DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
AMES, IOWA

1980
TRAFFIC LINE MARKING
PROGRAM

March 3, 1980
Compiled by: Office of Maintenance

T_A_B_L_E O_F C_O_N_T_E_N_T_S

INDEX

IOWA DEPARTMENT OF TRANSPORTATION
Traffic Line Marking Program
SECTION I
GENERAL POLICY

The District Paint Crew Supervisor is responsible, under the supervision of the District Maintenance Engineer or designated Resident Maintenance Engineer, for all highway painting, including curbs, within his district. Centerline marking should start about April 15th and be completed by July 1st, in order to complete edgeline, new construction, and second marking before winter shutdown.

1. Contacts with Cities, Towns and State Institutions

The city, town or state institution authorities where the maintenance of the extension or institutional roads is under contract with the Department of Transportation shall be contacted by the district to determine if they want the Department to mark the traffic lines on any of the primary road extensions or institutional roads. If the city, town or state institution requests the Department to do this marking they must provide the extra policing, traffic control and line protection which may be necessary during the marking operation. If the city, town or state institution does not want the Department to do this marking then the marking will not be done. On primary road extensions the marking will stop at the same place as in previous years (end of 45 mile zone, beginning of 25 or 35 mile zone).

2. Extensions and Institutional Roads Maintained by the Department of Transportation

All extensions and institutional roads maintained by the Department will be marked by the Departments forces provided the city, town or state institution will provide extra policing, traffic control and line protection which may be necessary during the marking operation.

3. Marking in State Parks

State Park Roads per se are not primary roads nor part of the primary road system. Until the last few years very few park roads were of a structural quality of width that they could tolerate the center or barrier lines placed on primary roads. Construction in recent years has provided some park roads of quality that could benefit by traffic lines. In order to enforce a uniform statewide policy, NO STATE PARK ROADS will be striped until a written request is submitted by the respective District Maintenance Engineers to the State Maintenance Engineer who will consult with the State Conservation Commission. Results of the consultation will be forwarded to the District Maintenance Engineer who will implement the work accordingly.

4. Marking by City

If any city prefers to do its own marking in a heavily traveled business district it should be encouraged to do so. Those cities having routine maintenance contracts with the Department of Transportation may request to do their own traffic line marking on the primary road extensions. The Department will reimburse the cities for painting those extensions included in the routine maintenance contract. The rate of reimbursement will be $70 per centerline for two lane pavements, $105 per centerline mile for four lane pavements, and $140 per centerline mile for six lane pavements. Portions of primary road extensions having in excess of 3000 vehicles per day per lane mile will qualify for a second marking during the year. Reimbursement for those portions will be at the same rate as for the first marking. The definition of four lane pavement described above under the paragraph entitled "Routine Maintenance" shall apply for this line marking. In lieu of cash reimbursement the cities, at their own request, may be furnished in kind and quantity the paint and beads which would ordinarily be used in painting said extensions. These quantities shall be calculated in accordance with the rates set forth in the current traffic line marking program. The item of centerline marking shall be included on the annual maintenance contract, Agreement Primary Road Extension Maintenance and Operation, as special maintenance. The marking performed by the cities shall conform to the Department's standards.

5. Working Basis

The line marking on extensions and institutional roads in cities, towns and state institutions will be done during regular working hours and with the same crew that marks rural roads. Any policing or additional help necessitated by heavy traffic or other causes must be furnished by the local authorities. The marking of rural pavement takes precedence over marking extensions and institutional roads and no special trips are to be made for this marking. The marking of extension will be done at the same time the marking crew is proceeding along with the regular sequence of marking rural pavement.

6. Street Cleaning

When necessary, streets which are normally maintained by cities and towns under contracts with the Department of Transportation are to be cleaned by the local authorities before paint is applied. In other towns the cleaning will be done by Department of Transportation crews.

7. Spotting Lines

The spotting of line locations and terminal points will be done by Department of Transportation forces as directed by the District Engineer.

8. Standard Marking

Standard marking will be done as designed and specified by the Office of Maintenance. This is covered in Section III of this instruction "Standard Marking Procedures". No exceptions will be made in order to comply with local line marking practices.

9. Flagmen and Operators

Temporary flagmen or operators may be hired in the 1980 marking program within budget limitations to complete the crews.

10. Expenses

The maximum expense allowed per day for meals and lodging will be in accord with I.D.O.T. Policies and Procedures Manual, Policy 120.02.

11. Weekly Reports to Ames Office (See sample Form page 7, Section IV)

Once painting begins a "weekly report" of painting activity is to be sent to the Ames Office and continued weekly whether or not painting was actually done. The "Week Ending" date should always be on a Thursday and the final report for the season should be marked "final".

The location of centerlines marked during the week should be colored in red on the district map. Edgelines painted during the week are to be marked in green. The proposed routing for the following week should be noted in blue. The miles painted are to be recorded to the nearest tenth of a mile for centerline and edgeline.

12. Paint or Beads Taken From Foreign Districts Stock

When a crew from a foreign District draws paint or beads from an inventory location outside their home District, they should prepare a "Stock Transfer" Form 133011, see page 6 of Sec. IV, in triplicate (3) copies, leaving the last copy for the issuing locations record, second copy to the receiver of the material, and the original to the Office of Supplies and Equipment Management.

SECTION II
TRAFFIC LINE MARKING DATA
AND
OPERATION OF TRAFFIC LINE MARKING MACHINES

Line Widths, Spacing and Thickness (See Fig.1)

A. Widths

Yellow Centerline - 4 1/2"
White Lane Line - 4 1/2"

Yellow Barrier Lines - 4"
White and Yellow Edge Lines - 4"

B. Spacing

Between lines - 3"; except double barrier - 10 1/2"
Intermittent yellow centerline and white lane lines formed by painting 10' and skipping 30'.

C. Thickness

Paint is 13 mils wet film thickness for centerline, barrier line and lane lines. All edge line will be 12 mils wet film thickness.

Paint and Bead Guns

If there is any question as to the operating condition of the guns the Paint Crew Supervisor should have them checked or repaired by the Office of Fleet and Equipment Management immediately.

Paint Quantities

A. Centerline, Lane Line

Centerlines and lane lines are painted 4 1/2" wide at 13 mils wet film thickness and are formed by painting 10' and skipping 30'. Centerlines are painted yellow and lane lines are painted white.

One gallon will paint 1,316' of intermittent line, or 4.02 gallons will paint one mile of intermittent line.

16.04 gallons will paint one mile of solid line.

B. Barrier Lines

Barrier lines are formed by painting a 4" wide yellow line 13 mils wet film thickness.

One gallon will paint 370' of solid line. 14.26 gallons will paint one mile of solid line.

C. Edge Lines

Edge lines are formed by painting a 4" wide line at 12 mils wet film thickness. All edge lines are painted white except the left edge of each roadway of divided streets and highways which shall be yellow.

One gallon will paint 401' of solid line.

13.16 gallons will paint one mile of solid line.

D. Proper Discharge Rates of Paint Guns

4" line @ 13 mils	- 2.85 gallons per minute
4" line @ 12 mils	- 2.63 gallons per minute
4 1/2" line @ 13 mils	- 3.21 gallons per minute.

Glass Beads

The glass beads which are overlaid on the paint are placed at the rate of 4 pounds per gallon of paint used.

Bead Guns - Pressure Discharge Type

These bead guns are constructed very similar to our paint guns and require comparable adjustments for correct rate of bead application and width of beads spread. Bead tank pressure will be slightly higher (7 to 15 lbs.) for adequate delivery to the gun. Rate of flow through the gun is dependant on throw or travel of valve stem (which is adjustable) and atomizing pressure on the gun. To adjust the bead width pattern requires primarily raising and lowering of gun, and secondarily the atomizing pressure.

CAUTION: Bead tanks are not designed for pressures exceeding 15 p.s.i.

Operating Speed of Paint trucks

The speed of the trucks will be 12 MPH or 1056 ft. per minute and all controls available must be utilized to maintain a uniform speed.

Prevention of Paint in Air Lines

In order to prevent paint or flushing solvent from getting into the air lines a check valve has been placed in the air supply line. As an additional precaution the paint supply valves at the paint strainers shall be closed when painting operations are stopped. Care must be taken not to overfill the paint tanks or to force paint into the air lines when filling the tanks.

Maintenance of Painting Equipment

1. The paint tanks and barrel should be kept full at all times; that is, they should not be allowed to set overnight at 1/3 or 1/2 full. As standard procedure the tanks should be filled to capacity after the day's run and checked to see that they are air tight.

2. Cleaning of paint tanks, barrel and paint lines. Methylene Chloride must be used in cleaning the paint tanks and paint lines. Past experience has shown best results by placing about 30 gal. of methylene chloride in a paint tank and sealing up the tank for 48 hours. There will be a pressure build-up in the tank due to the vapor pressure of the methylene chloride. Use air pressure to force the methylene chloride to the second paint tank and let it soak while cleaning the first tank. After second tank has soaked, flush the methylene chloride out through the paint lines. The methylene chloride that was used for cleaning the tanks may be saved to use as cleaner around the truck. Final cleaning of the tanks will be by scraping and wiping as before. No one will be allowed in the paint tanks unless he has a helper who can see him at all times from the outside of the tank and give any assistance necessary. The tank shall be ventilated before anyone is allowed in the tank.

   Air contamination levels from methylene chloride shall be checked and the area ventilated as necessary to limit the employees exposure in accordance with IOSHA regulations as follows: "8 hour time weighted average 500 ppm. Acceptable ceiling concentration 1000 ppm. Acceptable maximum peak above acceptable ceiling concentration of 2000 for 5 minutes in any 2 hour period."

Use of the Fast Dry Paint

The use of fast dry paint requires some different methods of operation than those used for the conventional traffic paint. The first consideration is that it is fast dry paint. The solvents in the paint are highly volatile and evaporate quickly making it necessary to keep the paint sealed air tight except during transfer pumping operations. The paint drums must be stored and handled carefully. Should the air tight seal be broken, the solvents will rapidly evaporate making the paint worthless. After the paint has been transferred to the paint truck, care shall be exercised to keep the paint tanks and lines air tight.

Flushing Fluid. The best flushing fluid is methylene chloride which also works well removing dried paint and is non-flammable. Methylene chloride also has some disadvantages which include cost, about $2.00 per gallon, and when stored in an unlined steel container, the container rusts quickly. To avoid the rust problem methylene chloride should be strained before using. This condition is particularly noticable in the pressure flushing tank on the truck so a filter has been placed in the line from this tank. Gasoline may also be used in the pressure flushing tank to flush gun tips after each use. In cold weather it may be desirable to use a mixture of ½ methylene chloride and ½ gasoline in the flushing tank. Methylene chloride should also be used for the noon and end of day cleaning up operation.

Caution: The solvents in the fast dry paint are extremely volatile and are flammable. You must use all effort necessary to reduce the fire hazard. All open flame, sparks and glowing material shall be kept away from the paint truck and nurse truck during loading and transfer operations. All flushing fluid and fast dry paint must be kept in closed nonleaking containers.

