installed traffic *|
 delineators, barricades, and lamps lost, stolen or damaged and not due to the *|
 Contractor's negligence; and the relocating of traffic delineators to the next *|
 detour phase under "Construction and Maintenance of Detours" on a force *|
 account basis. The replacement shall be for the cost of materials only. *|

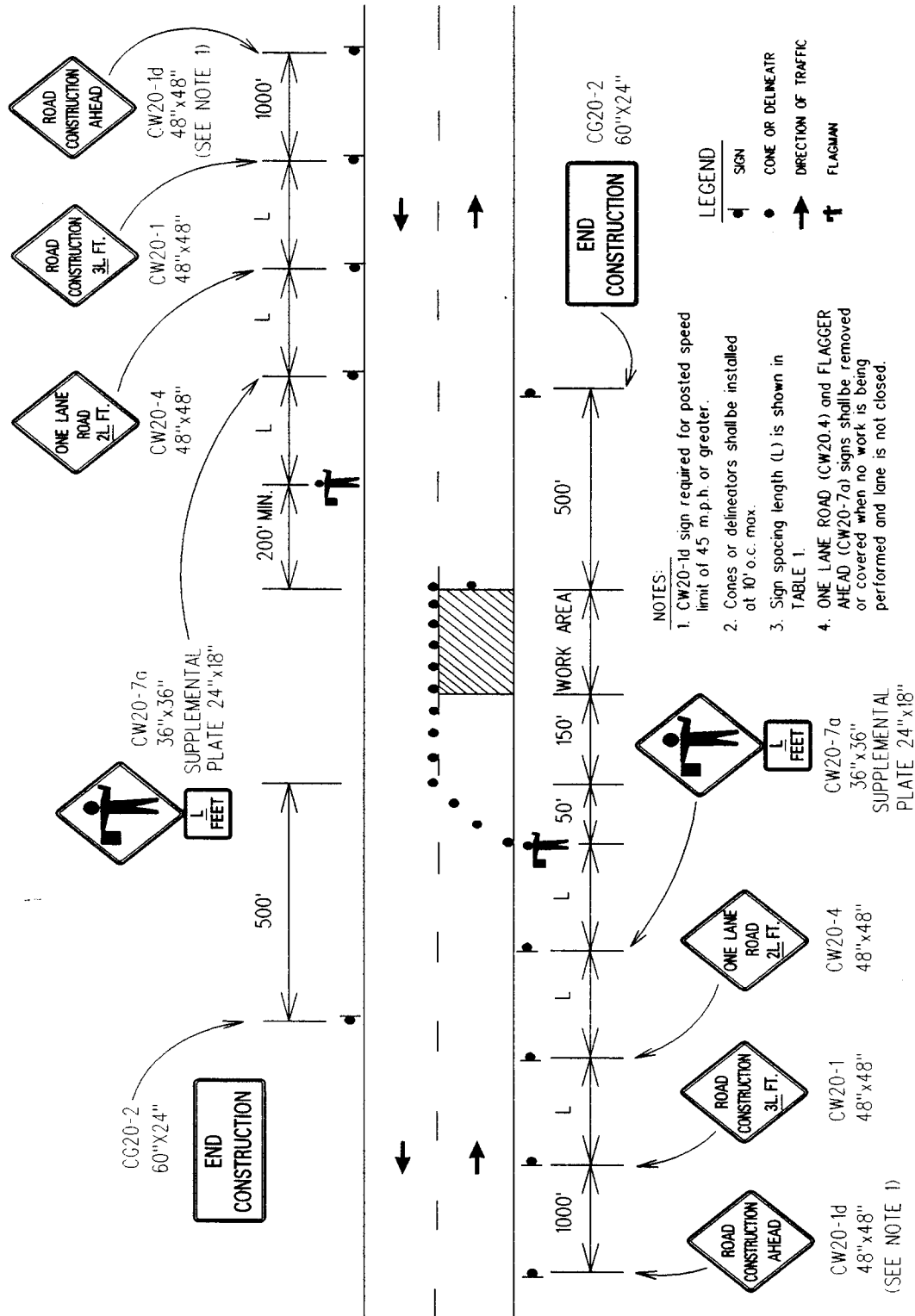
The Engineer will not pay for furnishing and maintaining traffic *|
 delineators used by the Contractor for its own operations separately. The *|
 Engineer will consider them incidental to the various contract items. *|

