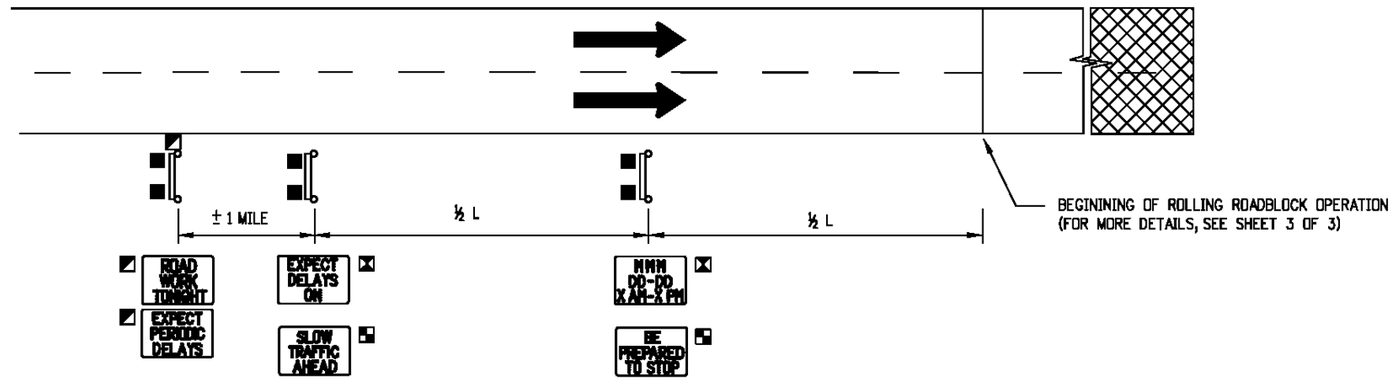

TYPICAL PLACEMENT OF VMS

SYMBOLS

- PORTABLE VARIABLE MESSAGE SIGN (VMS)
- LAW ENFORCEMENT VEHICLE WITH FLASHING RED AND BLUE LIGHTS
- DIRECTION OF TRAVEL
- CHANNELING DEVICE: FOR TYPE OF DEVICE TO BE USED, SEE SCHEDULE OF TRAFFIC CONTROL DEVICES INCLUDED IN THE PLANS.
- WORK AREA
- L — LENGTH OF ROLLING ROADBLOCK OPERATION
- TO BE PLACED ON DAY 1 OF THE ROLLING ROADBLOCK OPERATION
- TO BE PLACED ONE WEEK PRIOR TO ROLLING ROADBLOCK OPERATION
- TO BE PLACED DURING ROLLING ROADBLOCK OPERATION

GENERAL NOTES

1. ROLLING ROADBLOCK IS A TRAFFIC CONTROL TECHNIQUE TO SLOW (STOP, IF NEEDED) TRAFFIC TO FACILITATE SHORT DURATION WORK OPERATIONS WITHOUT AN ELABORATE AND DIFFICULT DETOUR. TRAFFIC CONTROL LAW ENFORCEMENT OFFICERS PACE, OR SLOW, THE TRAFFIC TO A SPEED THAT PROVIDES APPROXIMATELY 20-30 MINUTES TO PERFORM THE SPECIFIED CONSTRUCTION.
2. ON THE DAY OF THE ROLLING ROADBLOCK OPERATION, THE VARIABLE MESSAGE SIGN(S) SHALL BE REVISED TO INDICATE THE ACTIVITY WILL OCCUR THAT NIGHT OR DAY. THE ROLLING ROADBLOCK OPERATION BEGINS WITH A TRAFFIC CONTROL SUPERVISOR AT THE WORK SITE INITIATING THE PACING OPERATION IN ACCORDANCE WITH PACING DETAILS SHOWN ON SHEET 2. THE INTENT IS TO KEEP TRAFFIC MOVING, UNLESS THERE IS AN EMERGENCY.
3. TRUCK-MOUNTED ATTENUATOR(S) WITH VARIABLE MESSAGE SIGN(S) SHALL BE USED TO PROTECT CONSTRUCTION WORKERS AND/OR EQUIPMENT POSITIONED IN A TRAVEL LANE(S) AT THE WORK AREA DURING THE ROLLING ROADBLOCK OPERATION FROM AN ERRANT VEHICLE. IF NO WORKERS AND/OR EQUIPMENT ARE POSITIONED IN A TRAVEL LANE(S) AT THE WORK AREA, TRUCK-MOUNTED ATTENUATOR(S) SHALL NOT BE USED.
4. WHEN MORE THAN ONE ROLLING ROADBLOCK OPERATION IS REQUIRED IN ONE WORK PERIOD, THE CONTRACTOR SHALL ALLOW SUFFICIENT TIME BETWEEN ROLLING ROADBLOCK OPERATIONS TO PERMIT TRAFFIC TO RETURN TO NORMAL SPEEDS AND FLOW. ADDITIONAL TIME MAY BE REQUIRED BETWEEN ROLLING ROADBLOCK OPERATIONS TO ALLOW TRAFFIC TO RESUME NORMAL SPEEDS AND FLOW UPSTREAM OF THE WORK AREA, AS DETERMINED BY THE ENGINEER OR THE REGION TRAFFIC ENGINEER.