There will be no smoking during loading and transfer operations. Two 20 pound dry type fire extinguishers shall be placed on the paint truck and nurse truck, one on each side. The fire extinguishers will be located in racks where they may be quickly withdrawn for immediate use. During loading and transfer operations one fire extinguisher will be removed from each truck involved and placed on the ground at a distance of 15 to 20 feet from its truck. After the loading and transfer operations are completed and all containers closed, the fire extinguishers will be returned th their proper location on the trucks. The fire extinguishers will be checked each day before painting operations begin. If for any reason the fire extinguisher is not fully ready, it will be replaced that day.

Check of Paint Gun Delivery Rate

All paint trucks are now equipped with paint meters. The delivery rate shall be checked throughout the day to assure conformance with paint quantities as prescribed on pages 1 and 2 of Sec. II.

SECTION III
STANDARD MARKING PROCEDURES

A. Centerline

1. Two Lane Pavements

RURAL: Marked with dashed yellow line.

a. One lane bridges (less than 18' roadway)

Do not paint the centerline through one lane bridges.

The centerline shall be terminated at a point 200 feet in advance of each end of such bridges.

b. Narrow bridges (less than pavement width)

Centerline shall be painted through narrow bridges.

URBAN: Two lane pavements shall be marked with a dashed yellow line.

2. Four Lane Undivided Pavements

a. Parking Permitted

The centerline of a four lane undivided highway where four lanes are not usable for traffic at all times shall be marked with a dashed yellow 4½" wide line.

b. Parking Prohibited

The centerline of a four lane undivided highway where four lanes are usable for moving traffic at all times shall be marked with two solid 4" wide parallel yellow lines, provided the lane widths are not less than 10'.

3. Other Multi-Lane Undivided Pavements

Mark with two solid parallel yellow 4" wide lines provided there are four or more unrestricted lanes for free movement of traffic.

B. Lane Lines

Lane lines are used to define the two or more traffic lanes on either side of the centerline or median on a multi-lane pavement. Lane lines shall be marked with a dashed white 4½" wide line.

The transverse spacing of lane lines shall be determined as follows:

1. Paving less than 44' wide; In special cases, streets less than 44' wide are operated as four lane facility. In these cases all lane widths shall not be less than 10'.

2. 44' pavement between curbs: Mark lanes 11' wide.

3. 48' pavement between curbs: Mark lanes 12' wide.

The streets and highways described above shall have four unrestricted lanes (no parking permitted) for the free movement of traffic in order to qualify for lane markings.

Other multi-lane pavements (over four lanes) shall be marked with lane lines if the width of each of the four center traffic lanes is not less than 10' and the width of any additional traffic lanes is not less than 9'.

Centerline and lane lines shall not be painted through street intersections in urban areas only and should stop at the property line on each side of the cross streets. Centerline and lane lines shall not be painted through primary road intersections.

The Department of Transportation will not paint stop lines at urban street intersections, crosswalk lines, or any other special urban pavement markings, except as outlined in the Policy on Pavement Markings for Parking.

"When parallel parking is permitted by resolution and ordinance, the Department will erect and maintain the appropriate parallel parking signs. The Department will also paint the initial marking of parallel parking stalls on dustless surfaced parking lanes and the city or town will do the necessary painting to keep the parking stalls legible following the initial painting."

This policy was adopted because on occasion we provide in the resolution with the city or town that diagonal parking is to be eliminated and that parallel parking is to be permitted. The city or town subsequently passes the proper ordinances but does nothing further to eliminate diagonal parking.

Although the Department has established the above policy it is their desire that the painting of parallel parking stalls be kept to a minimum. Therefore you are requested to erect "Parallel Parking Only" signs at those locations where such parking is covered by a resolution and where diagonal parking practices continue to exist. The painting of parallel parking stalls should be done only at locations where painted diagonal stalls are in existence.

It is anticipated that these markings will be done by county crews. These special markings may be placed by the city or town at their discretion but should comply with the recommended policy in the Iowa Manual on Uniform Traffic Control Devices for Streets and Highways.

Most of the intersections on new construction are designed with sufficient width to accommodate through traffic and one or both turning movements. Lane lines shall be painted whenever there is adequate width for two or more lanes of traffic in any direction. At older intersections where there is adequate width but no plans have been furnished, lane lines shall be placed in accordance with the policy described herein.

C. Pavement Width Transitions

Line markings should be used to guide traffic at points where the pavement width changes to a lesser number of lanes. Line markings at pavement width transitions shall be not less than 4" wide and of a standard design for center, lane, or barrier lines.

Converging lines shall have a length the same as the length of the transitional pavement plus 200' (See Figure #3). A number of situations are possible, depending on which lanes must be offset. One or more lane lines must be discontinued, and the remaining center and lane lines must be connected in such a way as to merge traffic into the reduced number of lanes. Through the transition area, in the direction of convergence, the line separating the opposing directions of traffic should be of no passing zone design, either the double solid centerline of a multilane road or a normal broken centerline with an adjacent barrier line as prescribed for no passing zones.

D. No Passing Lines

No passing lines are single solid yellow 4" wide lines painted to the right of and parallel to the normal centerline in no passing zones. No passing zones are located where sight distance is restricted or other hazards prevent safe passing and the limits of the lines (and the zones) are established through surveys.

If a no passing line ends at a point 300' or less from the end of a narrow bridge, or grade intersection, the line shall be continued to the intersection and beyond the bridge for a distance of 50'.

No passing lines will not be painted through one lane bridges but will terminate 200' in advance of the near end and resume 200' beyond the far end of such bridges.

When the location of the no passing or barrier lines, in any one lane, is such that the distance between them is 400' or less the no passing or barrier lines shall be connected and made continuous.

If a no passing zone begins at a point 1,000 ft. or less past the end of a median, the no passing zone and yellow no passing line shall be extended to the end of the median and the "NO PASSING ZONE" sign eliminated as shown in Figure 32.

At an intersection similar to that shown in Figure 33, traffic moving away from the intersecting road where a no passing zone begins at a point 1,000 ft. or less from the stop line for traffic approaching the intersecting road, the no passing zone and yellow no passing line will be extended to a point adjacent to the stop line and the "NO PASSING ZONE" sign eliminated.

At a primary road intersection similar to Figure 34 for traffic approaching a primary road intersection where the approaching traffic must stop a no passing zone is established with no passing pennant and yellow no passing line from a point 600' from the intersection to the stop line at the intersection.

At primary road intersections similar to Figure 35 for traffic approaching a partially channelized intersection in which the approaching traffic is not required to stop and does pass through the channelized portion. A no passing zone shall be established to aid in directing left turning traffic to the proper channel. The channelization as used above could be an island or a barrel requiring left turning traffic to pass to the right of the channelization barrier. The no passing zone shall start 600 ft. from the intersection and continue to the channelizing object.

E. Obstruction Approach Marking

Obstruction approach pavement markings shall consist of a diagonal line, or lines, extending from the center or lane line to a point one to two feet on both sides of the obstruction. All lines used in obstruction approach marking shall be 8" wide. This type of marking is illustrated in the diagram as shown in Figure 4, and the length of the diagonal markings shall be as shown in the table in Figure 4A.

Distribution of Costs

I. General

The purpose of Section IV is to provide information and instructions to personnel engaged in traffic line marking operations for proper coding of time sheets, materials and supply transfers and field requisitions.

Foremen will charge their time, expenses and mileage to function 602 unless they are actually operating striping equipment or assisting in the striping operation in which case they will use the appropriate striping function. The weekly report will be used to notify the central maintenance office of the roads which were marked during the week, and the marking planned for the following week. The period covered by the weekly report will coincide with the work week (Friday through Thursday).

Loading and transfer of marking materials, equipment cleanup, travel time and delays should be charged to the appropriate marking function for the painting being performed.

Time which is connected with traffic marking but cannot be associated specifically with one of the three marking activities should be charged to function 674. The repair of "B" equipment including annual overhaul and cleanup should be charged to function 605.

Traffic control for striping operations will be charged to Function 673 "Traffic Control For Maintenance Operations" and to the District Cost Center.

The Stock Issue, form 133005, will need to be filled out at the end of each day charging out materials used on functions 663, 664, and 665. Materials should be charged out to the Maintenance areas and routes where they are used. (See sample of form, page 5 of Sec. IV).

II. Time Sheet Coding

A. Beginning on June 25, 1976 it will be necessary for paint crews to use foreign locations for each maintenance area where they paint lines. It will also be necessary to charge painting to the routes painted.

When painting a route through any maintenance area one time sheet entry will be made using the home county number for the maintenance area, the route number being painted and the line miles painted in that area. NOTE: only one member of the District crew

will report the accomplishment. For example if centerline is painted through the Grundy Center maintenance area from Iowa #118 to U.S. #63 one entry would be made as follows: Function 663, Foreign location 551101, County No. 38, Route No. 0175. (See sample page 3 of Sec. IV).

Paint crew supervisors must use the Maintenance Area Responsibility Maps dated July 1979 until a later one is published.

B. Local crews working with paint crews will treat highway striping the same as any other maintenance work. They will not use foreign location within their assigned maintenance area but when outside their own maintenance area they will use the area where they are working as a foreign location. However, when working on traffic control they will use the District Paint Crew Cost Center as Foreign Location and code their time to Function 673. (see sample page 4 of Sec. IV). Traffic control is charged this way so it can be identified yet associated with the marking operation. Whenever local maintenance operators are used they should be cautioned to use the District Paint Crew cost center as a foreign location for traffic control.

Form 181113 3-78 H-12478

PAYROLL, TIME, EXPENSE AND EQUIPMENT SHEET

NAME	EMPL NO	COST CENTER	P.C. NO	COST CENTER DESCRIPTION	E/N	SHIFT	VAC. ANNIV. DATE	SOC. SECURITY NO.	PAY PERIOD COVERED
John Doe	23456	553000	1	District 3 Office		1			5-11-79 through 5-24-79

DATE MO.	DATE DAY	REGULAR TIME A	OVER-TIME B	COMP. EARNED C	HOLI. COMP. EARNED D	E	F	G	H	I	J	K	L		FUNC. CODE XXX	FOREIGN LOCATION	PROJECT CONTROL NUMBER: SYSTEM NO.	CNTY. NO.	CONTROL SECT. OR BLDG. NO.	UNIT/ PAREN. NUMBER	WORK IDENTIFICATION NUMBER	VEHICLE USAGE: "A" NUMBER	ENDING ODOMETER READING	REIMBURSED DAILY TOTAL EXPENSE $	¢
05	24	80.0	(District Paint Crew Supervisor).												602							A011635773			
			Permanent and Part Time Employees																						
05	11	04.0	(Paint Crew)												663553306		760003				0002572162111689				
05	11	04.0	(Traffic Contrpl Trucks).												673		760003					A186741377 7			
			Note: All functions 663, 664, and 665 charges should be to a foreign location.																						

DETAIL TIME TOTALS	REGULAR TIME A	OVER-TIME B	COMP. EARNED C	HOLI. COMP. EARNED D	E	F	G	H	I	J	K	L	
SHIFT 1													
SHIFT 2													
SHIFT 3													

INDIRECT TIME TOTALS	SICK LEAVE M	VACA. LEAVE N	HOLI. LEAVE O	INJ. LEAVE P	MILI. LEAVE Q	OTHER LEAVE R	COMP. TAKEN S	HOLI. COMP. TAKEN T	STANDBY U	CALL BACK V	W	X	Y	Z	
SHIFT 1															
SHIFT 2															
SHIFT 3															

I the within claimant do certify that the items for which payment is claimed were furnished for state business under authority of the law; and the charges are reasonable, proper, and correct, and no part of this claim has been paid.

