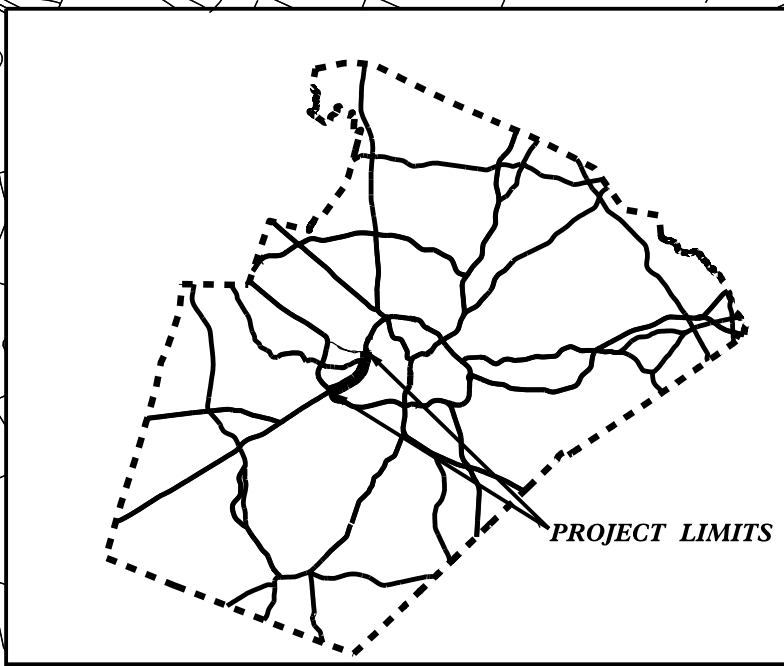
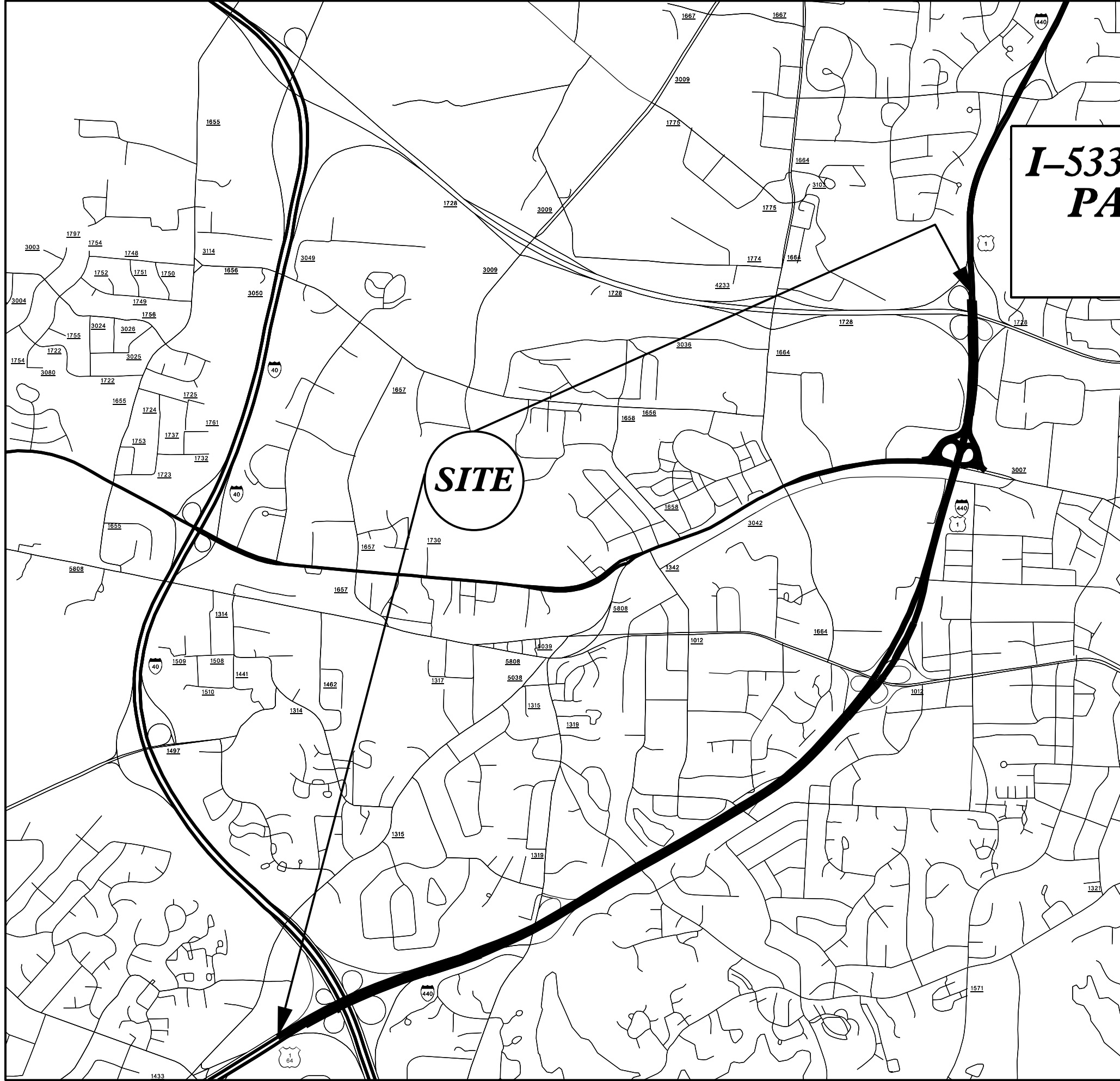


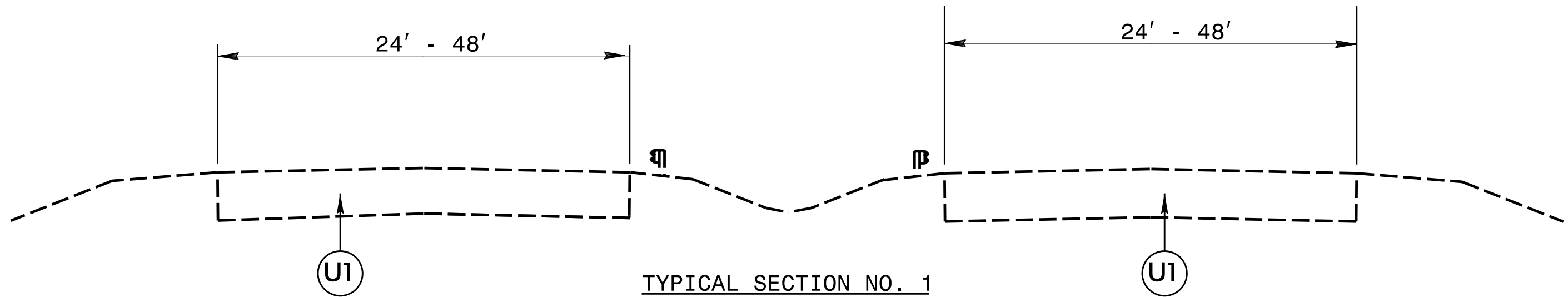
# *I-5333B, WAKE COUNTY PAVEMENT REPAIR ON I-440*



**VICINITY MAP**

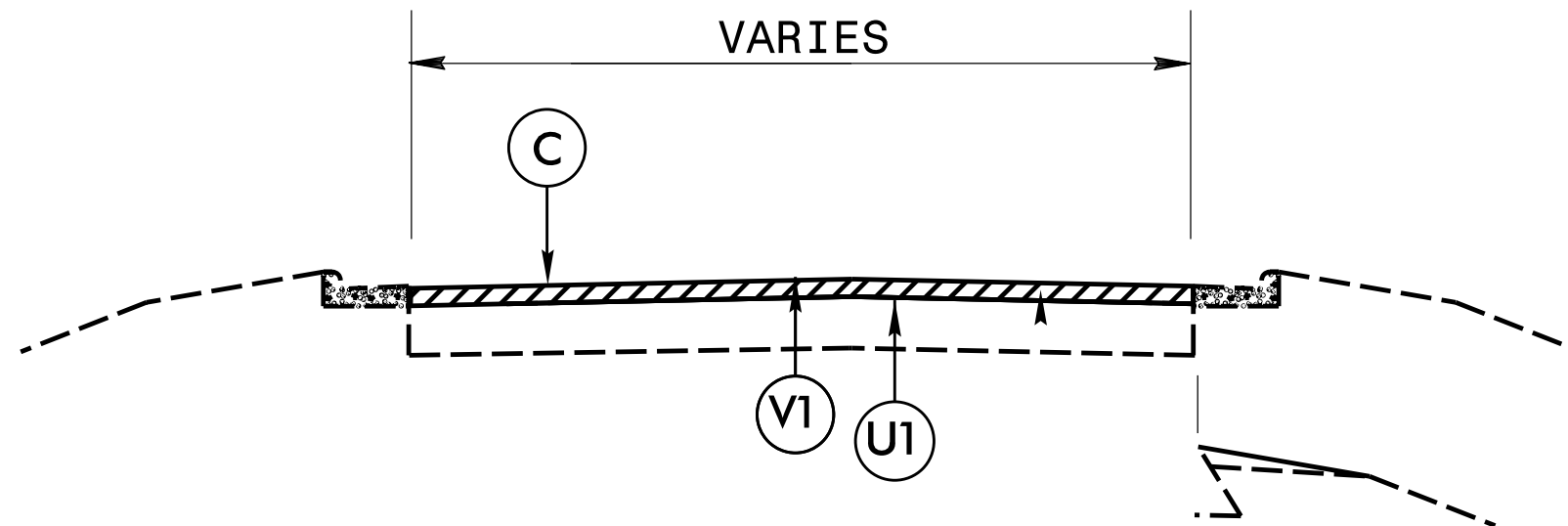
PAVEMENT SCHEDULE

C	1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
U1	EXISTING ULTRA-THIN HMA PAVEMENT OVER EXISTING CONCRETE PAVEMENT
V1	3/4" MILLING TO REMOVE EXISTING NOVACHIP



TYPICAL SECTION NO. 1

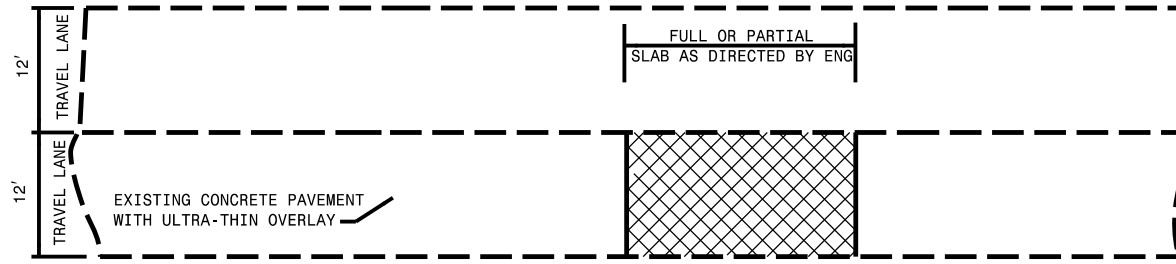
CONDUCT SPALL REPAIR ALONG MAINLINE PAVEMENT IN AREAS, AS DIRECTED BY THE ENGINEER