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STANDARD PLAN NO.
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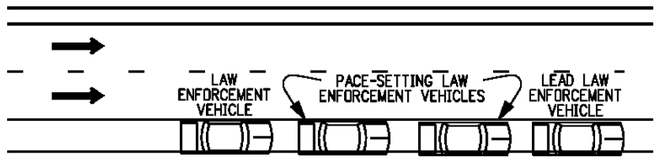
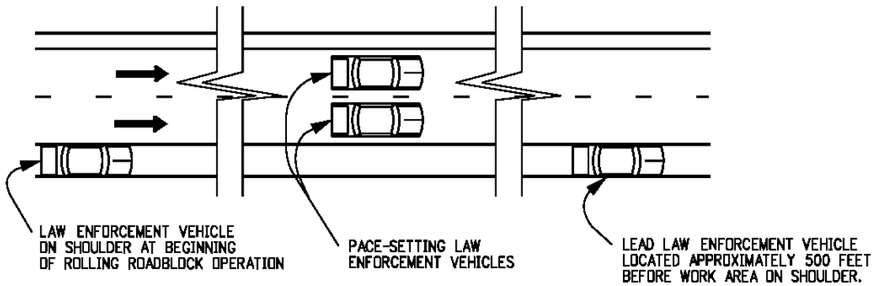


STAGE 1

STAGE 1 NOTE:

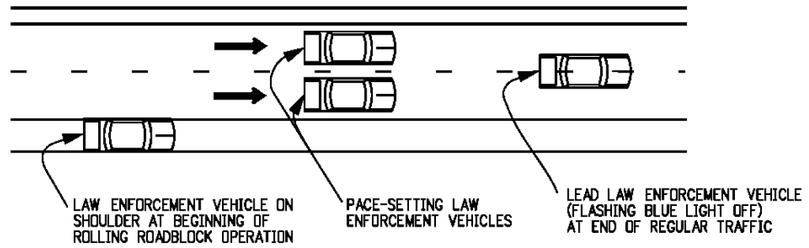
MINIMUM OF FOUR (4) LAW ENFORCEMENT VEHICLES LOCATED UPSTREAM OF THE WORK AREA AT THE BEGINNING LOCATION OF THE ROLLING ROADBLOCK OPERATION WITH FLASHING BLUE LIGHTS OFF.



STAGE 3

STAGE 3 NOTES:

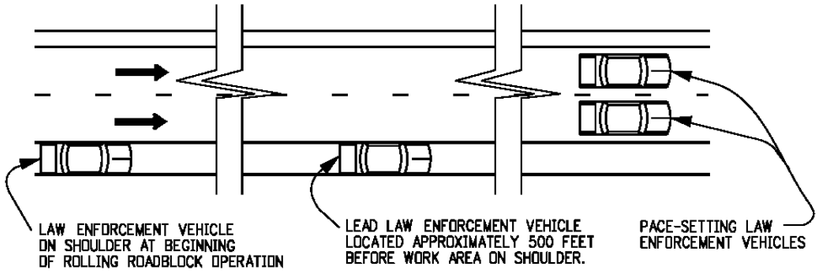
1. THE TWO (2) PACE-SETTING LAW ENFORCEMENT VEHICLES SHALL BEGIN TO SLOW TO THE PACING SPEED (10 MPH MINIMUM), FOR THE DURATION OF THE ROLLING ROADBLOCK OPERATION.
2. THE LEAD LAW ENFORCEMENT VEHICLE (FLASHING BLUE LIGHTS OFF) SHALL MATCH THE SPEED OF THE LAST VEHICLES AHEAD OF THE PACE-SETTING LAW ENFORCEMENT VEHICLES, AND CONTINUE FOLLOWING TRAFFIC UNTIL A POINT APPROXIMATELY 500 FEET IN ADVANCE OF THE WORK AREA. THE LEAD LAW ENFORCEMENT VEHICLE SHALL THEN COME TO A COMPLETE STOP ON THE RIGHT SHOULDER, AND TURN ON ITS' FLASHING BLUE LIGHTS. IF REQUIRED, CRASH TRUCKS WITH REAR-MOUNTED ATTENUATOR(S) AND CHANGEABLE MESSAGE SIGN(S) SHALL MOVE INTO THE TRAVEL LANES APPROXIMATELY 200 FEET UPSTREAM OF THE WORK AREA WITH THE IMPACT ATTENUATORS DOWN AND OPERATING ONCE TRAFFIC HAS CLEARED THE WORK AREA.



STAGE 2

STAGE 2 NOTE:

ONCE THE LAW ENFORCEMENT VEHICLES ARE IN PLACE AND THE LAW ENFORCEMENT SUPERVISOR AT THE WORK AREA NOTIFIES ALL LAW ENFORCEMENT OFFICERS INVOLVED TO BEGIN THE ROLLING ROADBLOCK OPERATION, THE LAST THREE (3) LAW ENFORCEMENT VEHICLES SHALL TURN ON THEIR FLASHING BLUE LIGHTS. THE FIRST THREE (3) LAW ENFORCEMENT VEHICLES SHALL ENTER THE TRAVEL LANES, WITH THE SECOND AND THIRD LAW ENFORCEMENT VEHICLES IMMEDIATELY FORMING A SIDE-BY-SIDE "PACING OPERATION" OF ALL LANES BEHIND THE LEAD LAW ENFORCEMENT VEHICLE (FLASHING BLUE LIGHTS OFF).

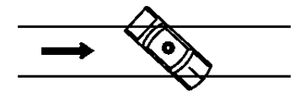


STAGE 4

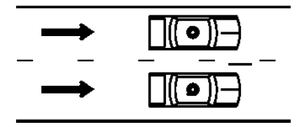
STAGE 4 NOTES:

1. WHEN THE PACE-SETTING LAW ENFORCEMENT VEHICLES ARE WITHIN APPROXIMATELY TWO (2) MILES OF THE WORK AREA, THEY SHALL NOTIFY THE ONSITE TRAFFIC CONTROL SUPERVISOR OF THEIR LOCATION. ONCE THE CONTRACTOR'S ON-SITE SUPERINTENDENT HAS BEEN NOTIFIED OF THE PACE-SETTING LAW ENFORCEMENT VEHICLES' LOCATION, THE CONTRACTOR SHALL BEGIN TO CLEAR THE TRAVEL LANES OF ALL EQUIPMENT AND DEBRIS IN ORDER TO REOPEN ALL TRAVEL LANES.
2. IN CASE OF EMERGENCY, THE PACE-SETTING LAW ENFORCEMENT VEHICLES SHALL COME TO A COMPLETE STOP ONCE THEY REACH THE LEAD POLICE VEHICLE. IF NO EMERGENCY IS ENCOUNTERED, THE CRASH TRUCK(S) SHALL BE MOVED FROM THE TRAVEL LANES, AND THE TWO (2) PACE-SETTING LAW ENFORCEMENT VEHICLES SHALL CLEAR THE WORK AREA AND IMMEDIATELY MOVE TO THE RIGHT SHOULDER OR AN AREA DESIGNATED BY THE TRAFFIC CONTROL SUPERVISOR, AND TURN OFF THE FLASHING BLUE LIGHTS. ONCE THE TWO (2) PACE-SETTING LAW ENFORCEMENT VEHICLES PASS THE WORK AREA, THE TRAFFIC CONTROL SUPERVISOR SHALL INSTRUCT THE LEAD AND LAST LAW ENFORCEMENT VEHICLES TO TURN OFF THEIR FLASHING BLUE LIGHTS.