If the proposal specifies "Additional Police Officers and/or Additional *|
 Traffic Control Devices", the Engineer will pay for the legal notices *|
 required by the Engineer on a force account basis. The Contractor shall *|
 require a paid invoice from the newspaper agency. *|

If the proposal does not specify "Additional Police Officers and/or *|
 Additional Traffic Control Devices", the Engineer will not pay for the legal *|
 notices. The Engineer will consider the legal notice incidental to the *|
 various contract items. *|

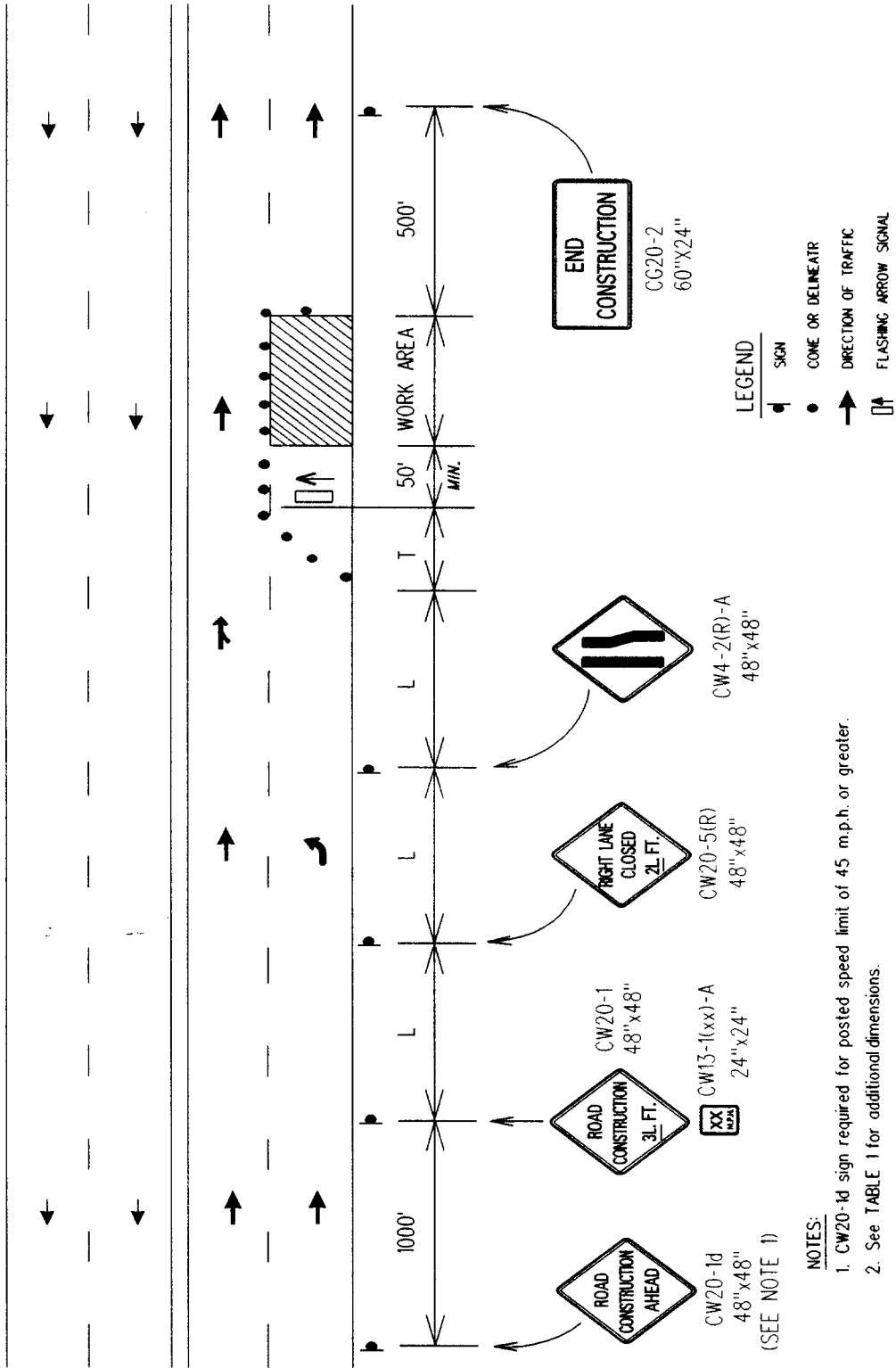
The Engineer will make payment under: *|