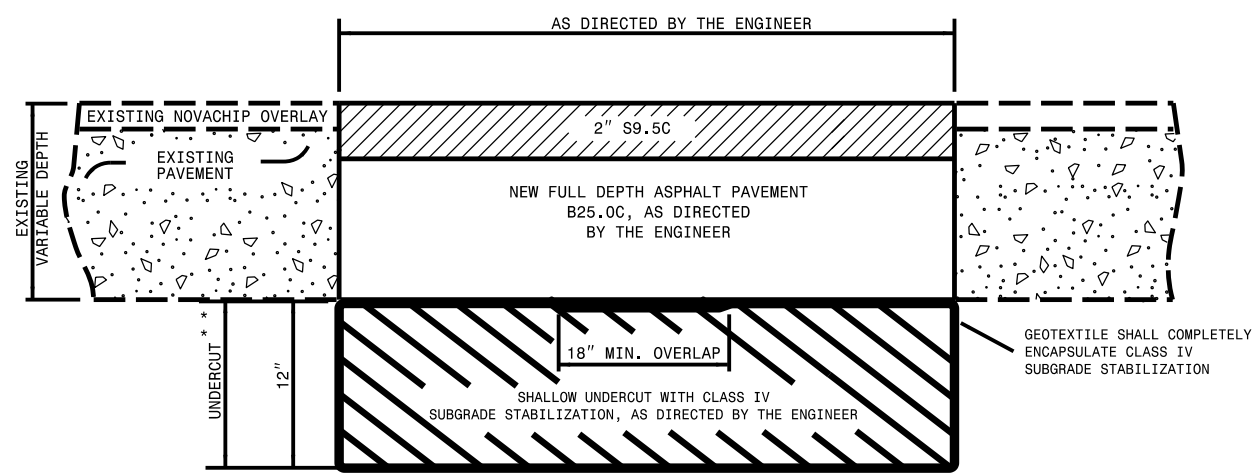
TYPICAL SECTION NO. 2

SHOULDER GRADING WITH ASB IN AREAS AS DIRECTED BY THE ENGINEER

\* USE ON RAMPS AND LOOPS AT HILLSBOROUGH STREET



**TOP VIEW OF EXISTING CONCRETE SLAB REPAIR  
TO BE PERFORMED IN AREAS, AS DIRECTED BY THE ENGINEER**



**CROSS SECTION OF EXISTING CONCRETE SLAB REPAIR**

\* DIMENSIONS ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED  
 \*\* UNDERCUT REQUIRED IN AREAS AS DIRECTED BY THE ENGINEER

**FULL AND PARTIAL SLAB REPACEMENT DETAIL  
 LOCATIONS AS DIRECTED BY THE ENGINEER**

PAVEMENT SCHEDULE	
C	2" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C
E	VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AS DIRECTED BY THE ENGINEER
U	EXISTING PAVEMENT STRUCTURE

PROJECT NO.	SHEET NO.	TOTAL NO.
46152.3.2		

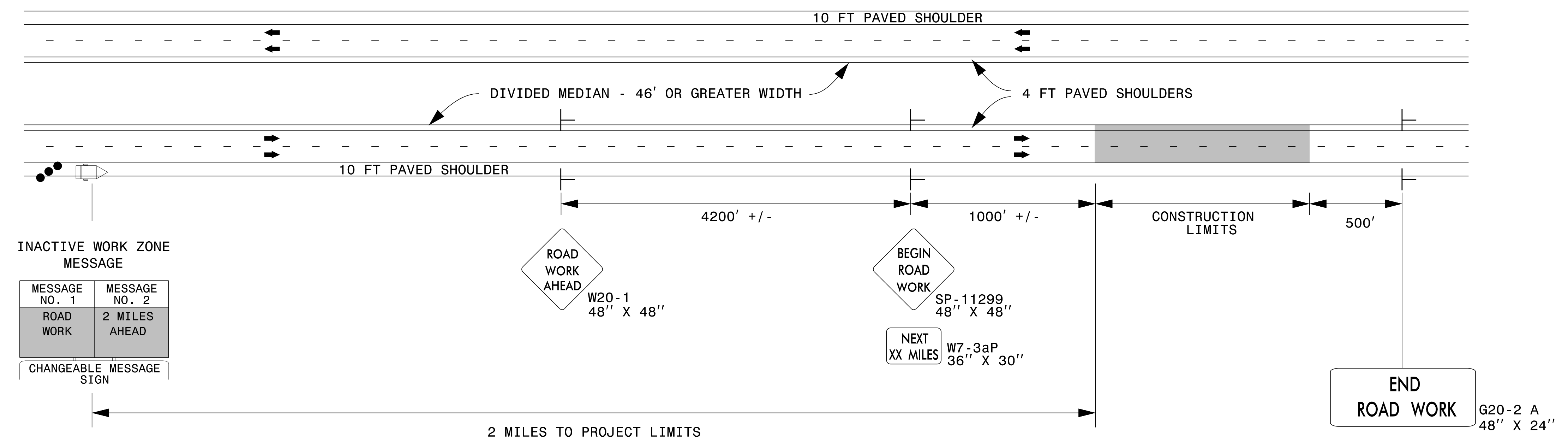
### SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	FINAL SURFACE TESTING REQUIRED	WARM MIX ASPHALT REQUIRED	LENGTH MI	WIDTH FT	REMOVAL OF EXISTING CONCRETE PAVEMENT SLABS SY	GEOTEXTILE FOR SOIL STABILIZATION SY	AGGREGATE SHOULDER BORROW (ASB) TON	SHOULDER GRADING SMI	SHALLOW UNDERCUT CY	CLASS IV SUBGRADE STABILIZATION TON	0.75" MILLING SY	BASE COURSE, B25.0C TONS	SURFACE COURSE, S9.5C TONS	ASPHALT BINDER FOR PLANT MIX TON	PATCHING EXISTING PAVEMENT TONS	PATCHING CONCRETE PAVEMENT SPALLS SF	PORTABLE LIGHTING LS	INDUCTIVE LOOP LF
46152.3.2	Wake	1	I-440 (BELTLINE) INNER AND OUTER	FROM NC 54 (HILLSBOROUGH ST) TO US 1	1	2		NO	NO	4	24	134	134	236	0.20	45	90	9,680	75	919	58	100	225.00	1.00	350
<b>TOTAL FOR MAP NO. 1</b>										4		134	134	236	0.20	45	90	9,680	75	919	58	100	225.00	1.00	350
<b>TOTAL FOR PROJ NO. 46152.3.2</b>										4		134	134	236	0.20	45	90	9,680	75	919	58	100	225.00	1.00	350
<b>GRAND TOTAL</b>										4		134	134	236	0.20	45	90	9,680	75	919	58	100	225.00	1.00	350

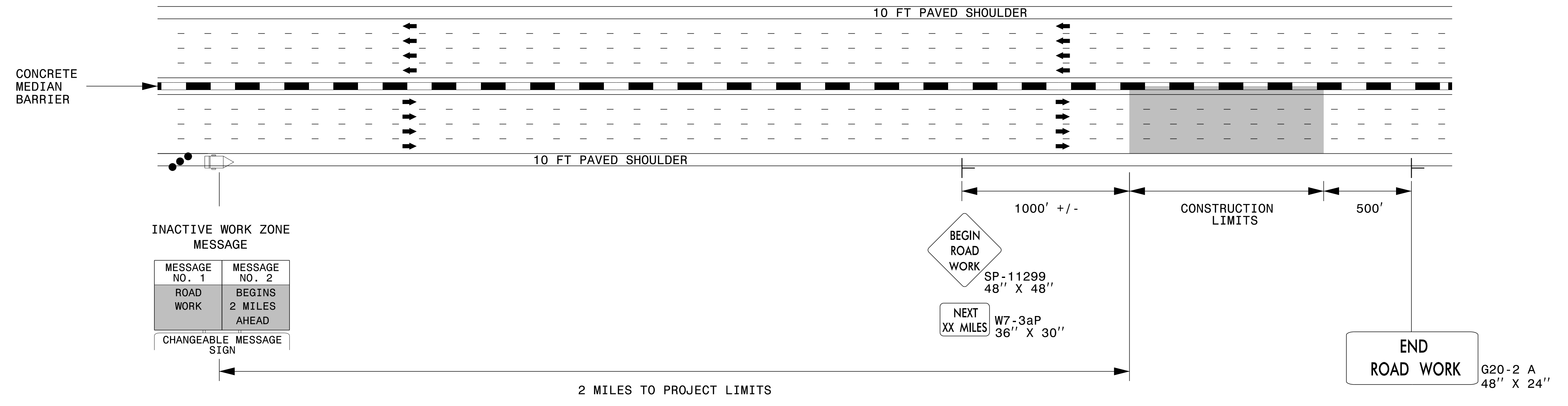
### THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	LENGTH	WIDTH	4400000000-E	4405000000-E	4410000000-E	4415000000-N	4420000000-N	4430000000-N	4445000000-E	4480000000-N	4510000000-N	4600000000-N	4688000000-E	4700000000-E
										STATIONARY WORK ZONE SIGN SF	PORTABLE WORK ZONE SIGN SF	BARRICADE MOUNTED WORK ZONE SIGN SF	FLASHING ARROW BOARD EA	CHANGABLE MESSAGE SIGNS EA	DRUMS EA	TYPE III BARRICADE LF	TMA EA	LAW ENFORCEMENT HR	SEQUENTIAL FLASHING WARNING LIGHTS EA	6" X 90 M WHITE THERMO LF	12" X 90 M WHITE THERMO LF
46152.3.2	Wake	1	I-440 (BELTLINE) INNER AND OUTER	FROM NC 54 (HILLSBOROUGH ST) TO US 1	1	2		4	24	224	256	90	2	3.00	160	48	2	1,000	12	1,700	350
<b>TOTAL FOR MAP NO. 1</b>								4		224	256	90	2	3	160	48	2	1,000	12	1,700	350
<b>TOTAL FOR PROJ NO. 46152.3.2</b>								4		224	256	90	2	3	160	48	2	1,000	12	1,700	350
<b>GRAND TOTAL</b>								4		224	256	90	2	3	160	48	2	1,000	12	1,700	350

## DIVIDED MEDIANS WITH WIDTHS 46' OR GREATER



## DIVIDED MEDIANS WITH WIDTHS LESS THAN 46' OR WITH PERMANENT MEDIAN BARRIER

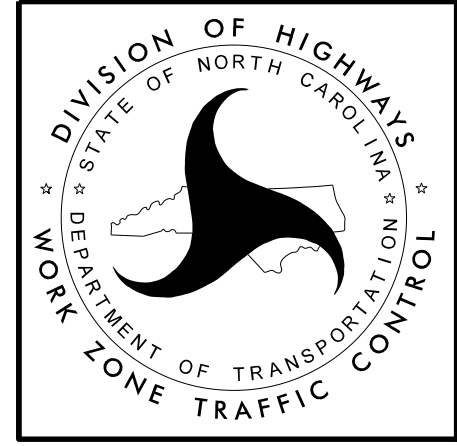


**NOTES:**

- 1) LATERAL CLEARANCE AT ALL SIGN LOCATIONS SHALL BE 6' AS MEASURED FROM THE EDGE OF PAVEMENT.
- 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) FOR MEDIAN WIDTHS LESS THAN 46' (MEASURED EDGELINE TO EDGELINE) USE THE BOTTOM DRAWING.
- 4) IF STATIONARY GENERAL WARNING SIGNS ARE USED, THEY WILL BE PAID FOR PER SECTION 104 OF THE NCDOT STANDARD SPECIFICATIONS AS EXTRA WORK.
- 5) INSTALL "ROAD WORK AHEAD" (W20-1) ALONG ENTRANCE RAMPS 500' PRIOR TO RAMP TERMINAL, AND "END ROAD WORK" (G20-2a) AT THE END OF EXIT RAMPS WITHIN THE WORK ZONE.