TYPICAL APPLICATIONS
ROLLING ROADBLOCK - MULTI-LANE MAINLINE PACING DETAILS



ONE LANE RAMP



TWO LANE RAMP

TYPICAL APPLICATIONS
ROLLING ROADBLOCK - RAMP CLOSURE DETAILS

RAMP CLOSURE NOTES:

1. ONCE NOTIFIED BY THE TRAFFIC CONTROL SUPERVISOR TO BEGIN THE ROLLING ROADBLOCK OPERATION, EACH LAW ENFORCEMENT VEHICLE AT THE INDICATED RAMP SHALL TURN THEIR FLASHING BLUE LIGHTS ON, AND POSITION THE VEHICLE ACROSS THE RAMP LANE(S) TO CLOSE RAMP ACCESS.
2. ONCE THE ROLLING ROADBLOCK OPERATION PASSES THE CLOSED ON-RAMP, THE LAW ENFORCEMENT VEHICLE ON THE RAMP SHALL TURN OFF THEIR FLASHING BLUE LIGHTS, AND MOVE FROM THE RAMP LANE(S) TO ALLOW TRAFFIC TO ENTER THE MAINLINE ROLLING ROADBLOCK OPERATION.

GENERAL NOTES:

EACH LAW ENFORCEMENT OFFICER SHALL HAVE A MARKED VEHICLE WITH FLASHING BLUE LIGHTS FOR THE ROLLING ROADBLOCK OPERATION. THE LOCATION AND NUMBER OF LAW ENFORCEMENT OFFICERS AT EACH LOCATION SHALL BE AS FOLLOWS:

NO. OF LAW ENFORCEMENT VEHICLES*	FUNCTION	LOCATION
1, MINIMUM	SUPERVISOR	WORK AREA
1 LEAD VEHICLE	VARIES	MOBILE OPERATION
1 PER TRAVEL LANE	PACING OPERATION	MOBILE OPERATION BEGINNING X MILES UPSTREAM AND TERMINATING AT THE WORK AREA.
1 STATIONED AT BEGINNING OF ROLLING ROADBLOCK OPERATION	ADVANCED WARNING TO MOTORISTS	STATIONED AT THE BEGINNING OF ROLLING ROADBLOCK OPERATION
1 PER ENTRANCE RAMP	ENTRANCE RAMP ROADBLOCKS	ONE AT EACH OF THE ENTRANCE RAMPS UPSTREAM OF THE WORK AREA

* THERE SHALL BE AT LEAST ONE LAW ENFORCEMENT VEHICLE PER LANE. FINAL NUMBER OF LAW ENFORCEMENT VEHICLES SHALL BE DETERMINED BY THE LAW ENFORCEMENT AGENCY.

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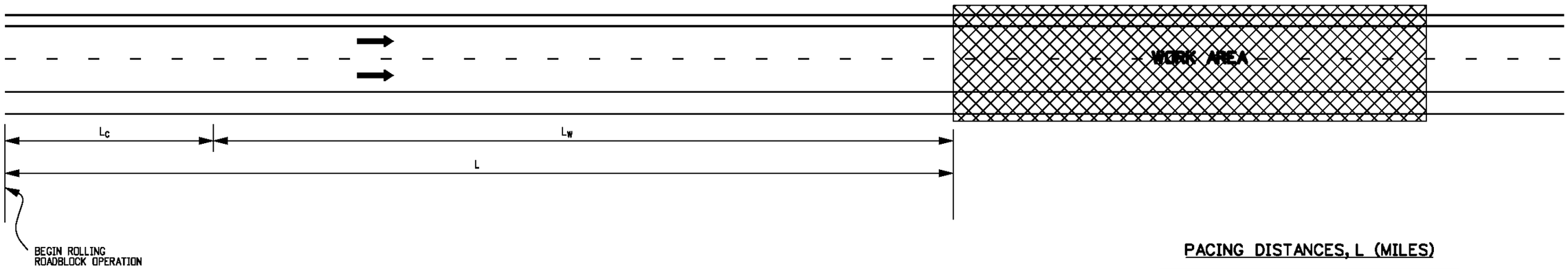

DESIGN NOTES:

1. THE DESIGN SHALL EVALUATE THE ACTUAL DISTANCE REQUIRED FOR THE ROLLING ROADBLOCK OPERATION BASED ON SITE-SPECIFIC FEATURES SUCH AS: ROADWAY GEOMETRICS, PACING SPEEDS, REGULATORY SPEEDS, INTERCHANGE SPACING, WORK DURATION, AVAILABILITY OF LAW ENFORCEMENT OFFICERS, TRAFFIC VOLUMES, AND MAXIMUM QUEUE LENGTH.
2. THE STARTING POINT OF A ROLLING ROADBLOCK OPERATION SHALL CONSIDER THE FOLLOWING FACTORS: THE SPEED OF THE PACING LAW ENFOCEMENT VEHICLES, THE LOCATION OF ENTRANCE RAMPS, HORIZONTAL AND VERTICAL ALIGNMENT OF THE FACILITY.
3. IN SOME INSTANCES, IT MAY BE NECESSARY TO CLOSE A LANE AT THE WORK SITE TO POSITION A CRANE(S) AND THE MATERIALS TO BE LIFTED.
4. ALL MATERIAL TO BE INSTALLED SHALL BE ON-SITE BEFORE THE ROLLING ROADBLOCK OPERATION BEGINS.
5. IT MAY BE NECESSARY TO INSTALL TEMPORARY BARRIER WALLS TO PROTECT PRE-POSITIONED AND ASSEMBLED MATERIALS IN THE RIGHT-OF-WAY.
6. THE MINIMUM SPEED ALLOWED FOR A PACING OPERATION IS 10 MPH.

S_R = REGULATORY SPEED, MPH

S_P = PACING SPEED, MPH

T_W = WORK DURATION, MINUTES

L = TOTAL PACING DISTANCE, MILES

$= \frac{T_W}{60} S_P \left(\frac{S_P}{S_R - S_P} + 1 \right)$

$= L_C + L_W$

L_C = DISTANCE PACE-SETTING LAW ENFORCEMENT VEHICLES SHALL TRAVEL BEFORE THE VEHICLES AT REGULATORY SPEED HAVE CLEARED THE WORK AREA.

$= \frac{\left(\frac{T_W}{60} \times S_P^2 \right)}{S_R - S_P}$

L_W = DISTANCE PACE-SETTING LAW ENFORCEMENT VEHICLES TRAVEL WHILE CONSTRUCTION WORK IS PERFORMED.

$= \left(\frac{T_W}{60} \times S_P \right)$

F_{HV} = HEAVY VEHICLE FACTOR

$= 1 + \left(\frac{P_T}{100} \times 0.50 \right)$

P_T = % TRUCKS

PACING DISTANCES, L (MILES)

S_R	S_P = 20 MPH PCPHPL <= 1,750					
	T_W (MIN.)					
	5	10	15	20	25	30
70	2.3	4.7	7.0	9.3	*	*
65	2.4	4.8	7.2	9.6	*	*
60	2.5	5.0	7.5	10.0	*	*
55	2.6	5.2	7.9	*	*	*
50	2.8	5.6	8.3	*	*	*

* SITE-SPECIFIC DESIGN REQUIRED

PACING DISTANCES NOTES:

Tw IS THE TOTAL TIME ALLOWED FOR WORK ACTIVITY, IN MINUTES. THIS TIME STARTS JUST AFTER THE LAST VEHICLE TRAVELING AT THE PRE-PACING REGULATORY SPEED CLEARS THE WORK AREA AND ENDS JUST AS THE ROLLING ROADBLOCK OPERATION REACHES THE WORK AREA. Tw MUST INCLUDE THE TIME REQUIRED TO CLEAR THE ROADWAY OF EQUIPMENT, MATERIALS, AND PERSONNEL.

DEMAND VOLUME MAY NOT EXCEED 1,750 PCPHPL WITHOUT A SITE-SPECIFIC DESIGN. TRAFFIC COUNTS CAN BE OBTAINED FROM THE REGION TRAFFIC ENGINEER, OR YOU MAY NEED TO COLLECT TRAFFIC COUNTS. HOURLY DIRECTIONAL TRAFFIC VOLUMES MUST BE CONVERTED TO PCPHPL USING THE FOLLOWING EQUATION:

PCPHPL = PASSENGER CARS PER HOUR PER LANE

$= \frac{\text{HOURLY DIRECTIONAL VOLUME}}{\text{NO. OF LANES (EACH DIRECTION)}} \times$ HEAVY VEHICLE FACTOR

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