Pay Item	Pay Unit
Traffic Control	Force Account
Additional Police Officers and/or Traffic Control Devices	Force Account
Type _____ Barricade	Each
Type _____ Barricade with Lamp	Force Account
Traffic Delineator	Each
Construction and Maintenance of Detours	Force Account



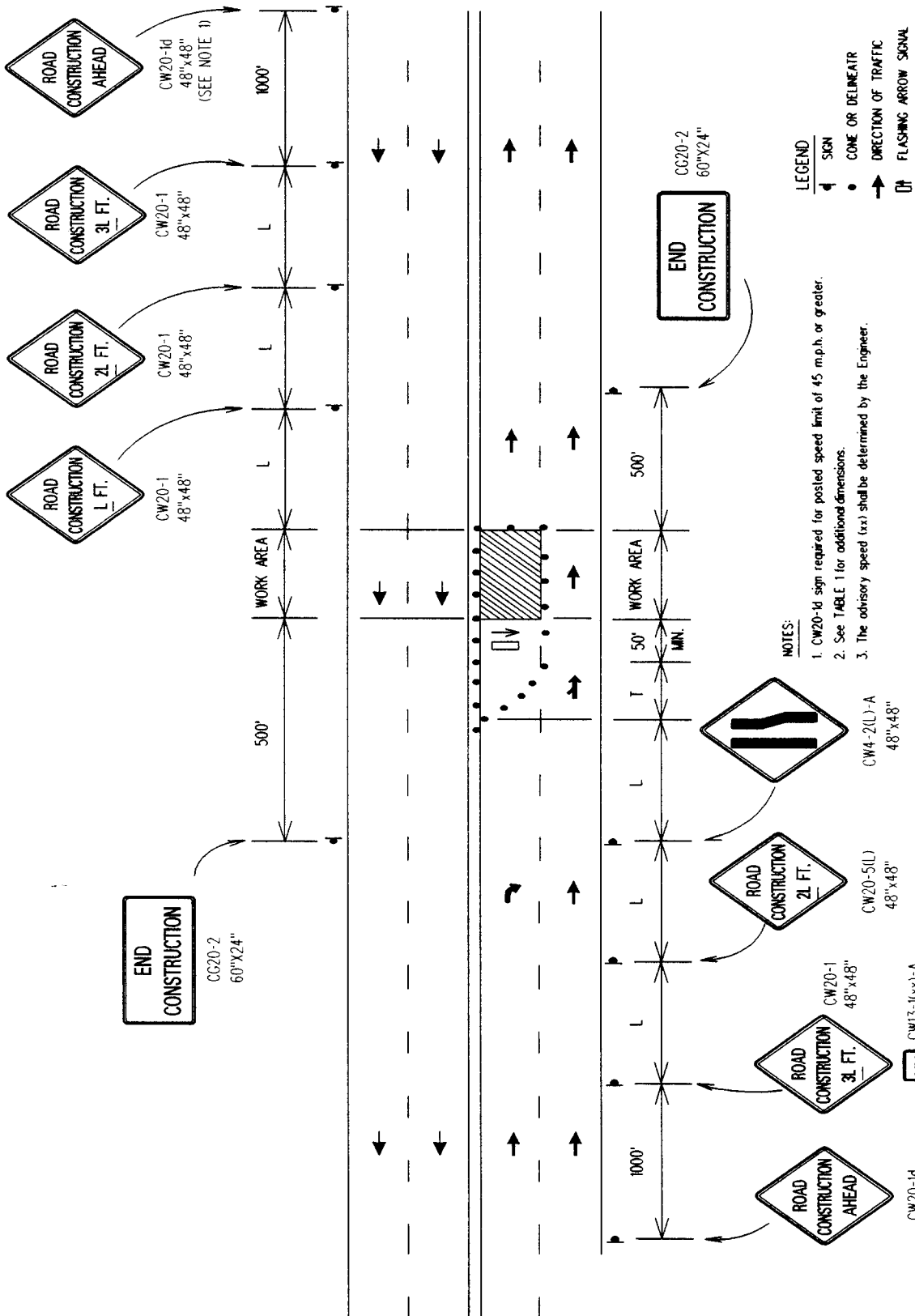
TWO-LANE HIGHWAY - ONE LANE CLOSED

FIGURE 1 - TRAFFIC CONTROL PLAN