**LEGEND**

- CHANGEABLE MESSAGE SIGN (CMS)
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
- TRAFFIC DRUM



**RESURFACING ADVANCE  
WARNING SIGNS FOR  
HIGH SPEED FACILITIES  
≥ 60 MPH**

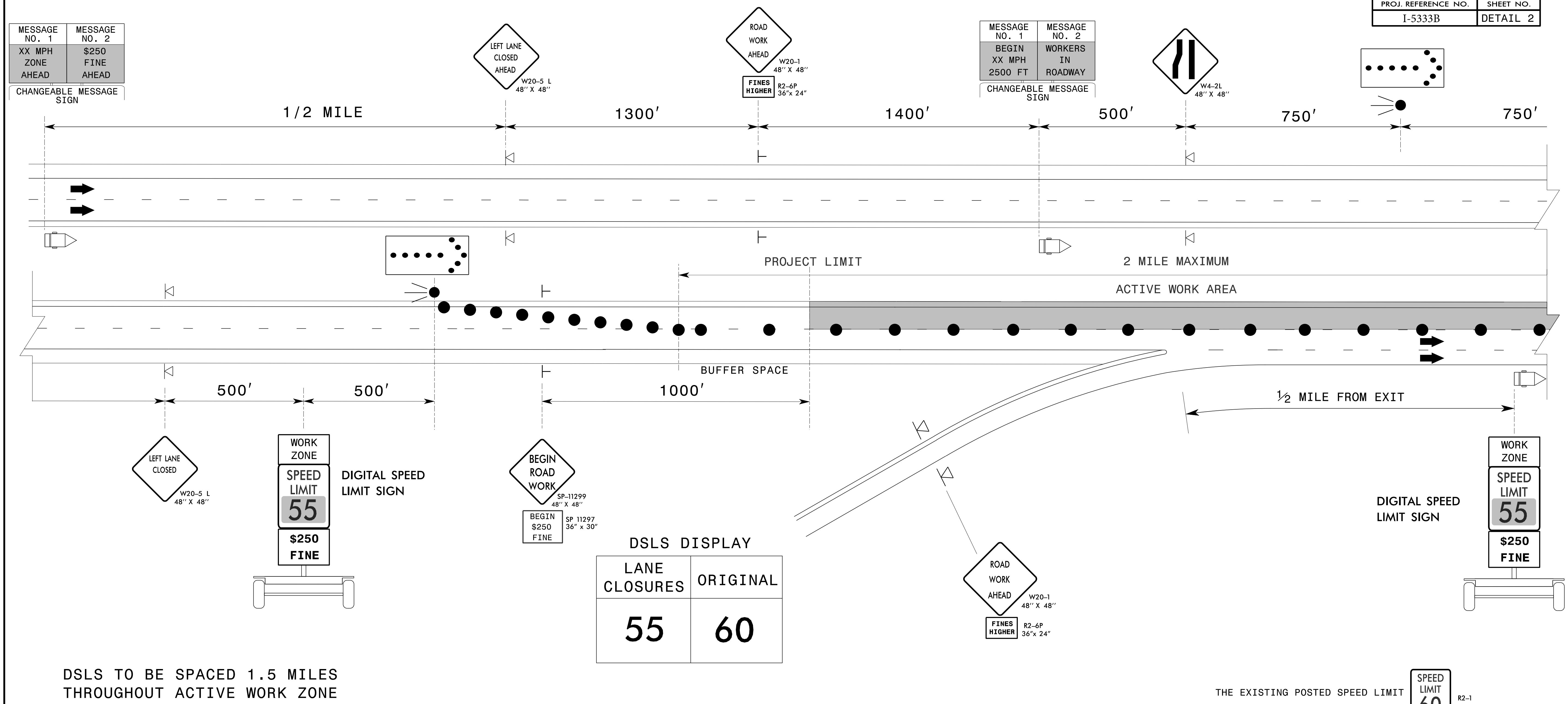
8/9/2016 C:\Users\kceddis\Desktop\Resurfacing\_AdvWarn\_HSpd.dgn User:kceddis

MESSAGE NO. 1	MESSAGE NO. 2
XX MPH ZONE AHEAD	\$250 FINE AHEAD

CHANGEABLE MESSAGE SIGN

MESSAGE NO. 1	MESSAGE NO. 2
BEGIN XX MPH 2500 FT	WORKERS IN ROADWAY

CHANGEABLE MESSAGE SIGN



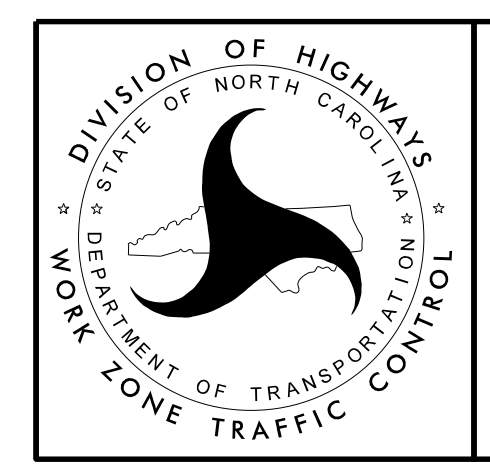
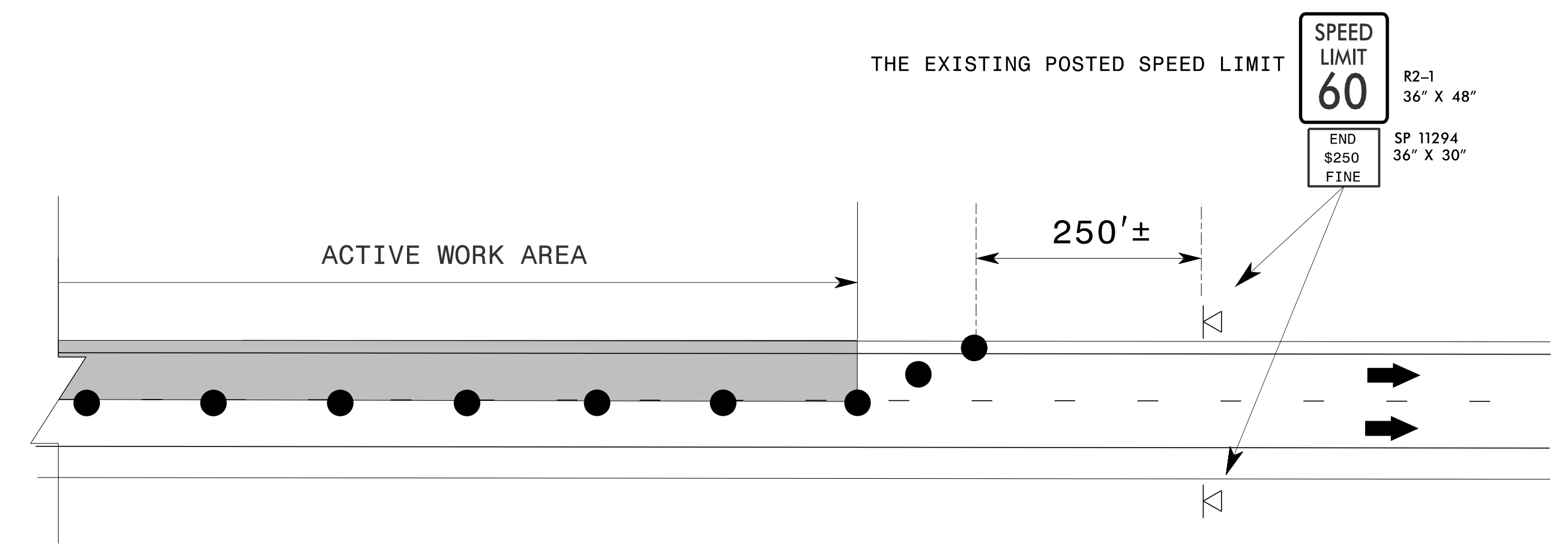
DSLS DISPLAY

LANE CLOSURES	ORIGINAL
55	60

DSLS TO BE SPACED 1.5 MILES THROUGHOUT ACTIVE WORK ZONE

### GUIDELINES

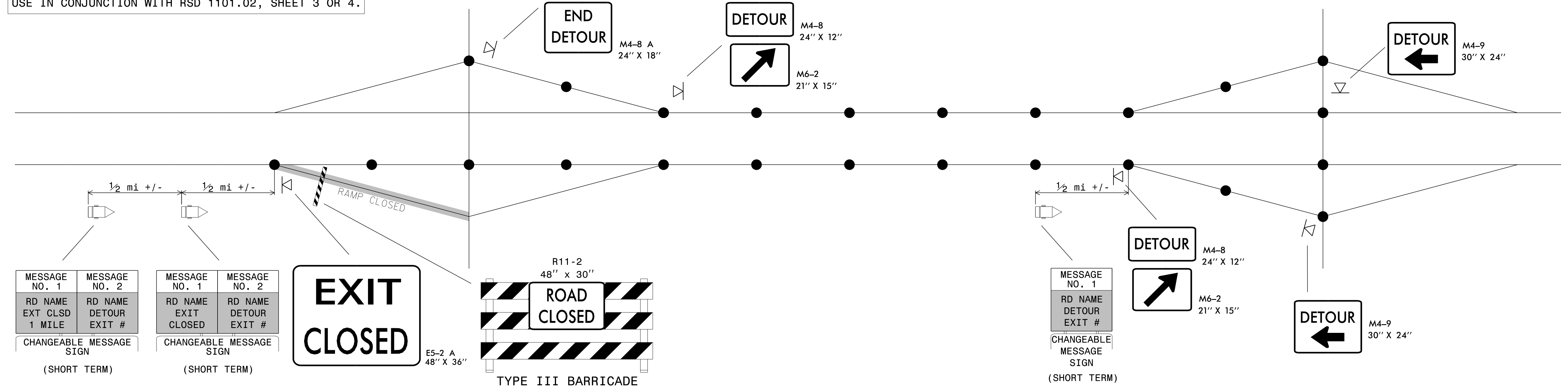
1. NCDOT HAS SOLE AUTHORITY OF THE SPEED LIMITS DISPLAYED ON THE DIGITAL SPEED LIMIT SIGNS.
2. THE WORK ZONE VARIABLE SPEED LIMIT REDUCTION ("WZVSLR") IS FOR USE ONLY AFTER AN ENGINEERING INVESTIGATION HAS BEEN PERFORMED BY THE REGIONAL TRAFFIC ENGINEER, THE DIVISION AND THE WORK ZONE TRAFFIC CONTROL SECTION.
3. THE "WZVSLR" IS INTENDED FOR USE ON FREEWAYS WITH ORIGINAL SPEED LIMITS 60 MPH OR GREATER. THE POSTED SPEED LIMITS DISPLAYED WITHIN THE ACTIVE WORK ZONE MAY VARY BETWEEN 55 MPH TO 70 MPH, DEPENDENT UPON ROAD WORK CONDITIONS AND THE ORIGINAL SPEED LIMIT OF THE FACILITY.
4. THIS APPLICATION IS FOR SHORT-TERM ACTIVITIES (i.e. LANE CLOSURES AND ROAD CLOSURES). THE MAXIMUM LANE CLOSURE LENGTH IS 2 MILES UNLESS OTHERWISE SHOWN IN THE PLANS. THE "WZVSLR" SHALL NOT BE IN OPERATION CONTINUOUSLY (24/7) FOR A PERIOD EXCEEDING 30 CALENDAR DAYS.
5. ALL ORIGINAL SPEED LIMIT SIGNS SHALL BE COVERED OR REMOVED. THE DIGITAL SPEED LIMIT SIGNS WILL TAKE THE PLACE OF ALL ORIGINAL STATIONARY SPEED LIMIT SIGNS. THE DIGITAL SPEED LIMIT SIGNS MAY BE TRAILER MOUNTED OR STATIONARY MOUNTED.
6. THE STATE TRAFFIC ENGINEER HAS TO ORDINANCE THE "WZVSLR" IN ORDER FOR THE REDUCTION AND/OR \$250 SPEEDING FINE TO BE VALID AND ENFORCEABLE. NO SPEED LIMIT MESSAGES/SIGNS SHALL BE INSTALLED PRIOR TO RECEIVING A SIGNED ORDINANCE. IN ADDITION, THE \$250 SPEEDING FINE ALSO REQUIRES A SEPARATE SIGNED ORDINANCE BY THE STATE TRAFFIC ENGINEER.
6. EACH DIRECTION OF THE PROJECT IS TO BE EVALUATED FOR THE "WZVSLR". THIS DRAWING INTENTIONALLY HAS 1 DIRECTION SIGNED AS A REMINDER TO CAREFULLY CONSIDER WHETHER BOTH DIRECTIONS OF THE PROJECT NEED TO HAVE THE SPEED LIMIT REDUCED.