PERSONAL EXPENSE PAY DISTRIBUTION	NON-TAXABLE MEALS	TAXABLE MEALS	LODGING	PERSONAL CAR	COMM. TRAVEL	PARK & TOLLS			TOTAL EXPENSE
OBJECT CODE	201	202	203	204	205	206			
IN-STATE									
OBJECT CODE	221	222	223	224	225	226			
OUT-OF STATE									
OBJECT CODE									
MISC EXPENSE									

CLAIMANT _____ DATE _____

APPROVED _____ DATE _____

AUDIT APPROVALS

Form 181113 3-78 H-12478

PAYROLL, TIME, EXPENSE AND EQUIPMENT SHEET

NAME	EMPL NO	COST CENTER	P.C. NO	COST CENTER DESCRIPTION	E/N	SHIFT	VAC. ANNIV. DATE	SOC. SECURITY NO.	PAY PERIOD COVERED
John Smith	12345	553306	1	Maintenance Denison Residency	N	1			5-11-79 thru 5-24-79

DATE MO.	DATE DAY	REGULAR TIME A	OVER-TIME B	COMP. EARNED C	HOLI. COMP. EARNED D	E	F	G	H	I	J	K	L		FUNC. CODE XXX	FOREIGN LOCATION	PROJECT CONTROL NUMBER: SYSTEM NO.	CNTY NO.	CONTROL SECT. OR BLDG. NO.	UNIT/ PAREN NUMBER	WORK IDENTIFICATION NUMBER	VEHICLE USAGE: "A" NUMBER	ENDING ODOMETER READING	REIMBURSED DAILY TOTAL EXPENSE $	¢
		Area Employees Assisting Paint Crew																							
		(Broom truck, Nurse truck, Paint truck, Pickup truck behind Paint Truck)																							
05	11	04.0													663			760003				1800611677			
		(Traffic Control Trucks)																							
05	11	04.0													673553000			760003				2066603407			
Note: If area employee codes time to function 673, use paint crew cost center as foreign location.																									
If functions 663, 664, or 665 are coded do not use foreign location unless working outside of home area.																									

DETAIL TIME TOTALS	REGULAR TIME A	OVER-TIME B	COMP. EARNED C	HOLI. COMP. EARNED D	E	F	G	H	I	J	K	L	
SHIFT 1													
SHIFT 2													
SHIFT 3													

INDIRECT TIME TOTALS	SICK LEAVE M	VACA. LEAVE N	HOLI. LEAVE O	INJ. LEAVE P	MILI. LEAVE Q	OTHER LEAVE R	COMP. TAKEN S	HOLI. COMP. TAKEN T	STANDBY U	CALL BACK V	W	X	Y	Z	
SHIFT 1															
SHIFT 2															
SHIFT 3															

I the within claimant do certify that the items for which payment is claimed were furnished for state business under authority of the law, and the charges are reasonable, proper, and correct, and no part of this claim has been paid.

PERSONAL EXPENSE PAY DISTRIBUTION	NON-TAXABLE MEALS	TAXABLE MEALS	LODGING	PERSONAL CAR	COMM. TRAVEL	PARK & TOLLS			TOTAL EXPENSE
OBJECT CODE	201	202	203	204	205	206			
IN-STATE									
OBJECT CODE	221	222	223	224	225	226			
OUT-OF STATE									
OBJECT CODE									
MISC. EXPENSE									

CLAIMANT _____ DATE _____

APPROVED _____ DATE _____

AUDIT APPROVALS

FORM 133005
11-75
H-15678

STOCK ISSUE

ISSUING LOCATION — COST CENTER LOC NO: 55 10 01 — MO. DAY YR.: 05 12 79 — NO. 468877

D.O.T. STOCK NUMBER	QUANTITY REQUESTED	UNIT OF ISSUE	DESCRIPTION	QUANTITY ISSUED	SYSTEM NUMBER	COUNTY NUMBER	ROUTE NUMBER OR BLDG. NUMBER	UNIT OR PAREN. NO.	A-NUMBER B-NUMBER JOB NUMBER A B J	BRIDGE NUMBER	RURAL 1 URBAN 2	PART 1 N.P. 2 SUSP. 3	FUNCTION CODE
016 045052	110	gal.	Paint, White Traffic Fast Dry	110		85	0030						664
016 047550	550	gal.	Paint, Yellow Traffic Fast Dry	550		85	0030						663
002 027400	3	Bag	Beads	3		85	0030						663
002 027400	2	Bag	Beads	2		85	0030						664
016 047525	55	gal.	Paint, Traffic Yellow Slow Dry	55		85	0069						665
002 027400	2	Bag	Beads	2		85	0069						665
			Distribution:										
			Original-Purchasing & Inventory Mgt.										
			2nd & 3rd-Issuing Location										

SHIPPING DATA (Use when delivery is to be by D.O.T. Freight Service)

IF DELIVERY IS TO BE MADE TO A LOCATION OTHER THAN THE 'CHARGE TO' COST CENTER, SO INDICATE BELOW.

DELIVER TO:

GARAGE LOCATION

COMMENTS:

TO BE COMPLETED BY WAREHOUSE PERSONNEL

No. Pkgs.	Packed By	Date
	TOTAL NUMBER OF PACKAGES	

MATERIAL ISSUER'S SIGNATURE — DATE

CHARGE TO

COST CENTER NAME	COST CENTER	LOC NO
	5511	05

REQUESTOR'S SIGNATURE — DATE

RECEIVER'S SIGNATURE — DATE

Form 296
7-70-50M
15261
PB 16546

I.S.H.C. STOCK TRANSFER

NO. 006435

MO.	DAY	YR.
07	27	78

TRANSFER FROM:	COST CENTER	LOC.	TRANSFER TO:	COST CENTER	LOC.
	55,50	01		5,5,1,0	0,1

SHIPPING AGENT:	Bert Jester	RECEIVING AGENT:	R. Johannes
ADDRESS:	Fairfield, Iowa	ADDRESS:	Ames, Iowa

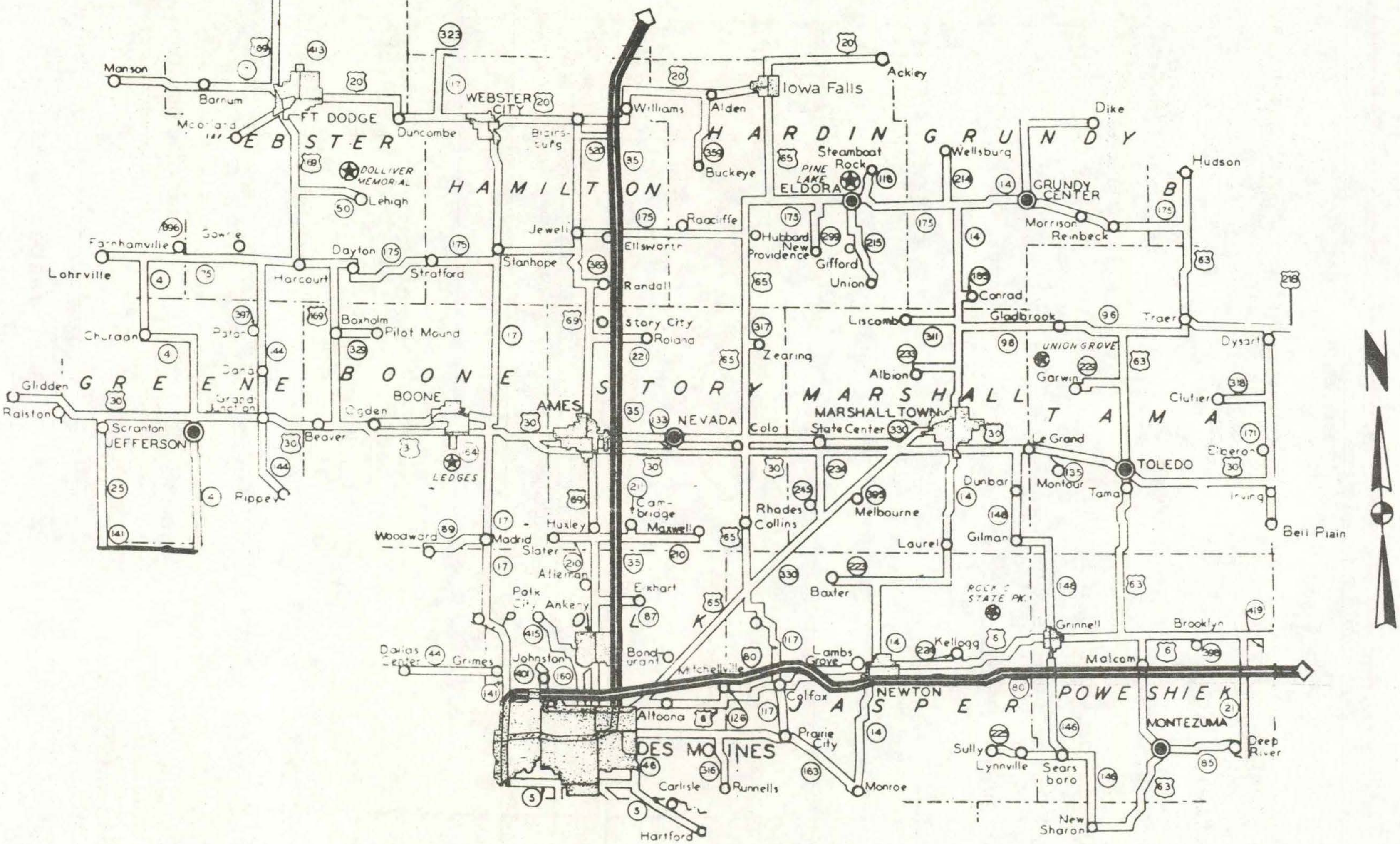
I.S.H.C. STOCK NUMBER	DESCRIPTION	QUANTITY ORDERED	UNIT OF ISSUE	QUANTITY SHIPPED
0 0 2 0 2 7 4 0 0	Beads, for C/L Marking 50 Lb.	100	Bag	100
0 1 6 0 4 5 0 5 2	Paint, white traffic fast dry, C/L	550	gal.	550
0 1 6 0 4 7 5 5 0	Paint, yellow traffic, C/L	550	gal.	550

SAMPLE

Original - Inventory Management
2nd Copy - Receiver of Material
3rd Copy - Issueing Location

COMMENTS: (Reason For Transfer)	WEIGHT	NO. PKGS.	CERTIFYING SIGNATURES
District 1 needs additional supplies.	20,000 LBS.	120	PACKED BY: DATE
			LOADED BY: Bert Jester DATE 7-27-78
			DELIVERED BY: DATE 7-28-78
			RECEIVED BY: R. Johannes DATE 7-28-78