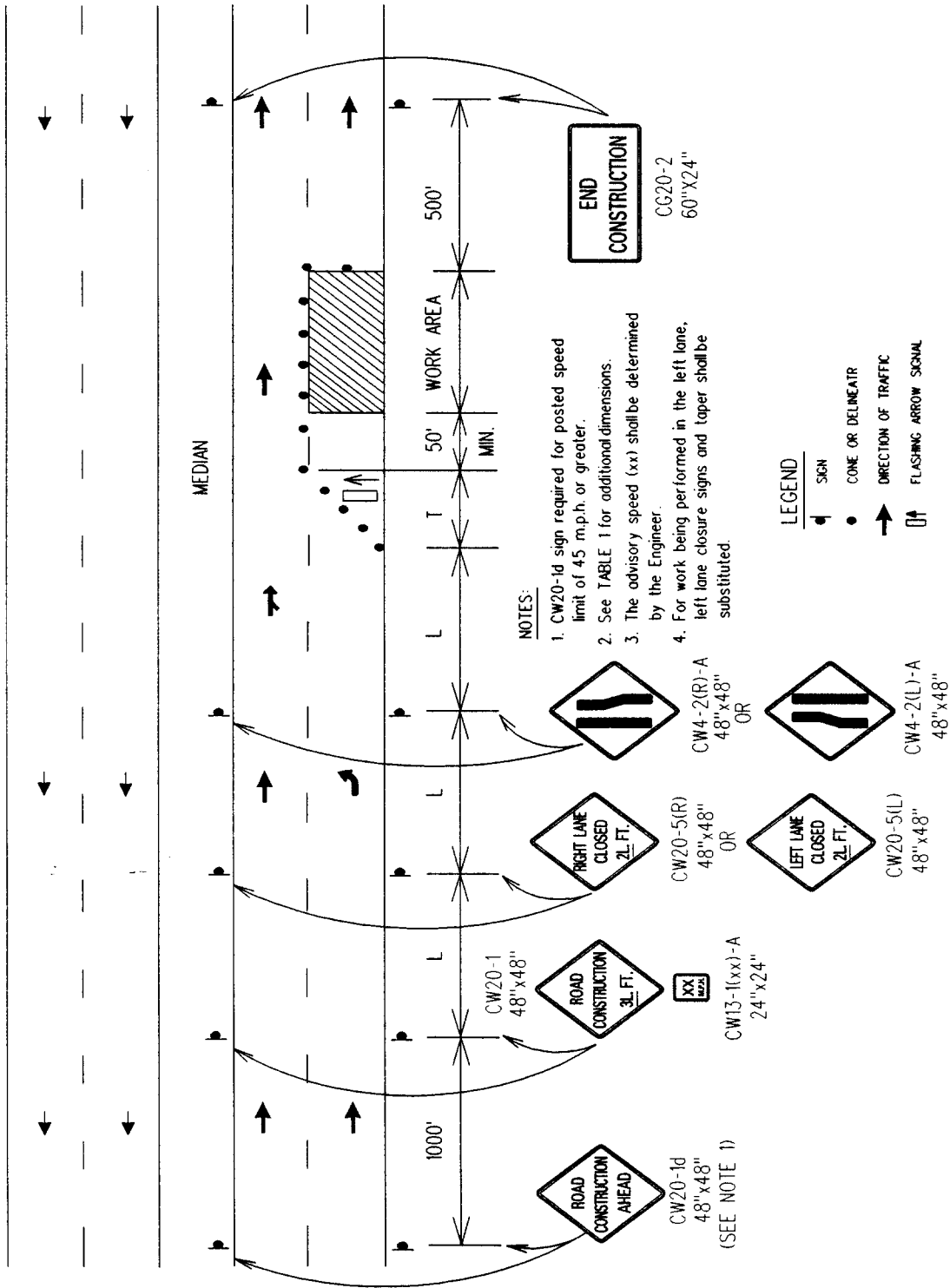
MULTILANE UNDIVIDED HIGHWAY - RIGHT LANE CLOSED

FIGURE 2 - TRAFFIC CONTROL PLAN



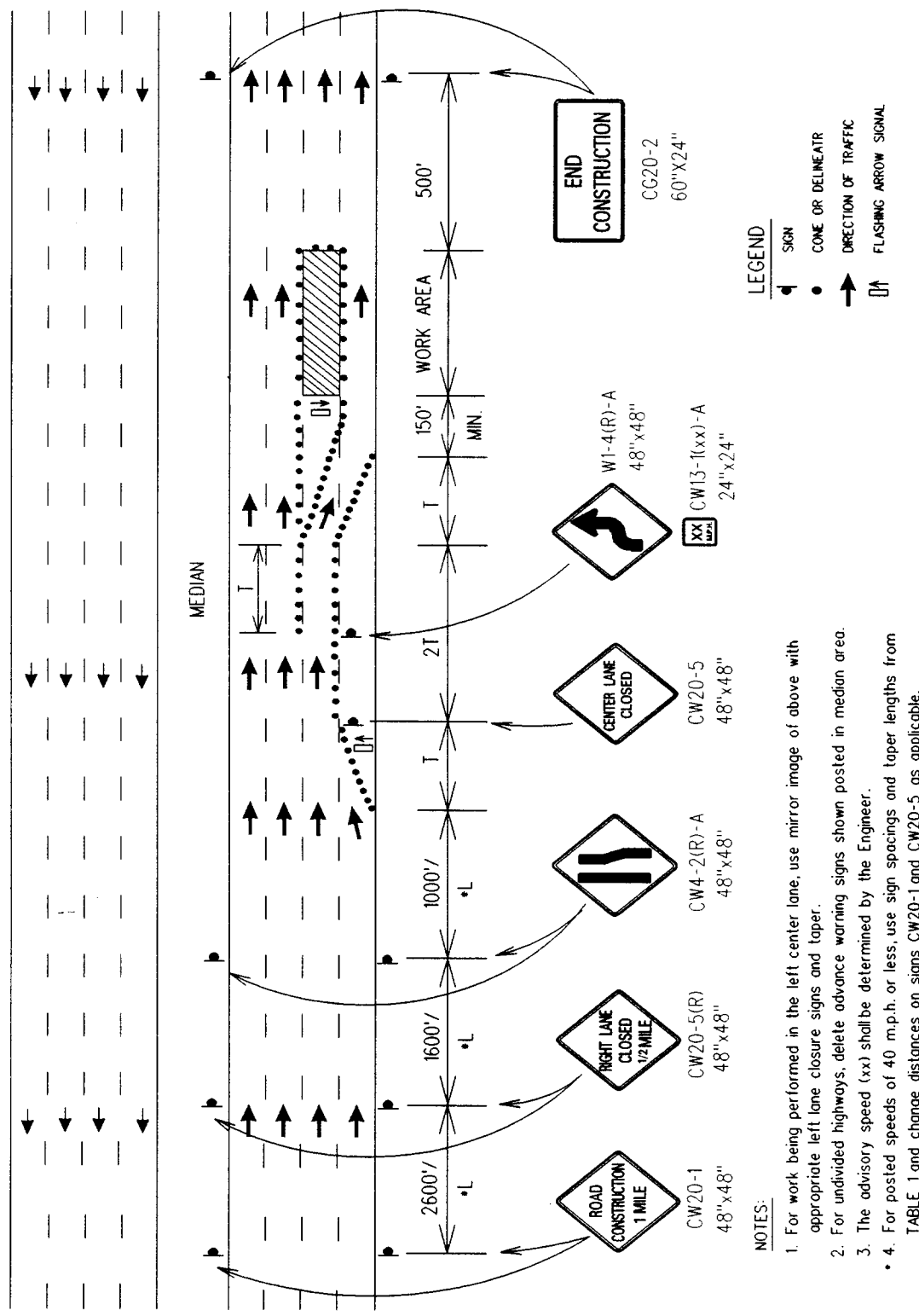
MULTILANE UNDIVIDED HIGHWAY - LEFT LANE CLOSED