WORK ZONE "VARIABLE" SPEED LIMIT REDUCTION USING DIGITAL SPEED LIMIT SIGNS

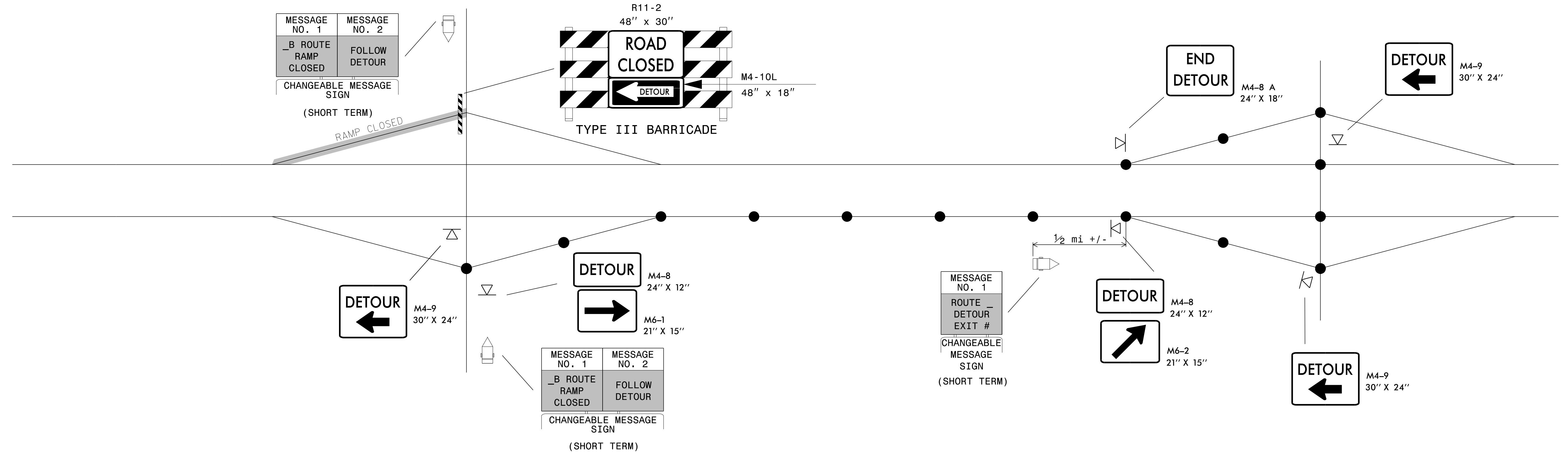
### SHORT TERM CLOSURE AND DETOUR OF OFF-RAMP TO ADJACENT INTERCHANGE

USE IN CONJUNCTION WITH RSD 1101.02, SHEET 3 OR 4.

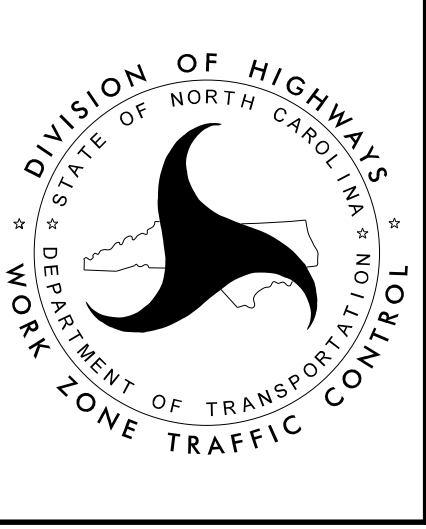
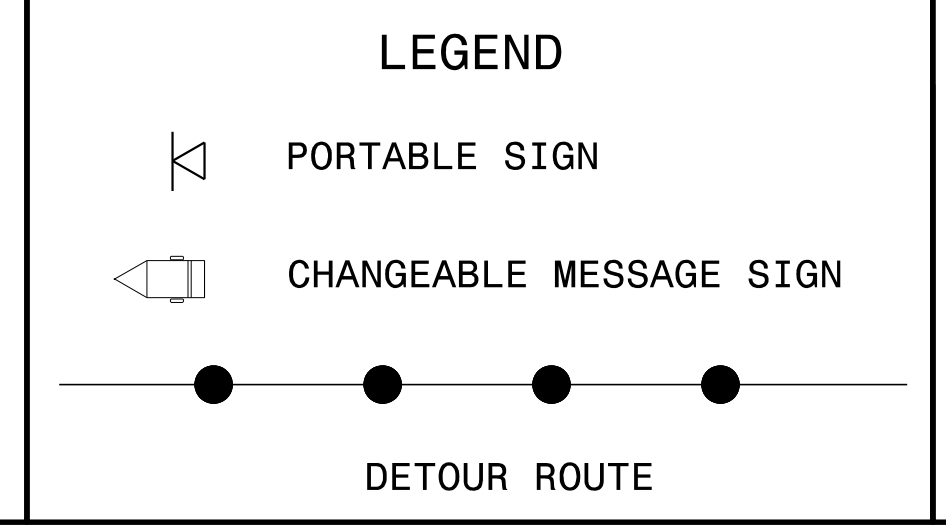


### SHORT TERM CLOSURE AND DETOUR OF ON-RAMP TO ADJACENT INTERCHANGE

USE IN CONJUNCTION WITH RSD 1101.02, SHEET 3 OR 4.



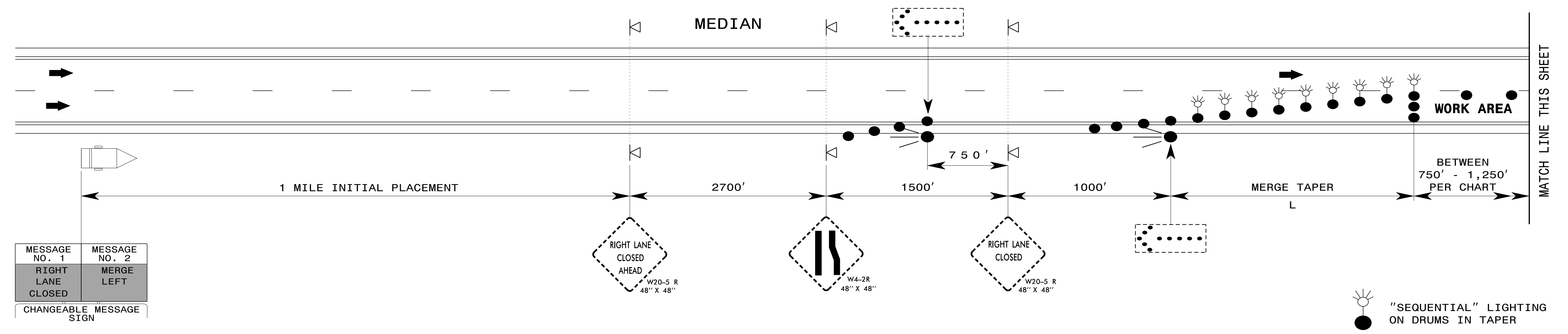
- GENERAL NOTES:**
1. THIS DRAWING IS INTENDED FOR USE DURING SHORT TERM CLOSURES OF INTERSTATE AND FREEWAY RAMPS.
  2. RAMP CLOSURES SHALL BE APPROVED BY THE ENGINEER.
  3. IF RAMP CLOSURE RESTRICTIONS APPLY, SEE SPECIAL PROVISION, "INTERMEDIATE CONTRACT TIMES AND LIQUIDATED DAMAGES".
  4. ADDITIONAL CHANGEABLE MESSAGE SIGNS AND POSSIBLE DETOUR SIGNS MAY BE NECESSARY FOR MORE COMPLEX CLOSURES/DETOURS. COMPENSATION FOR ADDITIONAL DEVICES SHALL BE MADE BASED ON THE UNIT BID PRICE FOR THE RESPECTIVE DEVICE.



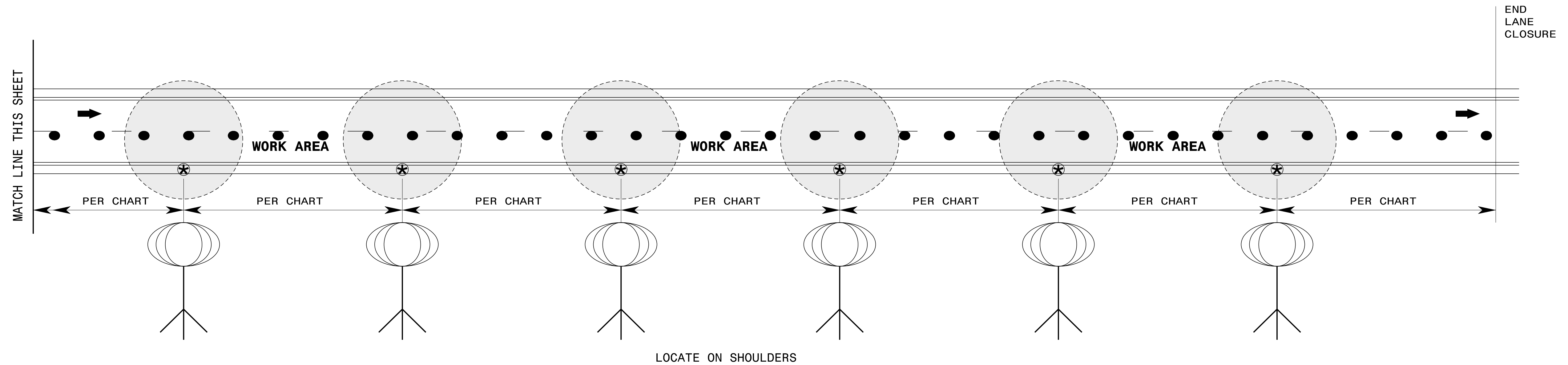
**SHORT TERM CLOSURE AND DETOUR OF INTERSTATE/FREEWAY RAMPS**

8/9/2016 C:\Users\kredais\Desktop\I-5729\Typical\Off-Ramp Detour.dgn User:kredais

# ADVANCE WARNING AREA



# WORK ZONE AREA



## SPACING CHART

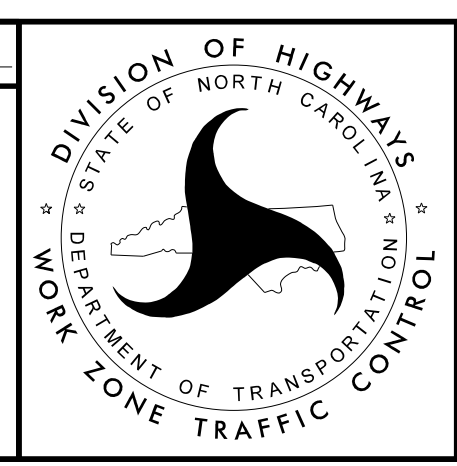
LIGHT OUTPUT (LUMENS)	MINIMUM LIGHTED FIXTURE AREA (SQUARE FEET)	MAXIMUM SPACING (FEET)	LIGHT UNITS (PER MILE)
50,000 TO 65,000	5.5	750'	6
66,000 TO 80,000	5.5	1,000'	5
81,000 TO 100,000	36	1,250'	4

## NOTES

- 1) SPACE LIGHT UNITS ACCORDING TO THE CHART.
- 2) EACH LIGHT UNIT SHALL BE CAPABLE OF ELEVATING TO A MINIMUM HEIGHT OF 14' ABOVE THE PAVEMENT.
- 3) PLACE ON PAVED SHOULDER IF POSSIBLE.