DISTRICT 1

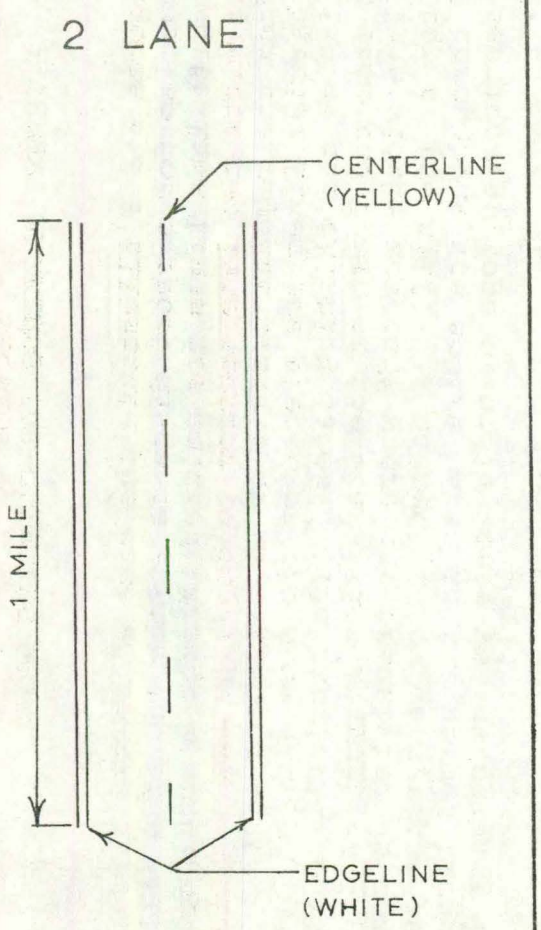


Week Ending Thursday____________________________1980

Centerline Painted (Red)________________Miles

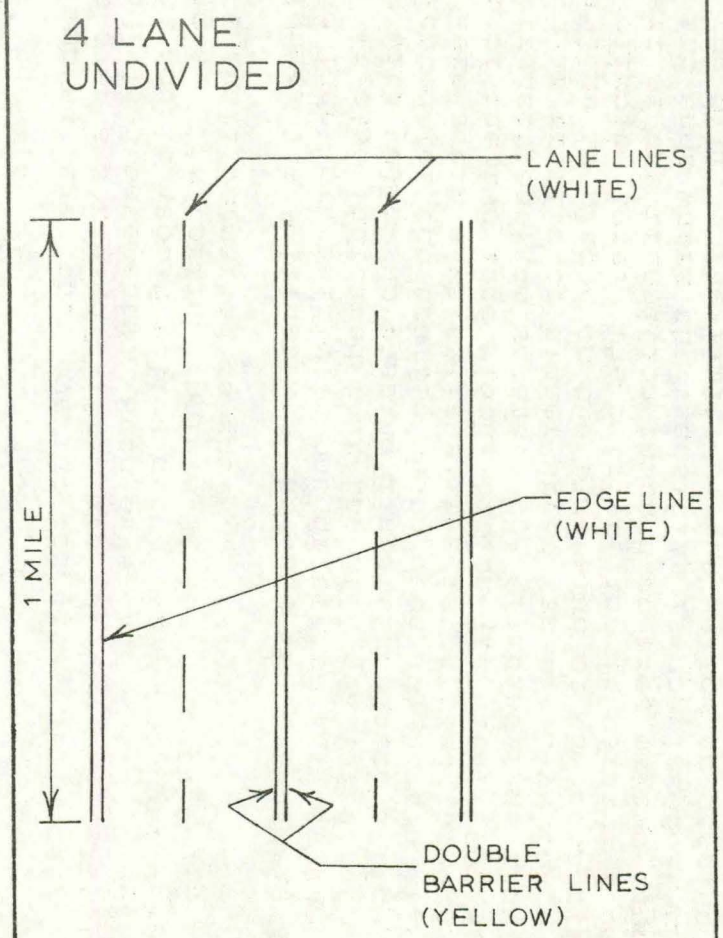
Edgeline Painted (Green)________________Miles

Proposed Next Week (Blue)



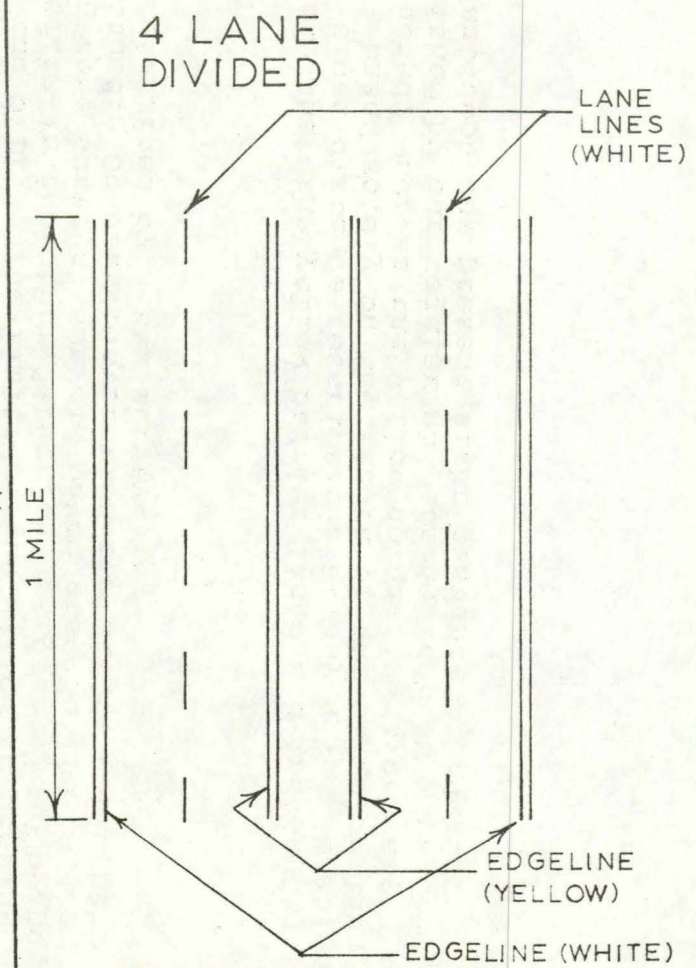
MILES MARKED

CENTERLINE — 1 MILE
EDGELINE — 2 MILES



MILES MARKED

CENTERLINE — 3 MILES
EDGELINE — 2 MILES



MILES MARKED

CENTERLINE — 2 MILES
EDGELINE — 4 MILES

4-9-74

SECTION V
PAVEMENT MARKINGS FOR CLIMBING LANES

Figures 6 & 8 illustrate the case where two climbing lanes overlap for a short distance at the top of a hill. Dashed white lane lines are painted through a portion of the full width two lane section to separate the climbing lanes from the regular traffic or higher speed lanes. Yellow barrier lines are placed on the same side of the centerline as the climbing lanes. The barrier line is painted from the start of the transition through an area of two lane widths and ends where the transition is completed at the top of the hill. A dashed yellow centerline is painted throughout the entire area in the normal manner, except sections at tops of hills where yellow barrier lines overlap.

Climbing lanes that overlap for great distances, perhaps over a series of hills, are for the most part four lane undivided pavements. Such pavements shall be marked with the double solid yellow centerline, and dashed white lane lines. The terminal points of such a section of pavement shall be marked as shown.

Figures 7 & 9 illustrate the case where there is a climbing lane for traffic in one direction but not the other. It also indicated that the hill qualified for marking with yellow no passing lines since such a line is indicated for the traffic which does not have a climbing lane. Here again a white lane line is painted through a portion of the two lane width section (to within 550 ft. of the transitions) to separate the climbing lane from the regular traffic or higher speed lanes. A yellow barrier line is placed on the same side of the centerline as the climbing lane. The barrier line is painted from the start of the transition through an area of two lane widths and ends where the transition is completed at the top of the hill. The limits of the yellow no passing line for traffic in the other direction are determined by no passing zone surveys. On old pavements the limits are established. On new construction the limits would have to be determined by a new survey.

Note that the yellow barrier lines are independent of the sight distance restrictions at any given location and are based solely on the length of the climbing lane constructed, whereas the yellow no passing lines are established by our regular no passing zone surveys, and are dependent upon our present sight distance standards.

SECTION VI
EDGE LINE MARKING
Revised March 1, 1978

The Department of Transportation's edge line marking policy states that all roads with an average daily traffic count of 1,500 vehicles per day or more and 20 feet or more wide will be edge lined. Variances will be allowed to omit isolated sections and also to paint lower volume sections for continuity of the program.

Edge line marking shall be done immediately upon completion of the center line marking program and at such other times during the traffic line marking season when conditions indicate that it is more advantageous to mark edge lines than other markings.

Size of Crew

The same size crew will be used as for the regular line marking program unless it is found from experience that the number of men on the crew should be reduced in order to have the most economical operation. It will be necessary to make careful observations to determine a proper crew size in relation to the amount and distribution of marking in the district, protection of lines and safety of parking personnel and to the traveling public. If experience indicates the need for reducing the crew size it should be done. After the edge line marking is done, a report should be made to the Ames office concerning recommended crew size and general impressions of the painting operations.

Paint Guns

The paint guns used for marking the barrier lines may be attached to the out riggers for marking the edge lines. Each district has a spare "Binks 33" paint gun which may be left attached to one of the out riggers.

Bead Guns

The bead guns used for applying beads to the barrier lines may be used for applying beads to the edge lines.

Description of Line

On two lane streets and highways the edge line shall be a continuous 4" white reflectorized line. On divided highways and streets the left edge line shall be a continuous 4" yellow reflectorized line.

Location of Line

The edge line will be placed 3" from the edge of the pavement.

Controlling the Regularity of Alignment

The edge line out riggers are mounted on the paint cart and the edge line marking equipment may be positioned by steering the cart. This is especially necessary at changes in pavement width, curves and intersections. On tangent sections the regularity of alignment will rest, for the most part, with the truck driver. It will be beneficial to the appearance of the edge lines for the driver and operator to practice with the edge line equipment. Kerosene or other non-staining liquid should be used to show the alignment produced.

Speed of Paint Trucks

A speed of 12 miles per hour, or 1056 feet per minute, must be maintained at all times. No exceptions will be permitted or tolerated.

Cleaning and Mowing Prior to Edge Line Marking

At some locations it will be necessary to make arrangements for the area crew to use a rotary mower to eliminate over hanging vegetation. Deposits of dirt, gravel or other debris, which will not be easily removed by the broom truck, should be cleaned from the pavement before painting operations are scheduled so the painting operation may proceed without stopping.

General Location of Lines to be Painted

1. Two lane pavements (Rural Design without 6" Integral Curb)

   a. Highways with an average daily traffic count of 1500 or more vehicles per day and which are 20' or more wide shall be marked with a continuous white line.

      1. When approaching a bridge narrower than the pavement, the edge lines are to be diagonal from a point 300' from the bridge to the gutter line of the bridge. When approaching a bridge wider than the pavement, the edge line shall continue through the bridge at the normal pavement width.

      2. At locations where there is an abrupt change in width, a 300' diagonal edge line shall be painted on the wider pavement from the edge of the wider pavement to the edge of the narrower pavement at the point of the change in width (See Figure 22).