FIGURE 3 - TRAFFIC CONTROL PLAN



MULTILANE DIVIDED HIGHWAY - ONE LANE CLOSED

FIGURE 4 - TRAFFIC CONTROL PLAN

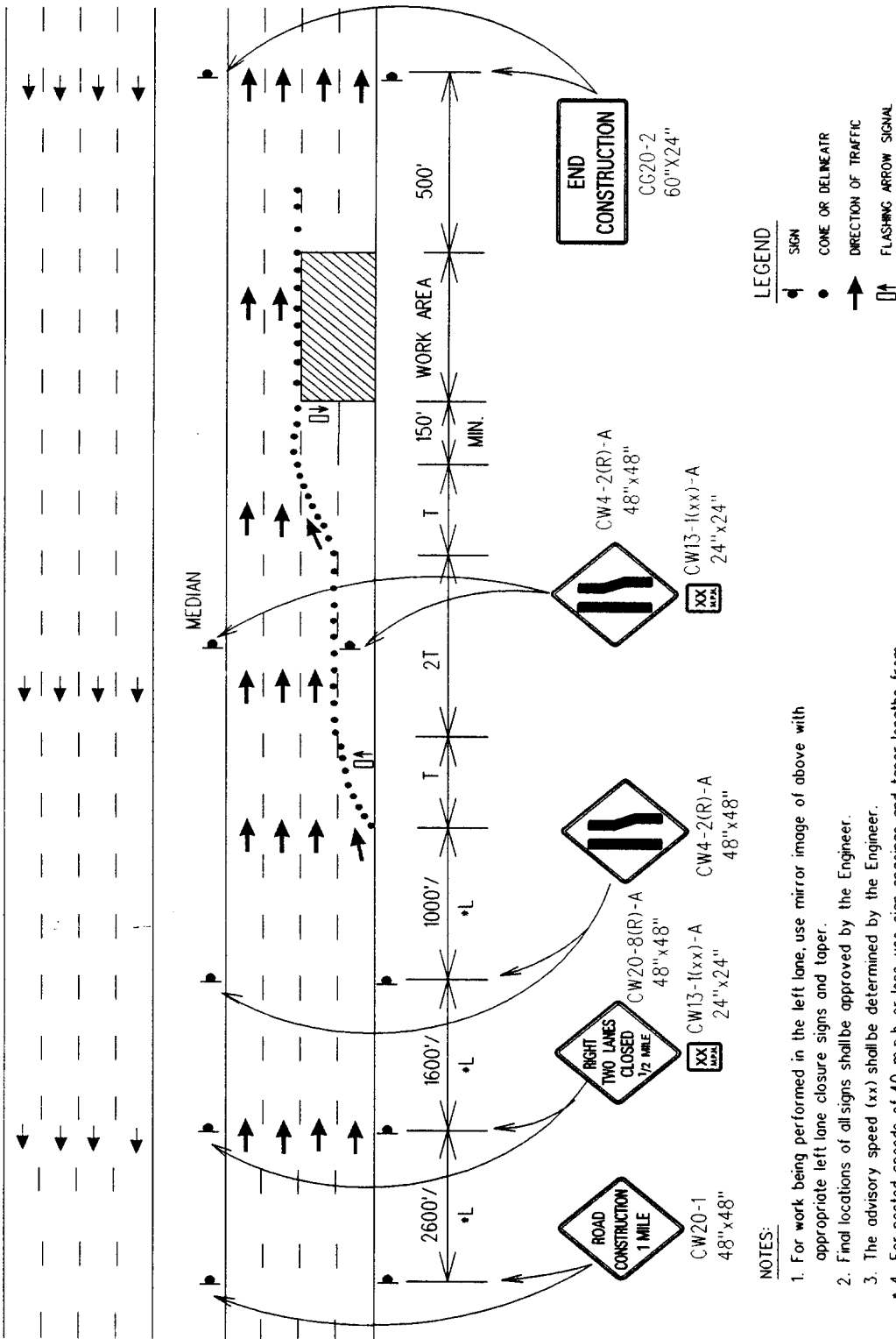


LEGEND

Symbol	Meaning
Sign symbol	SIGN
Circle with dot	CONE OR DELINEATOR
Arrow	DIRECTION OF TRAFFIC
Arrow with flashing symbol	FLASHING ARROW SIGNAL

- NOTES:**
1. For work being performed in the left center lane, use mirror image of above with appropriate left lane closure signs and taper.
 2. For undivided highways, delete advance warning signs shown posted in median area.
 3. The advisory speed (xx) shall be determined by the Engineer.
 4. For posted speeds of 40 m.p.h. or less, use sign spacings and taper lengths from TABLE 1 and change distances on signs CW20-1 and CW20-5 as applicable.

MULTILANE HIGHWAY - CENTER LANE CLOSED
 FIGURE 5 - TRAFFIC CONTROL PLAN



- NOTES:**
1. For work being performed in the left lane, use mirror image of above with appropriate left lane closure signs and taper.
 2. Final locations of all signs shall be approved by the Engineer.
 3. The advisory speed (xx) shall be determined by the Engineer.
 4. For posted speeds of 40 m.p.h. or less, use sign spacings and taper lengths from TABLE 1 and change distances on signs CW20-1 and CW20-a as applicable.

MULTILANE HIGHWAY - MULTIPLE LANE CLOSURE

FIGURE 6 - TRAFFIC CONTROL PLAN