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

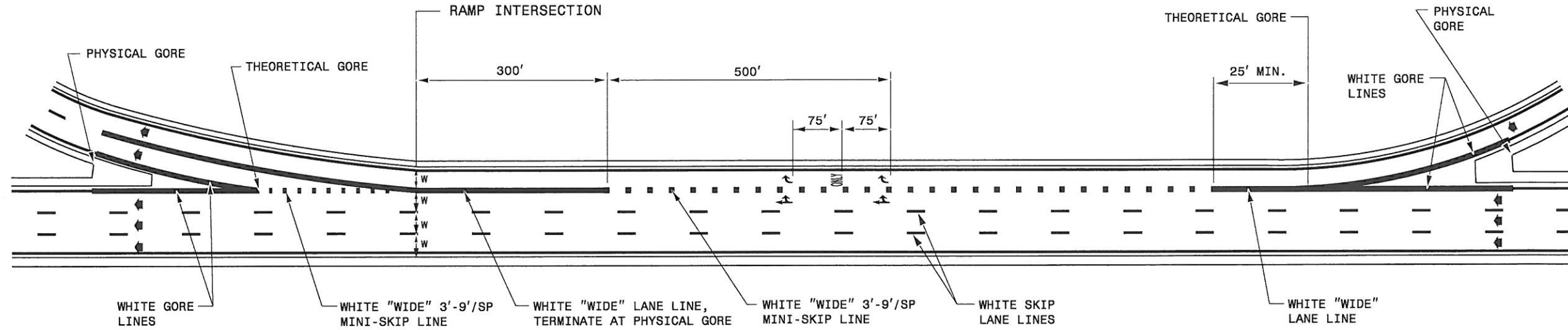
SEAL **DRAFT**



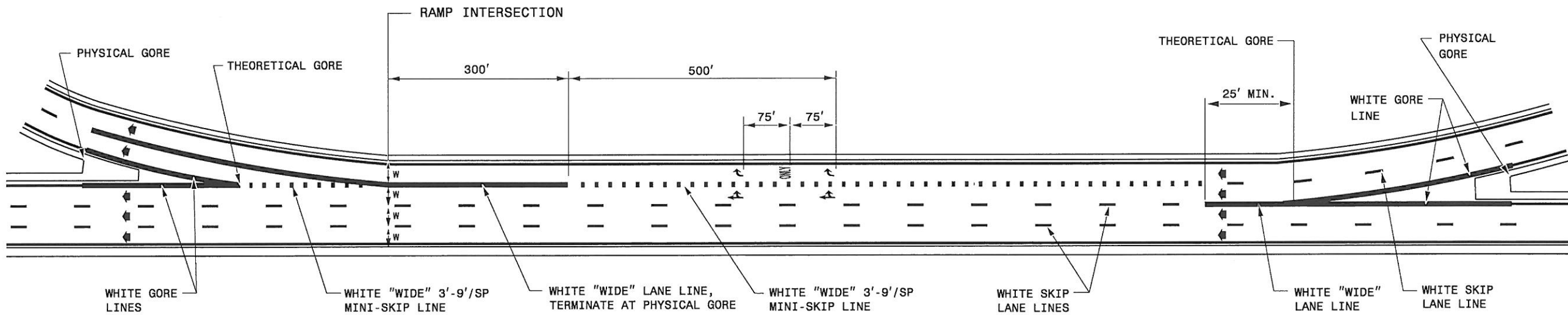
**WORK ZONE  
"PRESENCE"  
LIGHTING**



AUXILIARY LANE WITH MULTI-LANE EXIT RAMP, 2 MILES OR LESS BETWEEN RAMPS



AUXILIARY LANE WITH MULTI-LANE ENTRANCE RAMP AND EXIT RAMP, 2 MILES OR LESS BETWEEN RAMPS



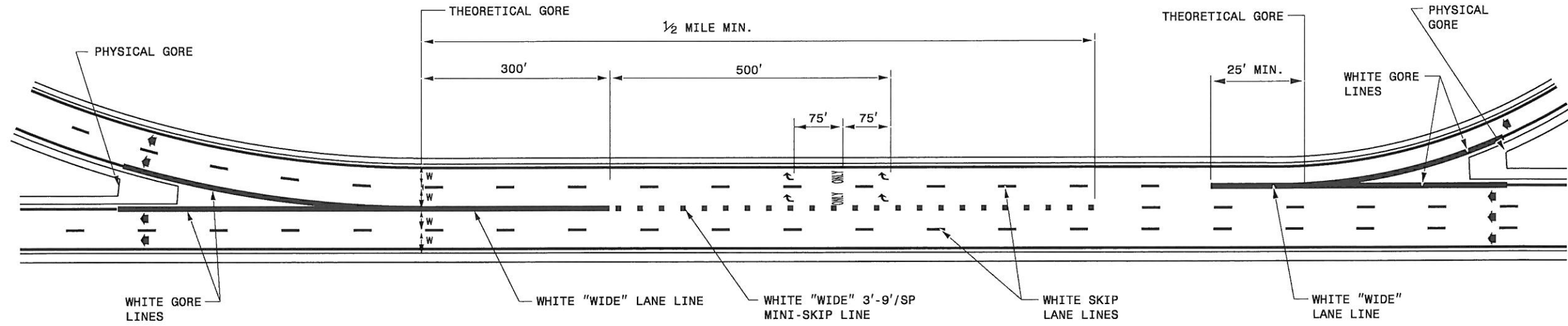
GENERAL NOTES:

- 1- USE THE GUIDANCE SHOWN ON THE FOLLOWING DETAILS IN CONJUNCTION WITH THE EXIT RAMP GUIDANCE SHOWN ON ROADWAY STANDARD DRAWING 1205.03.
- 2- LANE LINES INDICATED AS "WIDE" SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.
- 3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

LEGEND	
W	= WIDTH OF TRAVEL LANE
←	DIRECTION OF TRAFFIC FLOW
↪	DIRECTION OF TRAFFIC FLOW
↺ ONLY	PAVEMENT MARKING SYMBOLS & CHARACTERS

7-16

LANE DROP ADJACENT TO AUXILIARY LANE



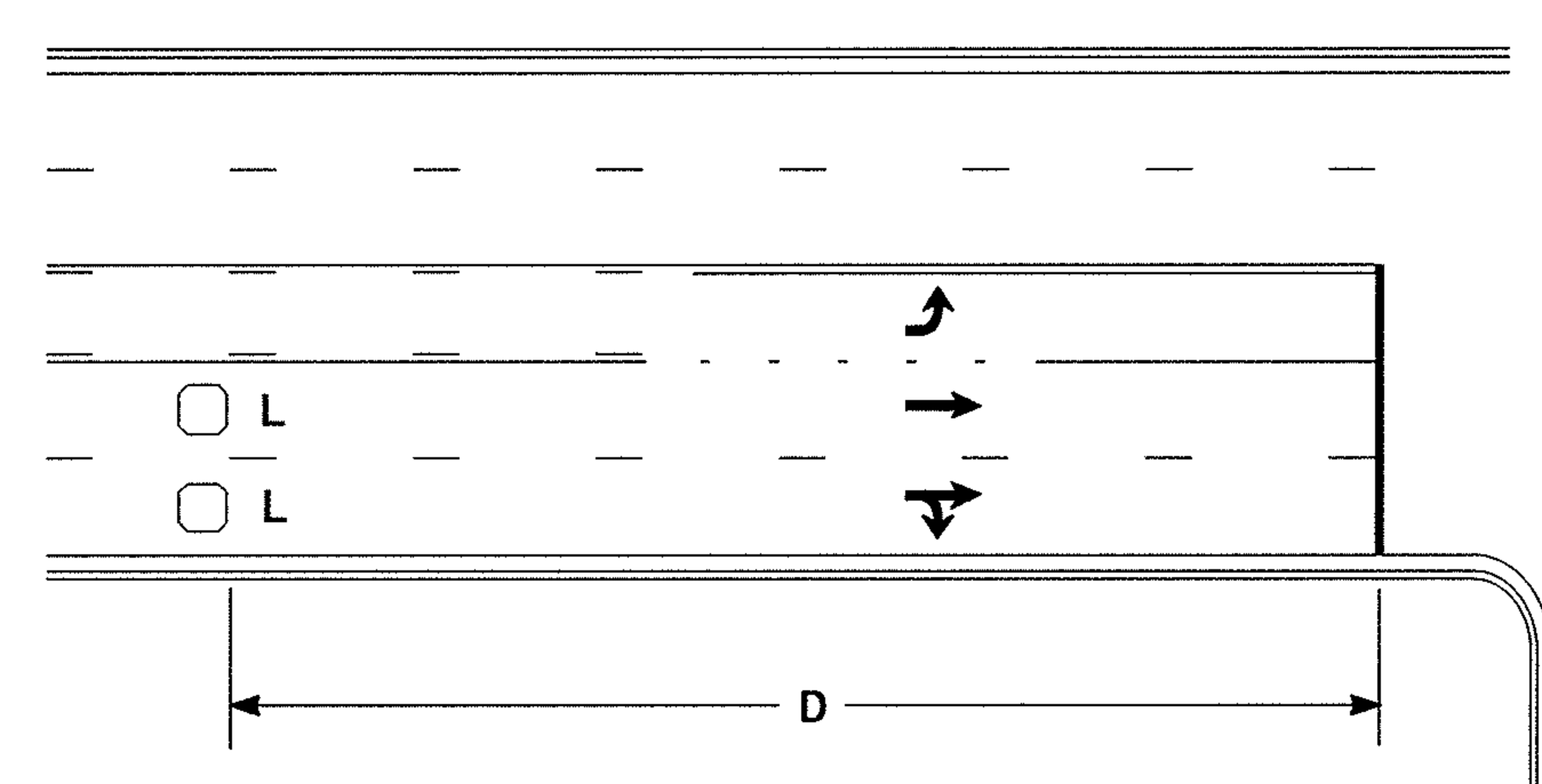
7-16

GENERAL NOTES:

- 1- USE THE GUIDANCE SHOWN ON THE FOLLOWING DETAILS IN CONJUNCTION WITH THE EXIT RAMP GUIDANCE SHOWN ON ROADWAY STANDARD DRAWING 1205.03.
- 2- LANE LINES INDICATED AS "WIDE" SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.
- 3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

LEGEND	
W	= WIDTH OF TRAVEL LANE
↔	DIRECTION OF TRAFFIC FLOW
↶ ONLY	PAVEMENT MARKING SYMBOLS & CHARACTERS

### High Speed Detection [≥40 mph (64 km/hr)]

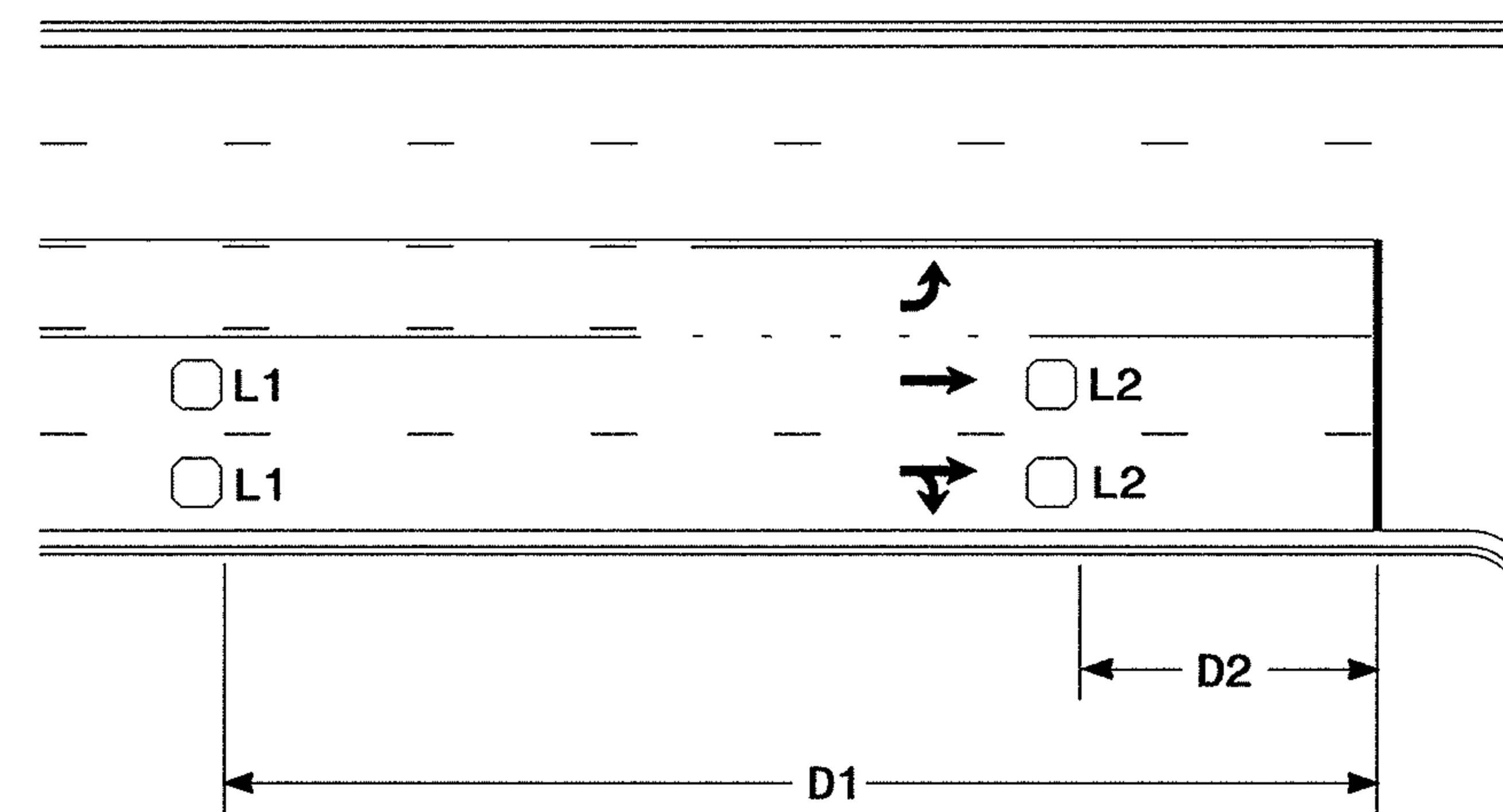


Speed Limit mph (km/hr)	D ft (m)
40 (64)	250 (75)
45 (72)	300 (90)
50 (80)	355 (110)
55 (88)	420 (130)