      3. At locations where there is a change in width because of a climbing lane, the edge line shall follow the pavement edge (See Figures 6 & 7).

      4. At locations where there is a change in width because of a transition from a two lane to a four lane pavement, the edge line shall follow the edge of pavement (See Figure 2). The Office of Maintenance will provide marking layouts for specific locations upon request.

      5. The following guide lines shall be used when painting edge lines at and through the various type intersections.

         A dashed white edge line (paint 2', skip 4') shall continue through curved intersections beginning and ending at the point where the solid edge line stops and starts (See Fig. 13, 14).

         GRAVEL PRIMARY OR SECONDARY ROAD
         The edge line shall be terminated at a point 100' in advance of and shall begin at a point 100' beyond the center line of the gravel road (See Figures 11-12).

PAVED PRIMARY ROAD WITH AVERAGE DAILY TRAFFIC OF 1500 OR MORE
The edge line shall continue around the intersection following the edge of the tapers, deceleration lanes, turning lanes and acceleration lanes (See Fig. 19, 20 and 21).

PAVED PRIMARY ROAD WITH AVERAGE DAILY TRAFFIC OF LESS THAN 1500 OR A PAVED SECONDARY ROAD
If there is a deceleration lane, the edge line entering the intersection shall be terminated at beginning of the taper (See Fig. 15 & 18).

If there is no deceleration lane, the edge line entering the intersection shall be terminated at the point of tangent and curve on the return. (See Figures 15, 16 and 17)

b. Two lane pavements with an average daily traffic count of less than 1500 vehicles per day or which are less than 20' wide shall be marked white as follows.

1. Edge lines shall be painted on both sides of approaches to all bridges including underpasses which have abutments or pile bents within 3' of the pavement. This includes bridges on every type of road upon which traffic line painting is done. The lines will extend 300' from the ends of each bridge. Where the bridge is narrower than the approach pavement the edge lines are to be diagonal from the 300' points to the gutter line of the bridge. Where the bridge is wider than the approach pavement, the edge line shall continue through the bridge at normal pavement width.

2. At locations where there is an abrupt change in width from a wide to a narrow pavement where the total change in width is 2' or more edge lines 300' long shall be placed on the wider of the two pavements beginning at a point on the edge of the wider pavement and extending diagonally to the edge of the narrower pavement at the point of change in width. (See Fig. 23)

3. At locations where there is a change in width because of a climbing lane, edge lines shall be painted following the pavement edge. The edge line leaving the climbing lane shall start at a point opposite the transition sign and shall end at a point 100' beyond the end of the transition. (See Figures 8 & 9)

4. At locations where there is a change in width because of a transition from a two lane to a four lane pavement, edge lines shall be painted following the edge of the pavement. The edge line leaving the four lane section shall start at a point opposite the transition sign and shall end 100' beyond the end of the transition. The Office of Maintenance will provide marking layouts for specific locations upon request.

5. At locations where there is a change in width because of a channelized intersection, edge lines shall be painted following the edge of the pavement. The edge line entering the intersection shall start at a point 100' in advance of the transition and shall end at a point 100' beyond the end of transition. The edge line leaving the intersection shall start at a point opposite the end of the lane line (if there is no lane line the edge line shall start 100' in advance of the transition) and shall end 100' beyond the end of the transition. The Office of Maintenance will provide marking layouts for specific locations upon request.

2. Undivided Four Lane Pavements

a. Paint edge lines on those rural type pavements which have an average daily traffic count of 1500 or more. Refer to the general painting instructions for two lane pavements in this category.

b. On those rural type pavements which have an average daily traffic of less than 1500 refer to the general painting instructions for two lane pavements in this category.

3. Divided Four Lane Pavement (Except Interstate)

a. The right edge line will be painted white and the left edge line yellow. Refer to the general painting instructions for two lane pavements in this category.

b. White edge lines will be painted on the right side and yellow edge line on the left side of ramps at interchanges on the primary road system. The interchanges would be the intersection of two primary roads where the through roadways intersect with a grade separation. The connecting curves or ramps of such interchanges will be edge lined.

c. Edge lines 300' long shall be painted on both sides of the approach lanes to all bridges where there is a rural type pavement. If the bridge is wider than the approach pavement, the edge line shall continue through the bridge at the normal pavement width.

d. Reflectorized solid yellow should be placed on the curbs of islands located in the line of traffic flow where the curb serves to channel traffic to the right of the obstruction. The nose and all of the taper plus 50' of the parallel portion of the curb shall be painted reflectorized solid yellow. If the opposite painted ends are 600' or more apart do not paint the entire length. A yellow 4 inch edge line shall be painted along the unpainted curb section. The entire length of curved sections of curbs shall be painted.

Reflectorized solid white should be used when traffic going in the same direction may pass on either side of the island.

e. Median crossovers for public roads should be gapped. The edge line should be painted through crossovers constructed for emergency and authorized vehicle use only.

f. A dashed white edge line (paint 2', skip 4') shall continue through the curved intersection beginning and ending at the point where the solid edge line stops and starts (See Fig. 13, 14).

4. Interstate

a. Paint edge lines on both sides of both lanes.

1. The left edge line shall be painted yellow and the right edge line white.

2. The edge line shall be painted through bridges at the normal pavement width.

3. At interchanges the continuous edgeline shall be terminated at the beginning of the taper for the deceleration lane; it shall resume, on the off ramp, 50' from the stopping point. On the on ramp the edgeline shall continue along the ramp and connect with the mainline edge line at the end of the taper. On the mainline the 4" edge line shall

commence at the end of the 8" gore line extending along the mainline from the off ramp gore and terminate opposite the beginning of the 8" gore line of the on ramp (See Fig. 25).

4. A dashed white edge line (paint 2', skip 4') shall be painted through the interchange at off ramps (See Fig. 25).

b. Paint edge lines on both sides of all ramps. (Right edge line white, left edge line yellow).

1. Off ramps. The edge line shall begin at a point 50' from the beginning of the taper and end at the point of curve and tangent on the return of the intersecting road or connect with the edge line of the intersecting road if it is included in the edge line program. On the side next to the through roadway the edge line shall begin at the end of the curb or channelizing line and end at the point of curve and tangent on the return of the intersecting road or connect with the edge line of the intersecting road if it is included in the edge line program.

2. On ramps. On the side opposite the through roadway the edge line shall start at the point of tangent and curve on the return of the intersecting roadway and connect with the edge line on the through roadway. On the side next to the through roadway the edge line shall start at the point of tangent and curve on the return and continue to the curb or channelizing line.

5. General Notes

No painting will be done in cities where they do their own painting. It is not intended to paint edge lines where there is 6" urban type curb.

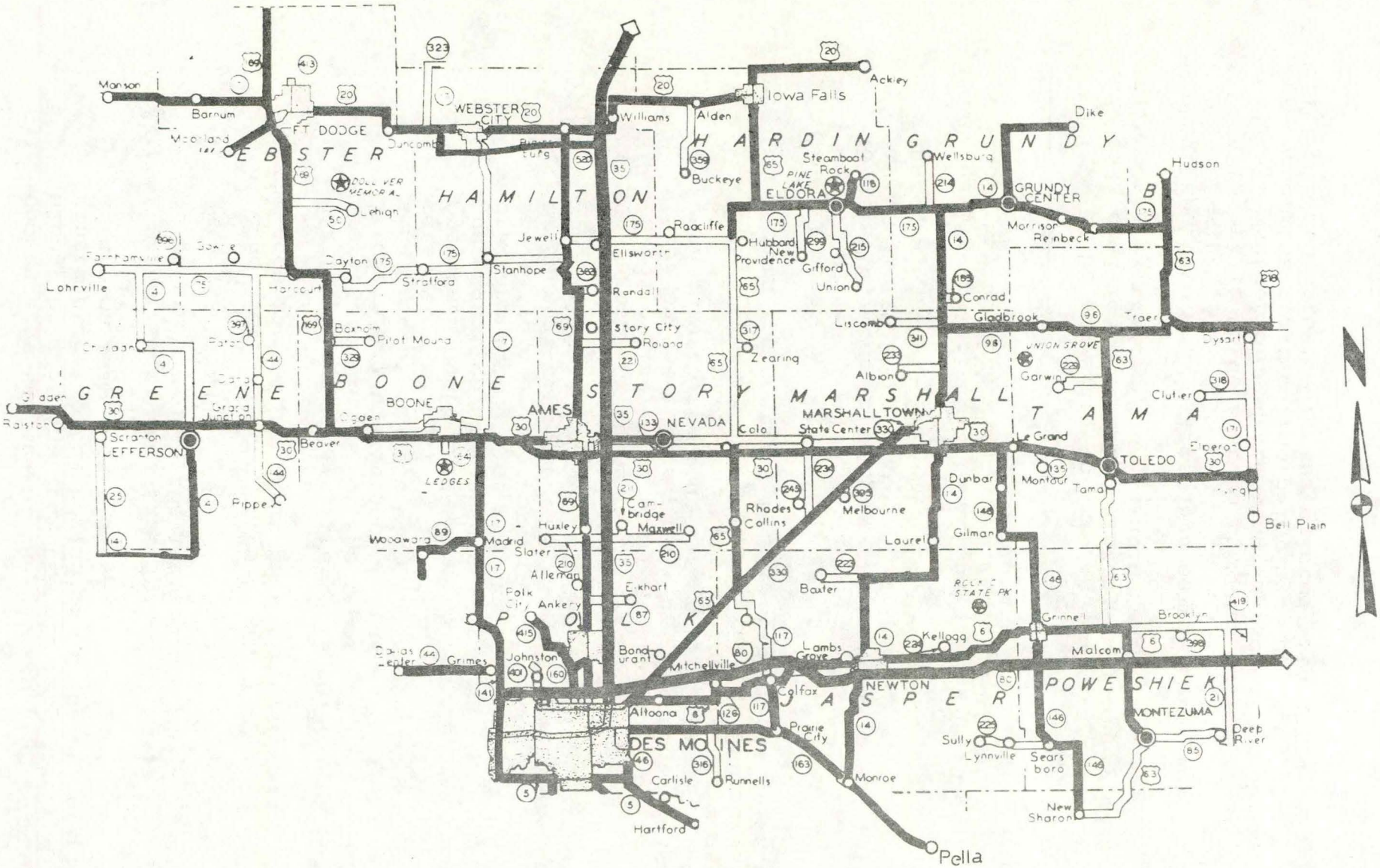
Edge line painting at locations other than those specified above may be authorized by the Office of Maintenance.

Record of Paint and Beads Used

It will be necessary to keep an accurate record of paint and beads used for edge line painting on a county basis the same as is done for traffic line painting work.

Weekly Report to Ames Office (See sample Form page 7 of Sec. IV).

A report is to be sent to the Ames Office at each weeks' end, Thursday, whether or not painting was actually done as is required for centerline traffic line painting. Use the letter size district map and note the routes painted with GREEN pencil.



Week Ending Thursday _____ 1980

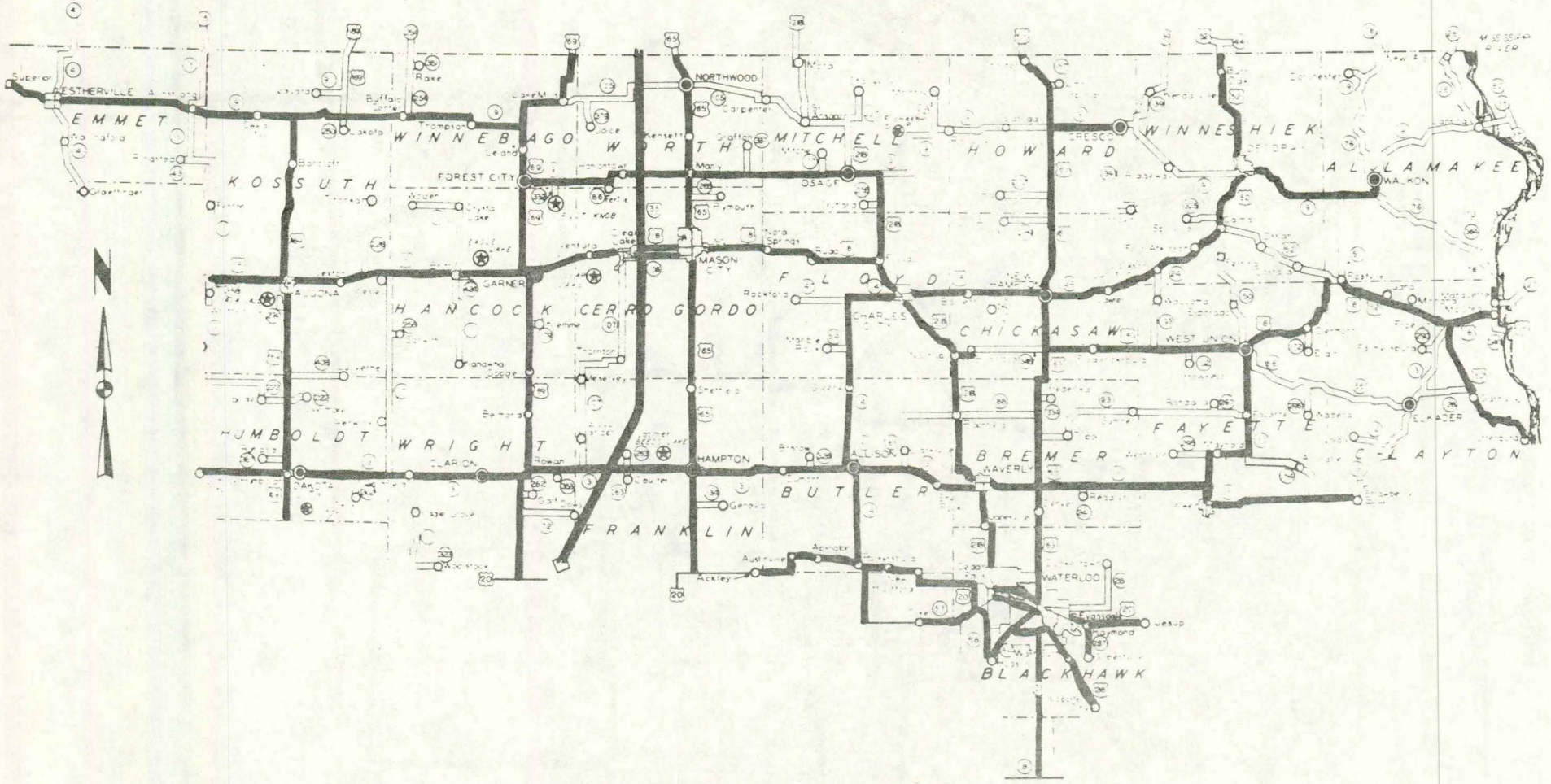
Centerline Painted (Red) _____ miles

Edgeline Painted (Green) _____ miles

Proposed Next Week (Blue)

EDGELINE MAP

DISTRICT 2



Week Ending Thursday _____ 1980

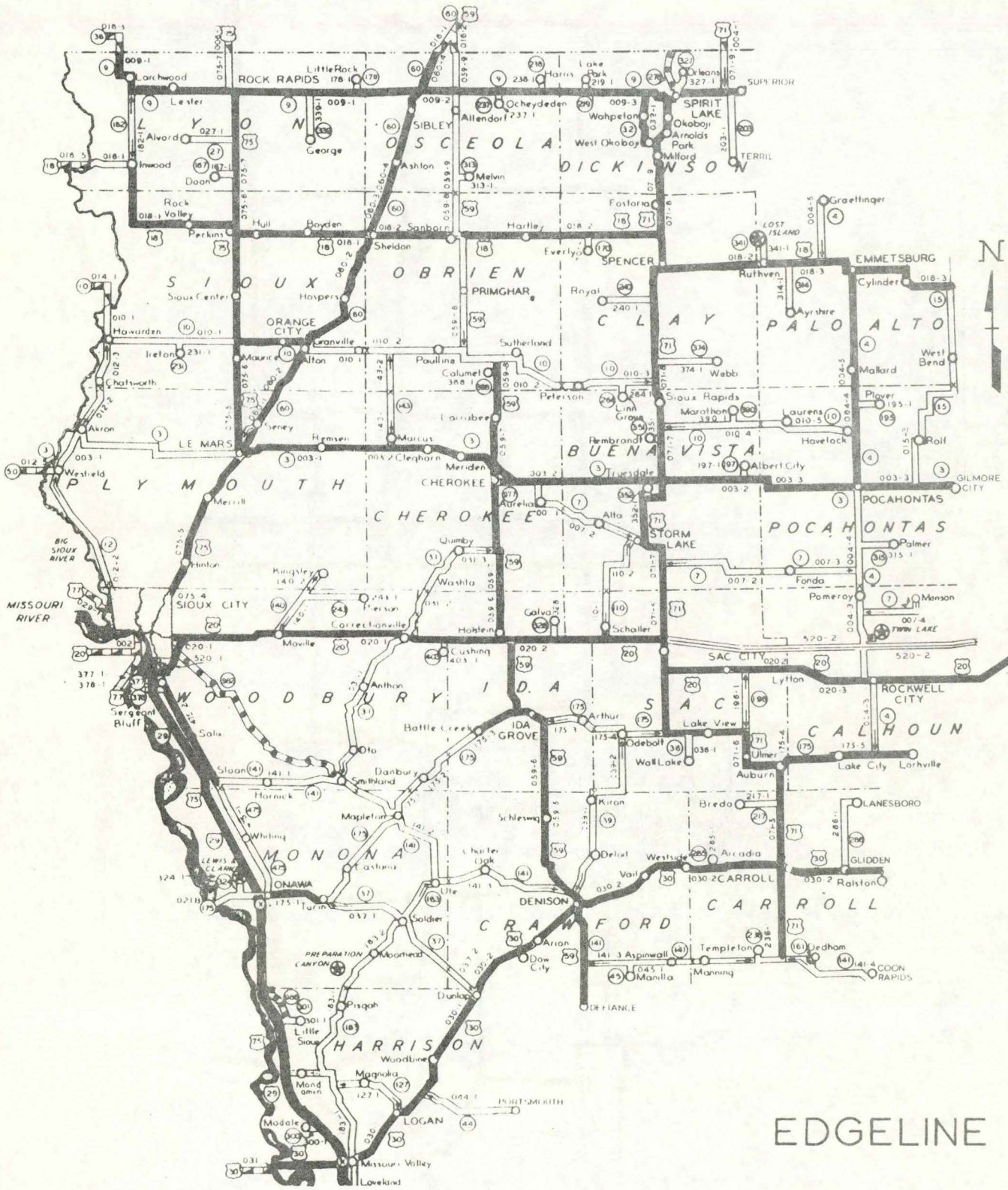
Centerline Painted (Red)_____miles

Edgeline Painted (Green)_____miles

Proposed Next Week (Blue)

EDGELINE MAP

DISTRICT 3



EDGELINE MAP

Week Ending Thursday _____ 1980

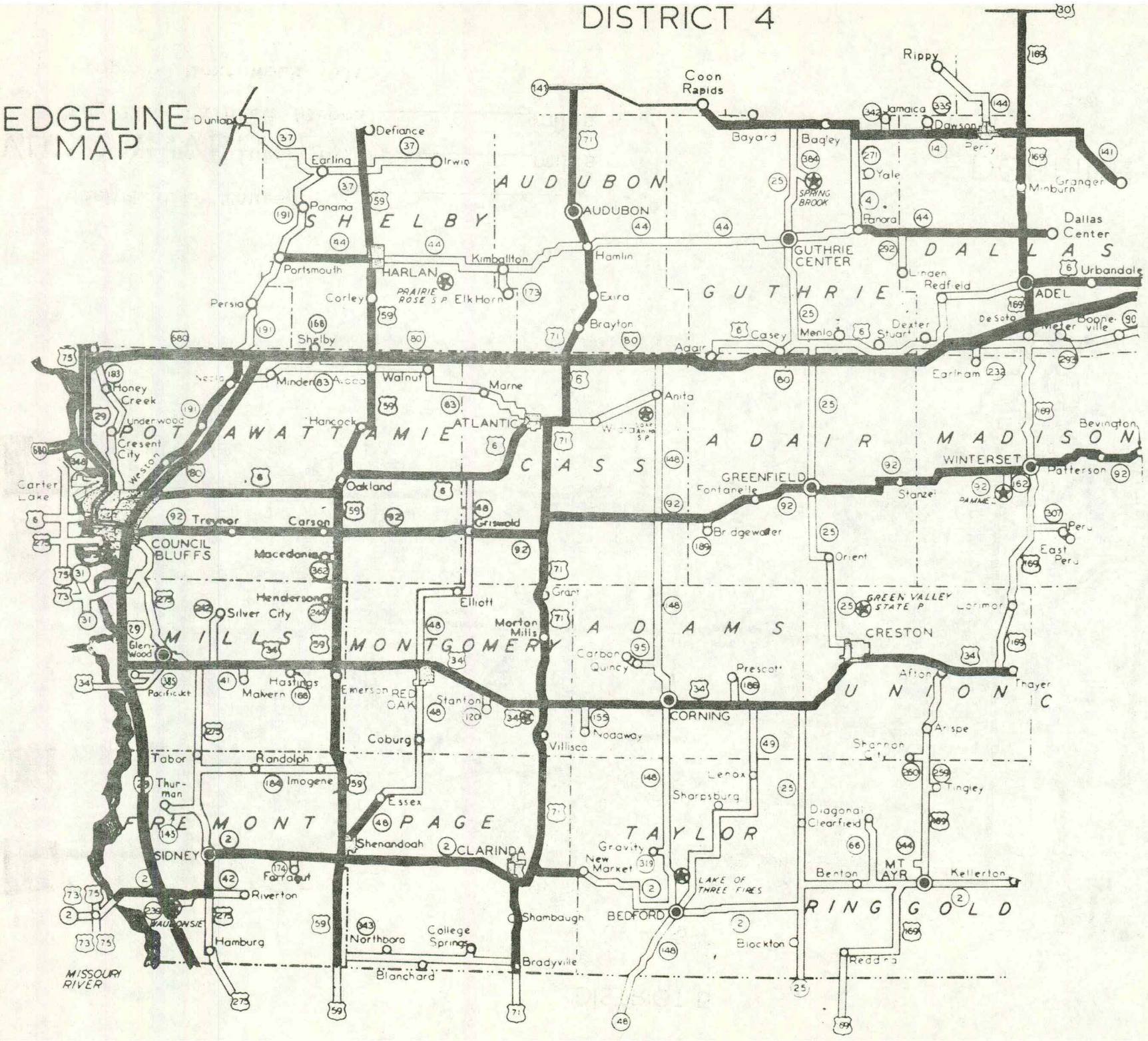
Centerline Painted (Red)_____miles

Edgeline Painted (Green)_____miles

Proposed Next Week (Blue)