L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series for TS1  
Controllers  
Wired separately for TS2,  
170, and 2070L Controllers

Volume Density Operation

OR

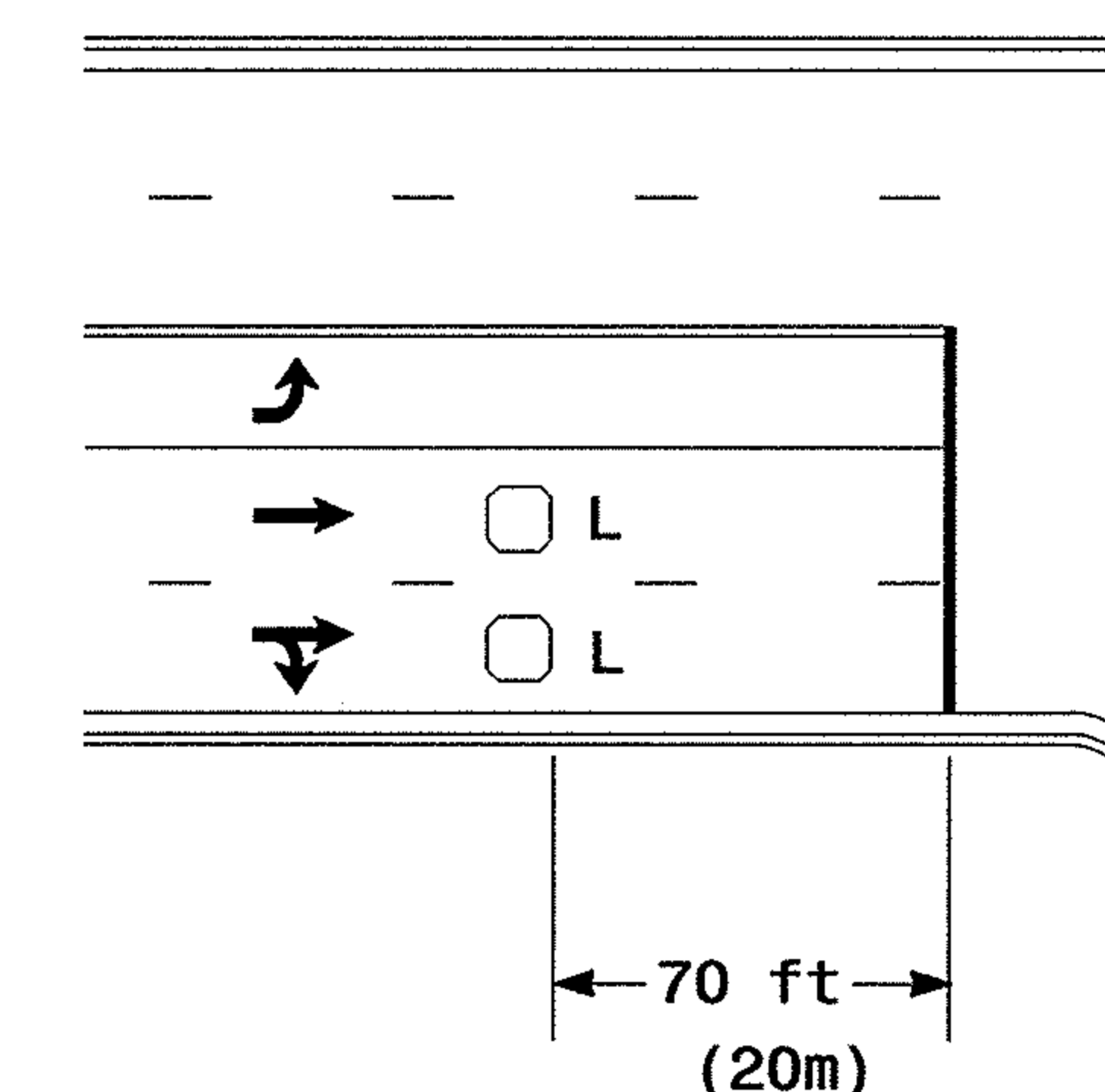


Speed Limit mph (km/hr)	D1 ft (m)	D2 ft (m)
40 (64)	250 (75)	80 (25)
45 (72)	300 (90)	90 (27)
50 (80)	355 (110)	100 (30)
55 (88)	420 (130)	110 (35)

L1 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series  
L2 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series

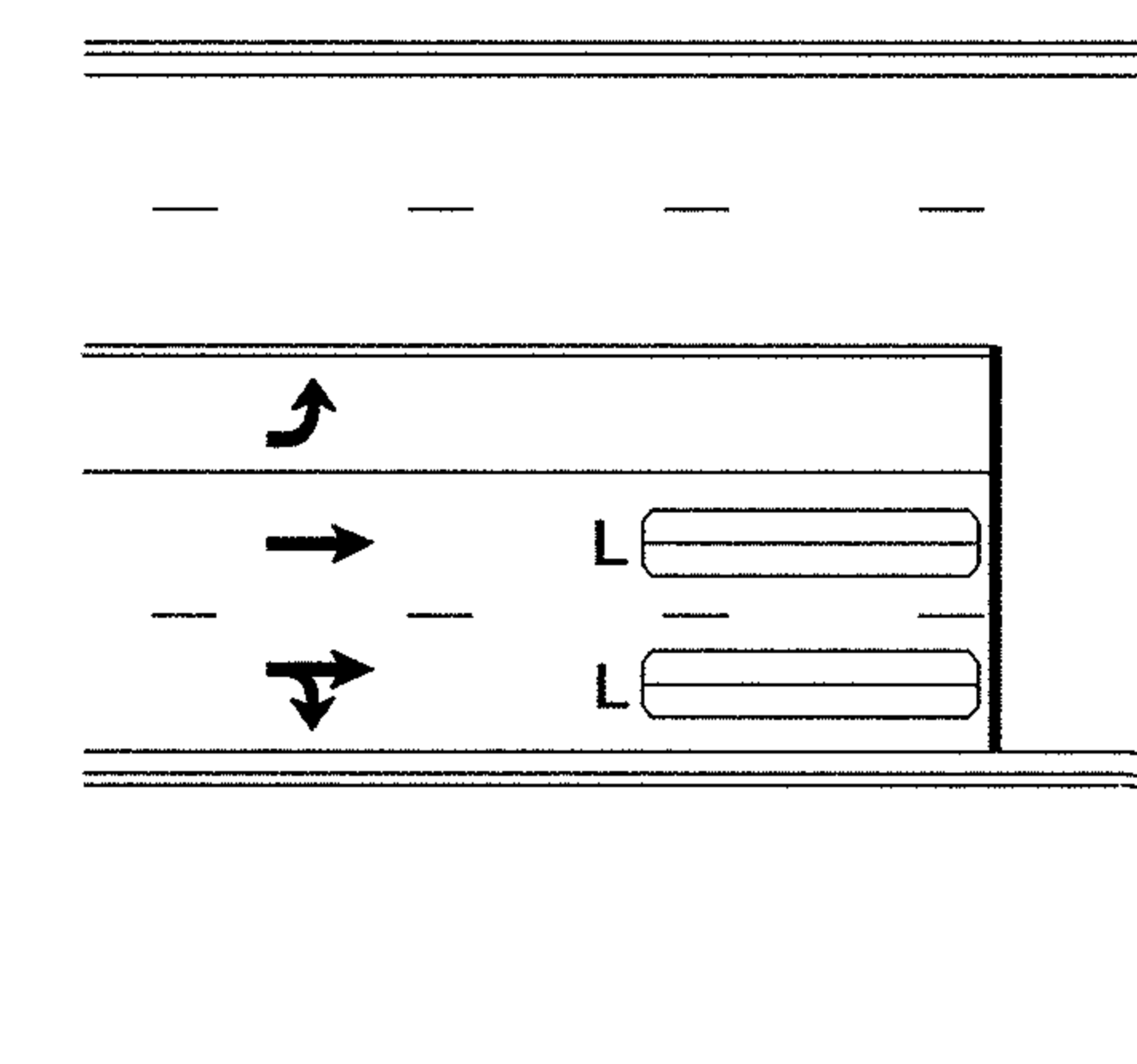
"Stretch" Operation

### Low Speed Detection [≤35 mph (56 km/hr)]



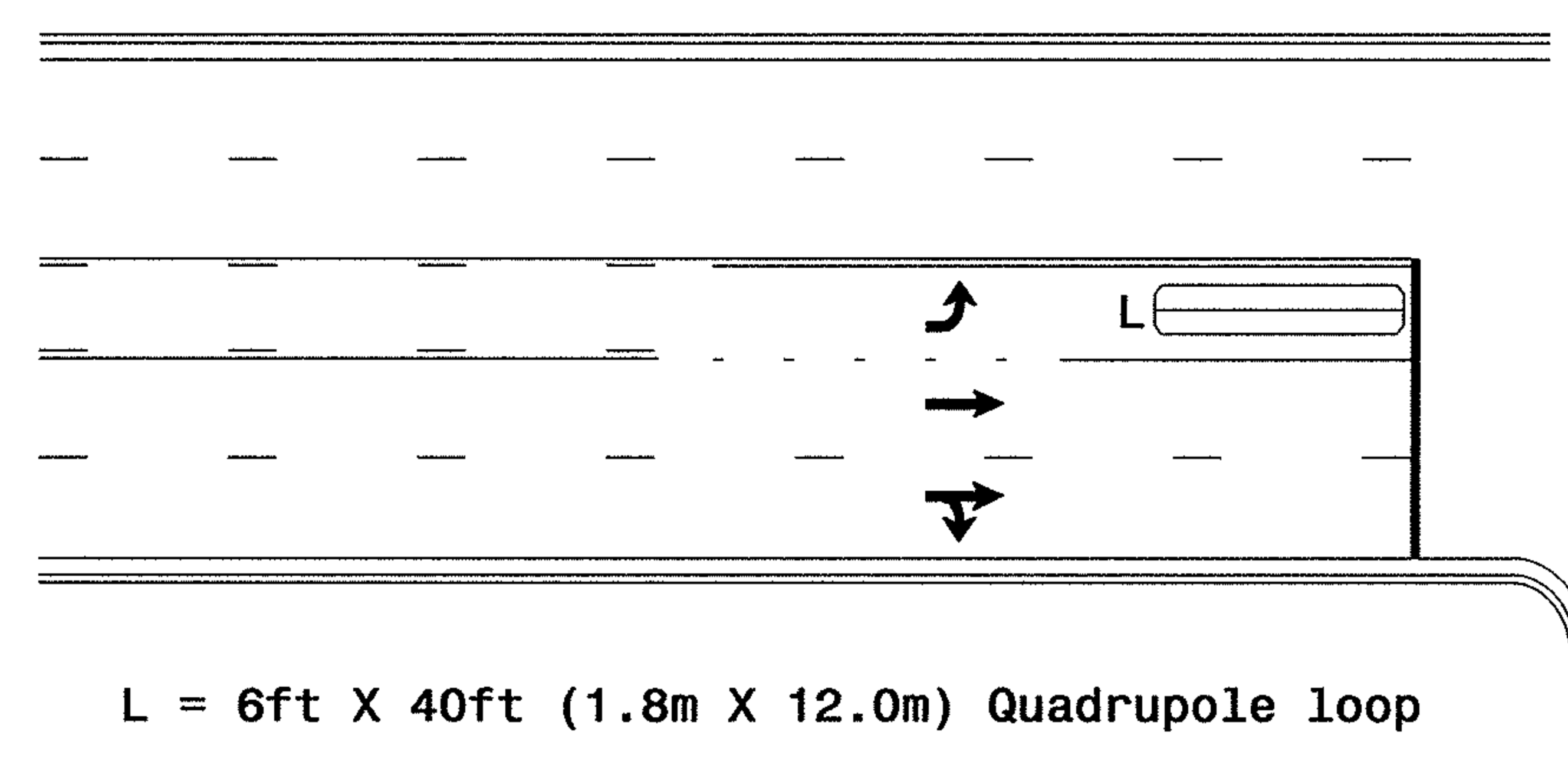
L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series

OR



L = 6ft X 40ft (1.8m X 12.0m)  
Quadrupole loop, wired separately

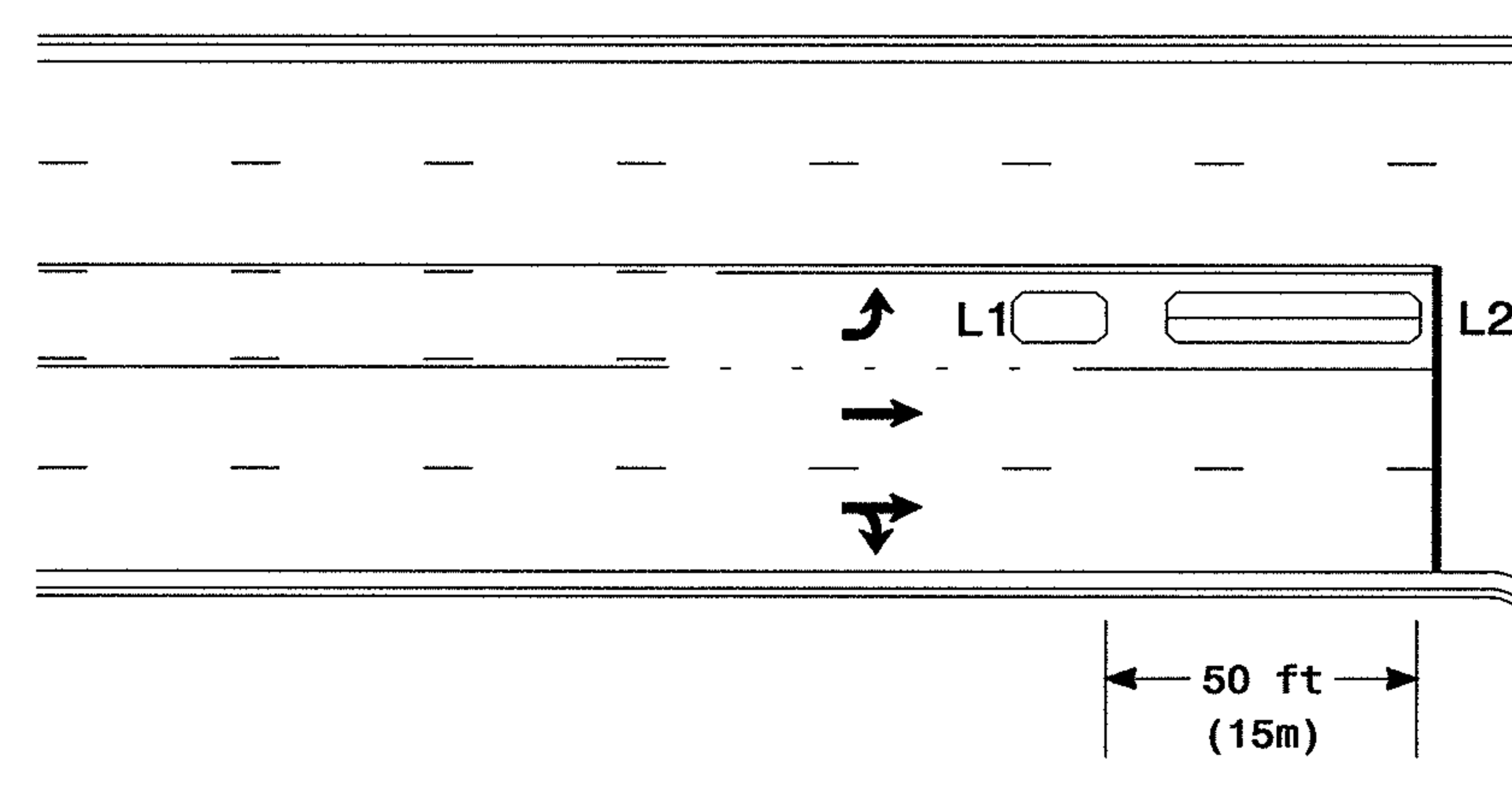
### Left Turn Lane Detection



L = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

Presence Loop Detection

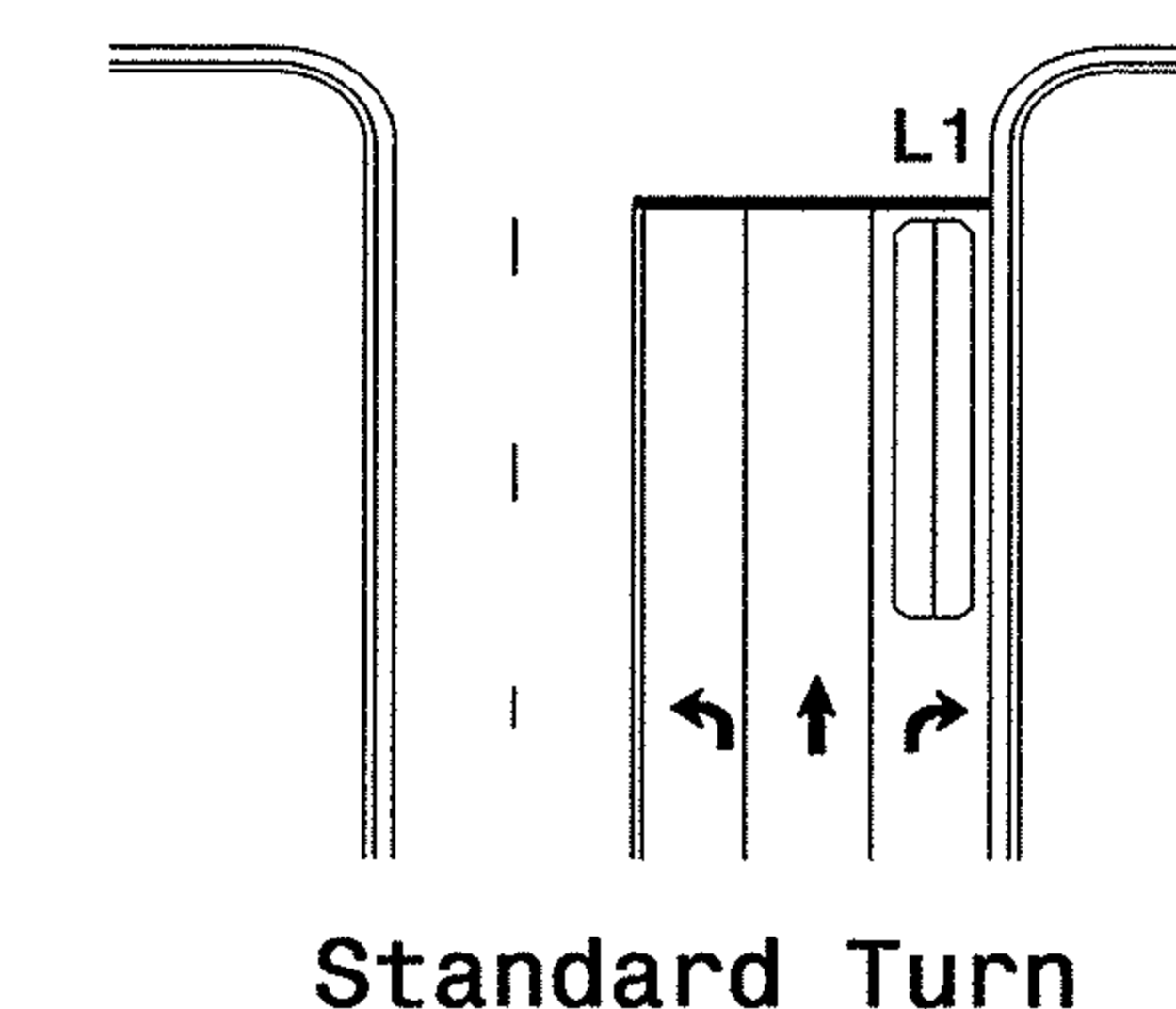
OR



L1 = 6ft X 15ft (1.8m X 4.6m) Queue detector  
L2 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