DISTRICT 4

EDGELINE MAP



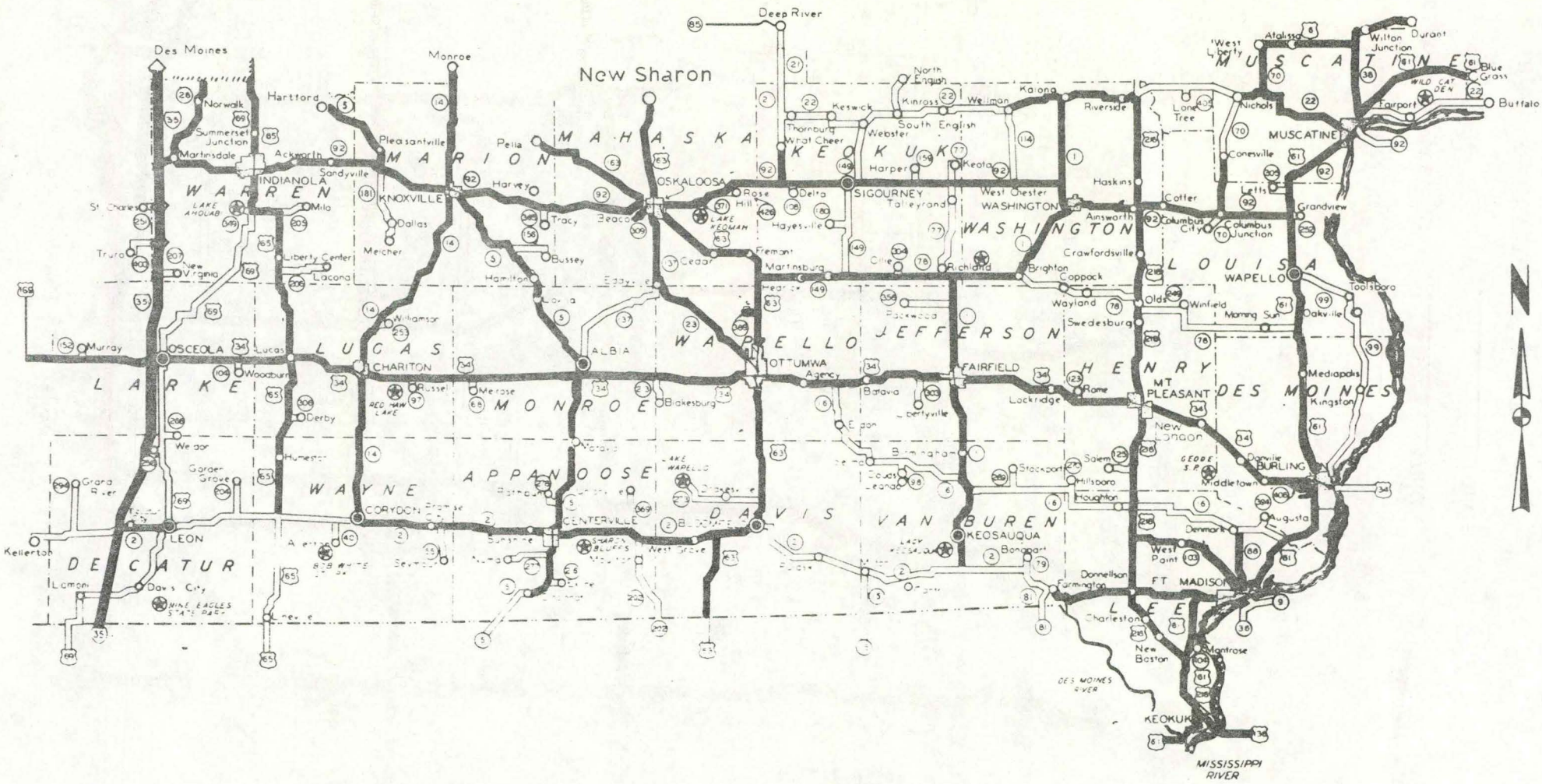
Week Ending Thursday _____ 1980

Centerline Painted (Red) _____ miles

Edgeline Painted (Green) _____ miles

Proposed Next Week (Blue)

DISTRICT 5



Week Ending Thursday _____ 1980

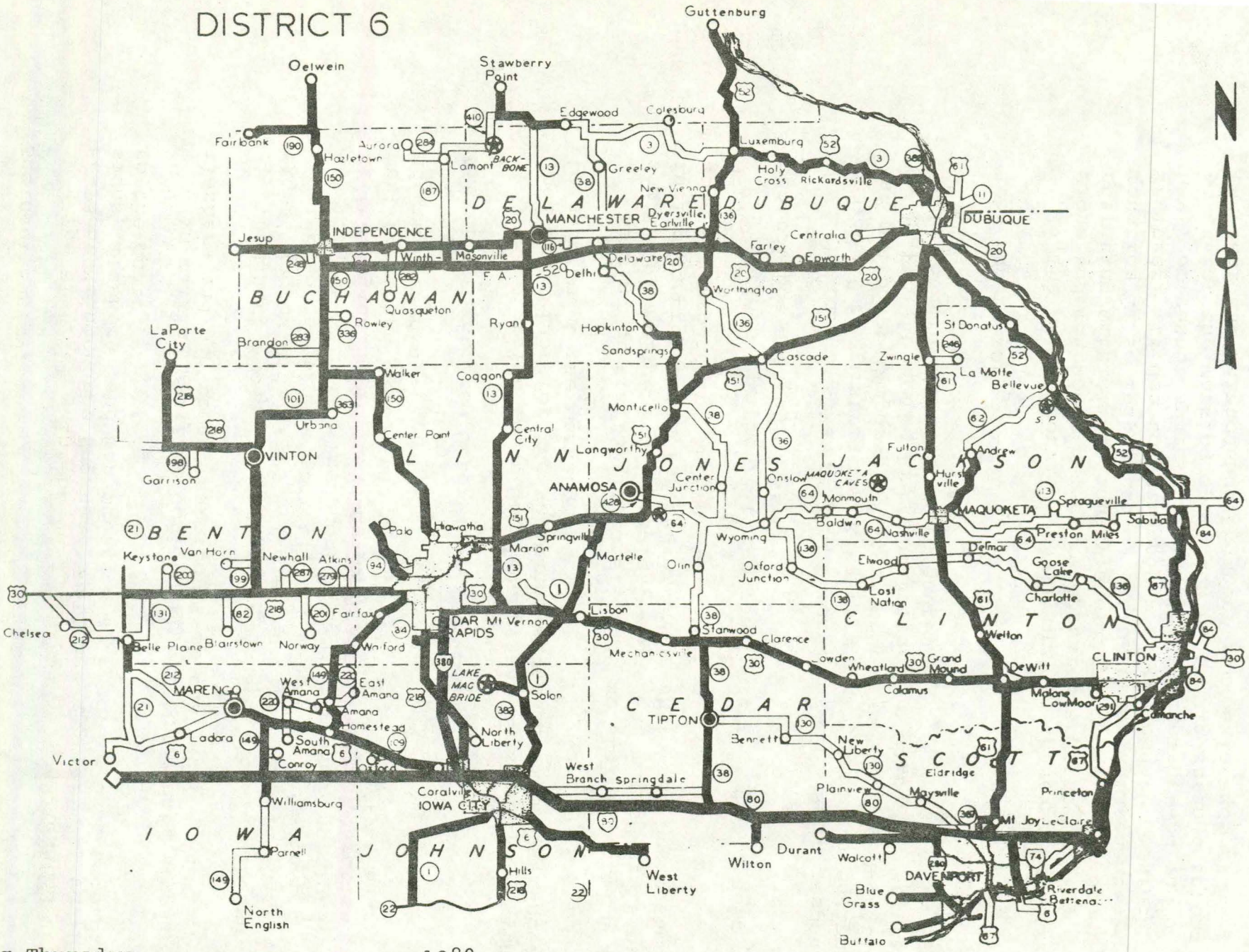
Centerline Painted (Red) _____ miles

Edgeline Painted (Green) _____ miles

Proposed Next Week (Blue)

EDGELINE MAP

DISTRICT 6



Week Ending Thursday _____ 1980

Centerline Painted (Red)_____miles

Edgeline Painted (Green)_____miles

EDGELINE MAP

SECTION VII
DIRECTING TRAFFIC PAST TRAFFIC LINE MARKING OPERATIONS

Engineer Supervision

The District Maintenance Engineer, or a designated Resident Maintenance Engineer shall see that all the equipment, signs, flashers, and man power is at hand and used according to the chart.

No marking shall be done until all equipment, signs, flashers and man power required is on the job.

The chart shows the location of the various units and signs' approximately two (2) minutes after painting has started and should be strictly followed. Be sure that traffic entering is warned. The proper placing of warning signs, etc. at the beginning or starting point of painting operation must be worked out in the field so that the traffic has adequate warning.

District Paint Crew Supervisor

The District Paint Crew Supervisor shall arrange with the Area Supervisor for the vehicles, signs and man power needed to supplement the marking crew.

Marking of traffic lines will not be started until a complete complement of vehicles, signs and man power is present, including protection for the on ramps that will be reached soon after painting is started.

The radio equipment in the county trucks should help to control the spacing of trucks.

The District Paint Crew Supervisor will be in responsible charge of the district marking crew and the county equipment and man power temporarily assigned to the marking operation. He shall call on the Area Supervisor for whatever assistance he needs to help direct the procedure.

Area Supervisor

The Area Supervisor shall furnish whatever equipment, signs and man power necessary to safeguard the marking operating within his county and lapping over into other counties if so instructed by the District Maintenance Engineer. If due to emergency work the county does not have, or cannot spare, the required equipment and man power for the marking operation he should arrange through the Resident Maintenance Engineer for assistance from adjacent counties.

A. Multi-Lane Divided Highways with Shoulders
Ref. Fig. 30 & 31.

General

This section is written to cover the marking of pavement on interstate highways and other multi-lane highways that have shoulders. The procedure for marking traffic lines so a shoulder is necessary to allow enough width for traffic to pass.

This instruction is to cover the marking of traffic lines on all interstate highways. It is also for use on other multi-lane highways with shoulders where the use of this procedure is reasonable and warranted, in the judgment of the District Engineer, to provide safety for personnel, equipment and the traveling public. The marking of multi-lane pavement at (1) channelized intersections of two lane highways, or (2) short sections of multi-lane divided pavement between two lane and city pavement, and (3) city type multi-lane curbed pavement will be covered by later instruction.