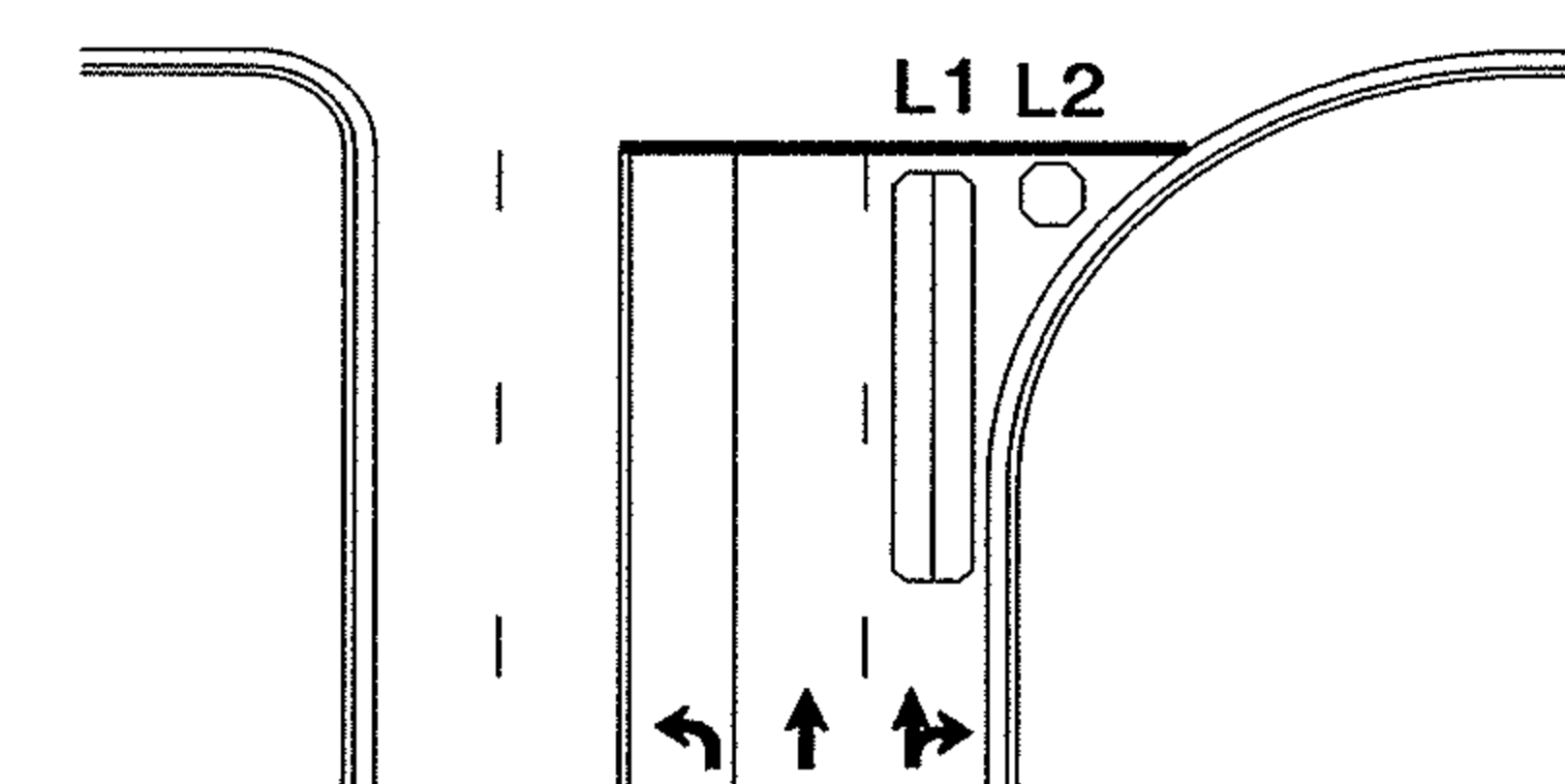
Queue Loop Detection

### Right Turn Lane Detection

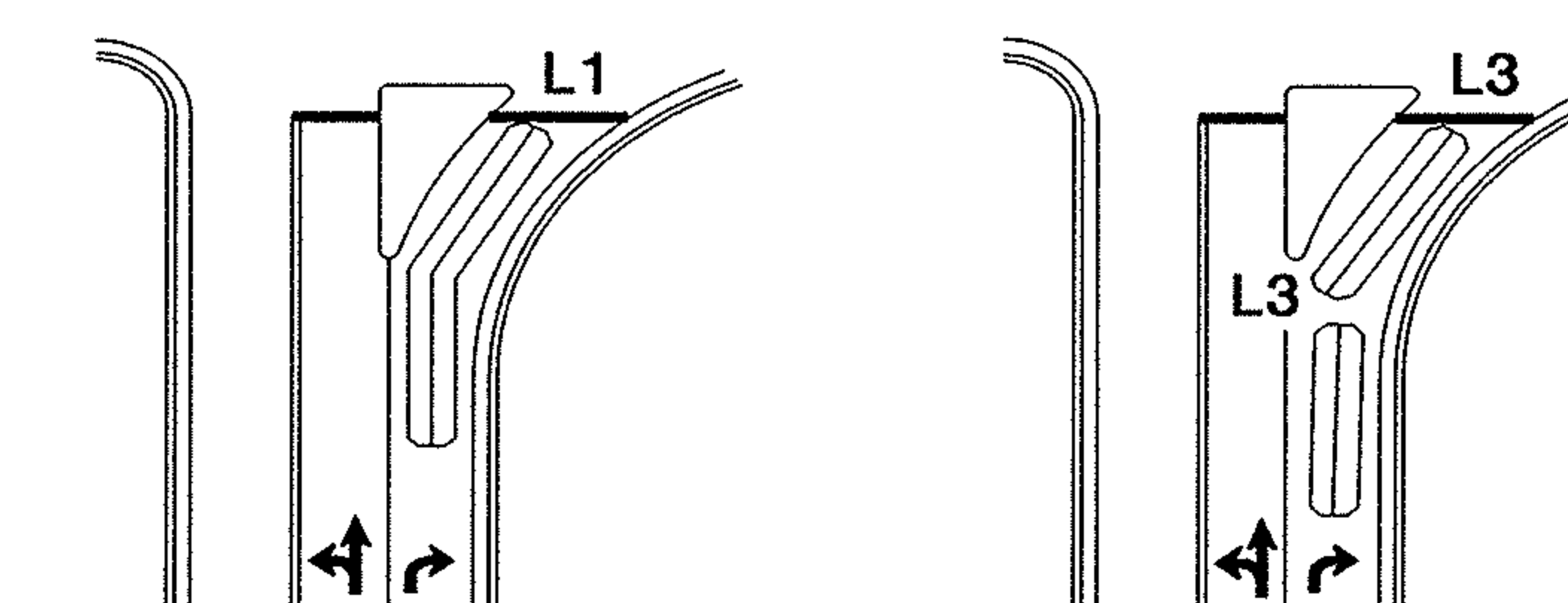


Standard Turn

L1 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop  
L2 = 6ft X 6ft (1.8m X 1.8m) [Minimum] Presence loop  
Wired separately  
L3 = 6ft X 20ft (1.8m X 6.0m) Quadrupole loop  
Wired in series

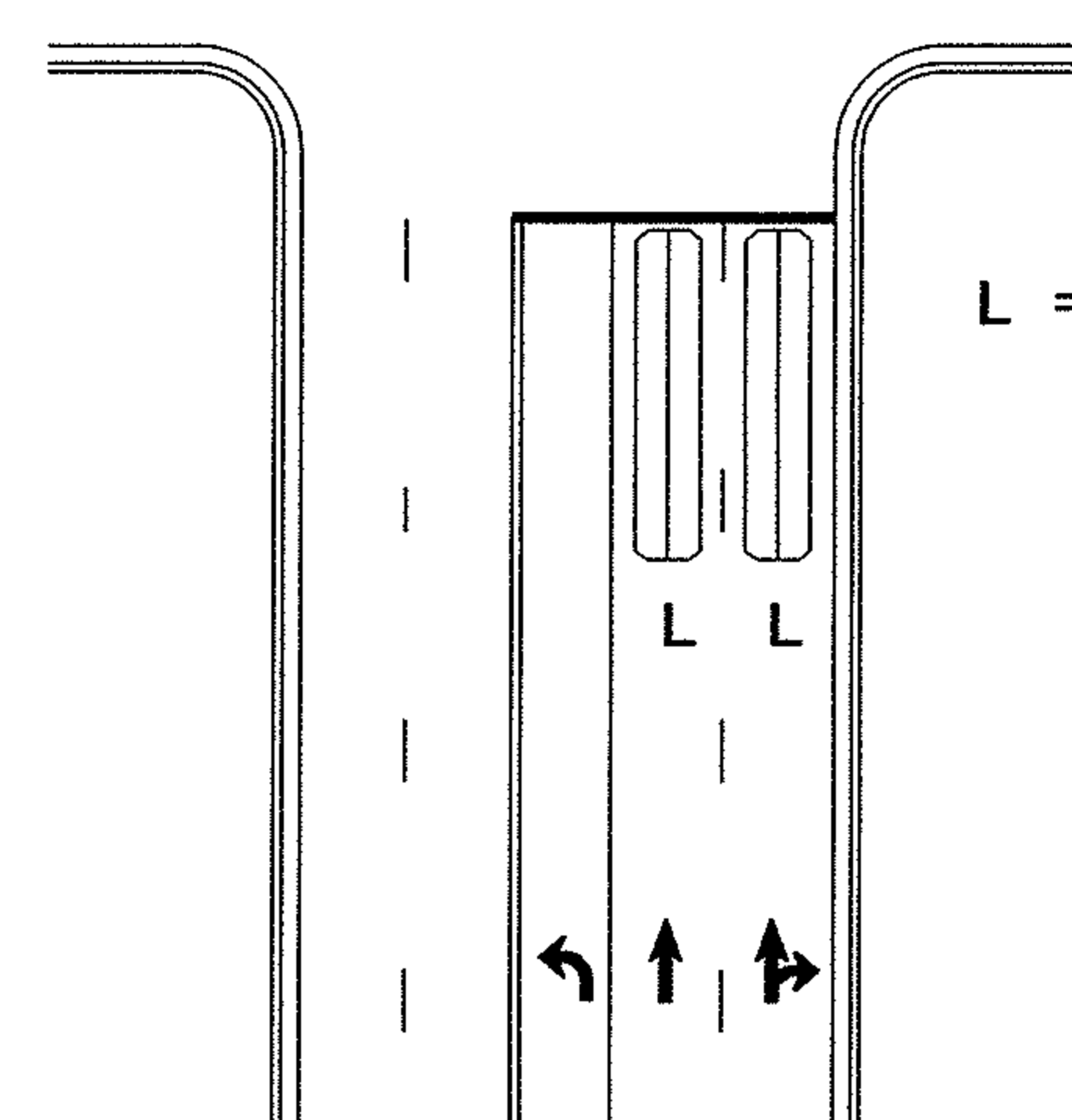


Wide Radius Turn



Channelized Turn

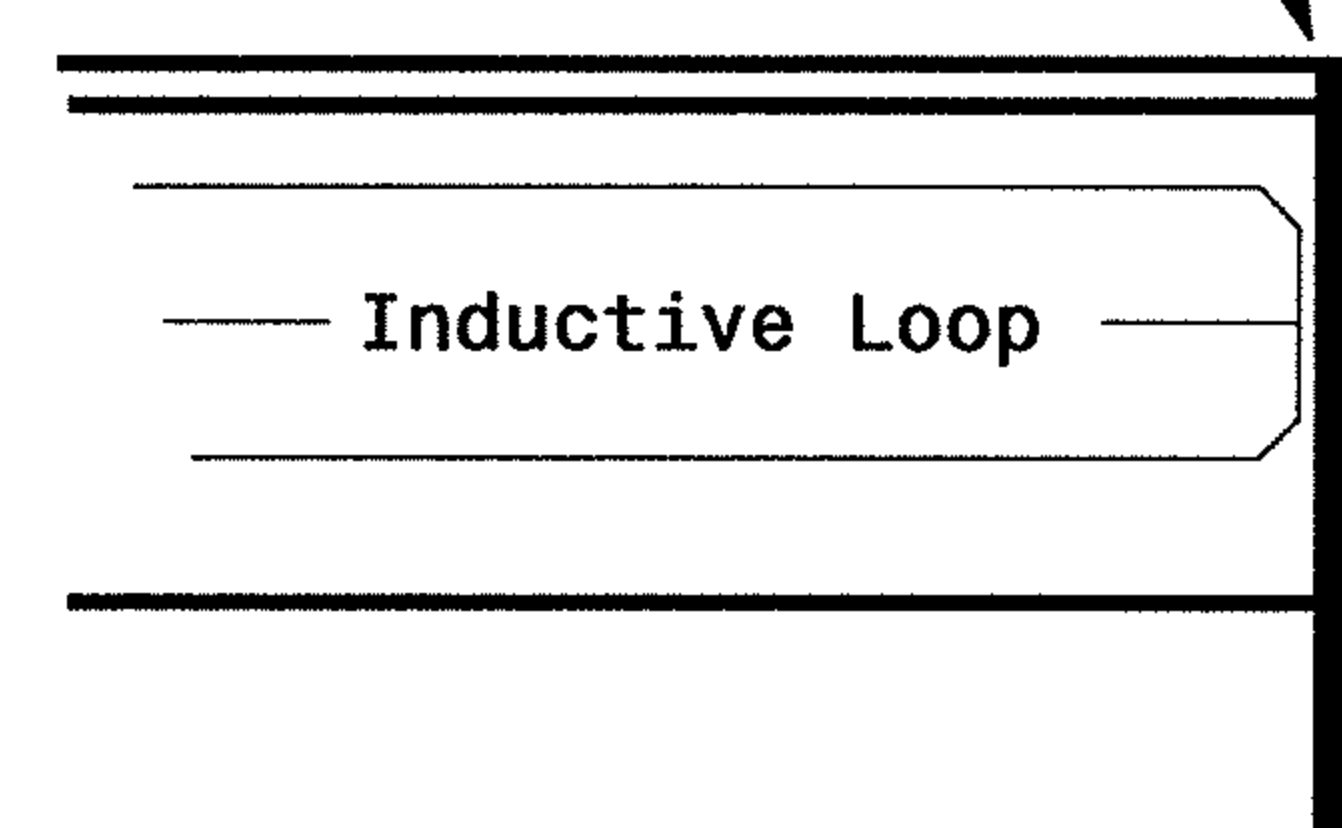
### Side Street Detection



L = 6ft X 40ft (1.8m X 12.0m)  
Quadrupole loop  
Wired to separate  
detectors/channels

### Presence Loop Placement at Stop Lines

Locate loop slightly  
behind leading  
edge of stop line



Note:  
Loop may be located in advance  
of stop line when stop line is  
greater than 15' (4.5m) from edge  
of intersecting roadway; or, when  
loop detects a permissive or  
protected/permissive left turn.

### Recommended Number of Turns

Single 6' X 6' (1.8m X 1.8m)  
loop (wired separately):

Length of Lead-in ft (m)	Number of Turns
< 250 (75)	3
250-375 (75-115)	4
375-525 (115-160)	5
> 525 (160)	6

Quadrupole loops: Use 2-4-2 turns  
6' X 15' (1.8m X 4.6m) Loops:  
Lead-in < 150' (45 m), use 2 turns  
Lead-in > 150' (45 m), use 3 turns

	Typical Loop Locations		
	PLAN DATE: June 2006 PREPARED BY: P. L. Alexander	REVIEWED BY: REVIEWED BY:	