The interstate highways and some relatively long sections of multi-lane pavements (with shoulders) require special signing and safety precautions to safeguard the employees, equipment and traveling public. Traffic on these facilities must have adequate warning as illustrated in Figures 30 & 31.

Marking of these highways will be accomplished as a moving operation and no traffic will be stopped except in an emergency. All information to the travelers will be by sign and flashing lights as outlined in the attached figures. Traffic entering the interstate highway at interchanges may also be warned with flagmen or signs and not stopped except in an emergency.

The State Highway Patrol may be requested to have an officer present during the marking of the main lanes on the interstate highways and other multi-lane facilities if available. The chart shows a suggested location for the patrol car. When marking is scheduled the District Maintenance Engineer shall arrange with the district office of the State Patrol for this assistance if deemed necessary.

B. Undivided Highways, Short Sections of Divided Highways, Channelized Intersections, Urban Type Pavement and Edge Line Operations.

This instruction is to cover the marking of traffic lines on primary highways not covered by the previous instruction for multi-lane divided highways.

The traffic line marking operation will be a moving operation and traffic will not be stopped except in an emergency and on primary roads which intersect the roadway being marked. All information for through traffic will be by signs attached to the trucks and moving with the marking operation. Traffic coming on to the primary roadway being marked from other primary roads may need to be stopped and advised of the traffic line marking operation.

No marking is to be done until all equipment, signs and operators are in their proper positions.

The distances between the units will apply only as the units move from the starting point but should have the same relative positions. During the marking operations the positions will be maintained as shown in these figures except for the front truck. The front truck must be in the right hand traffic lane to ensure that on coming traffic will see the first sign without the possibility of the view being blocked by traffic proceeding away from the marking operation. The traffic proceeding away from the marking operation (overtaking) shall be aided by the truck moving to the shoulder to make the passing operation safer and to keep traffic moving. Care must be used by the operator of this truck in moving from the shoulder to the traffic lane and he must watch to make sure he is clear of traffic at all times. When the end of the marking run is reached and the marking equipment is removed from the roadway the front truck should be parked on the shoulder ahead of the point where the marking was stopped.

All the signs are to be mounted in such a manner that they may be folded down or covered up so they will not be exposed to view of the traffic when the warning message on the sign is not necessary.

Figure 1
Standard Types of Pavement Markings

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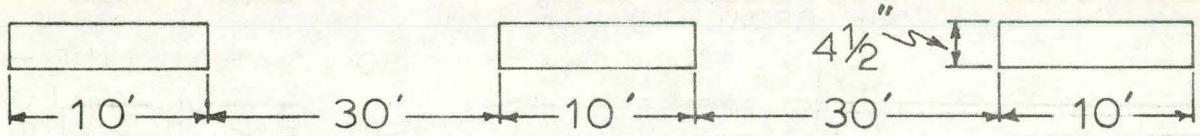
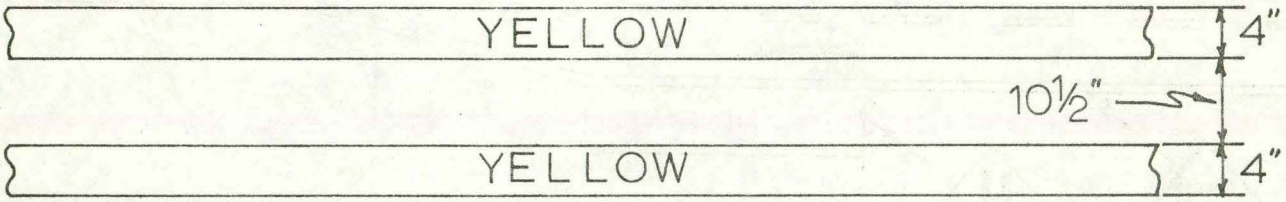
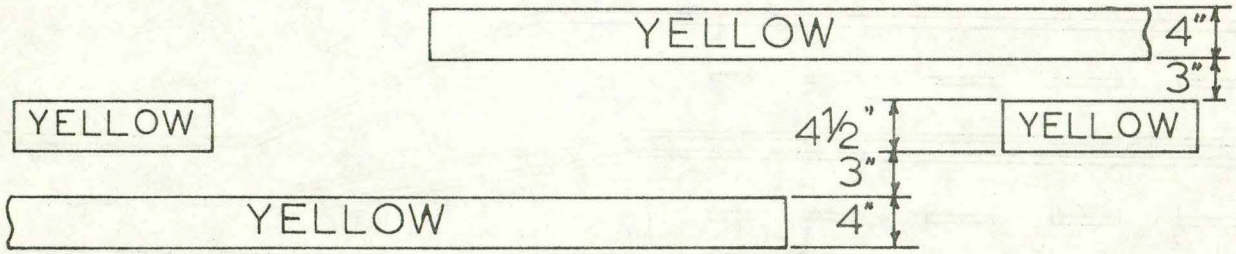
Rev. 3-23-73



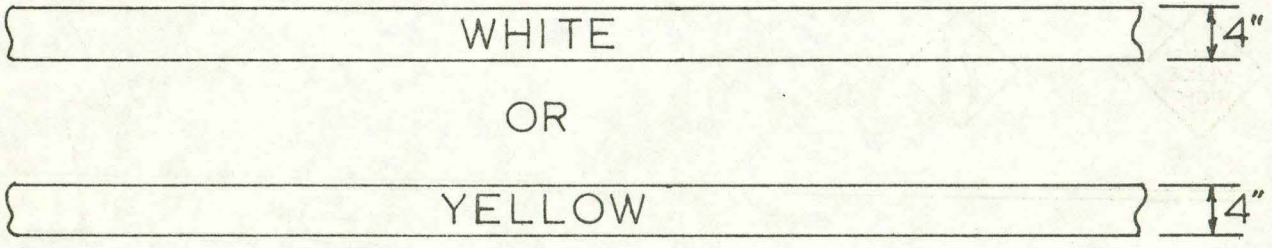
YELLOW CENTER LINE AND WHITE LANE LINE



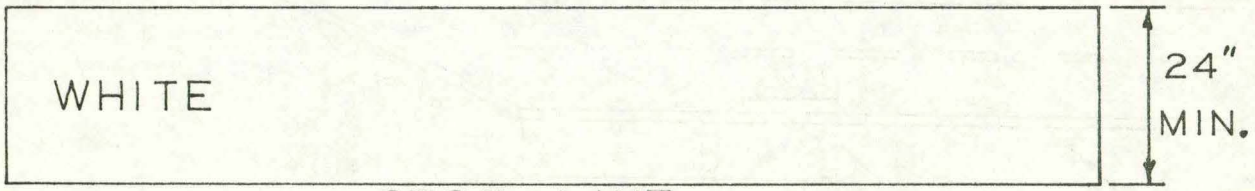
DOUBLE SOLID CENTER LINE



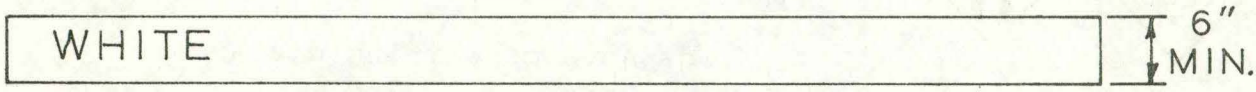
DOUBLE YELLOW OR NO-PASSING ZONE LINE



EDGE LINE

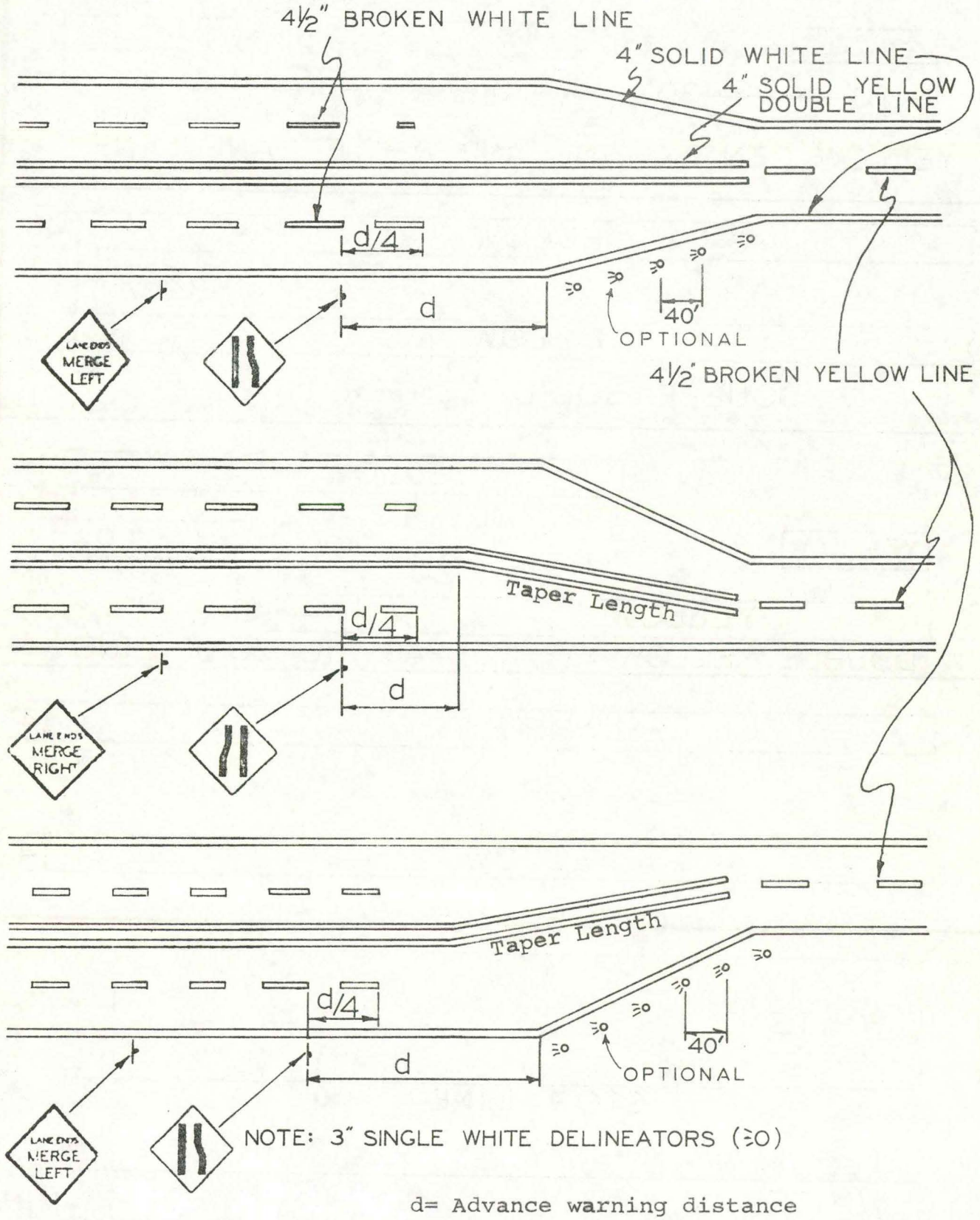


STOP LINE



CROSSWALK LINE

Figure 2
Standard Pavement Markings
Transition From Four-Lanes to Two-Lanes
Pavement in Edge Line Program

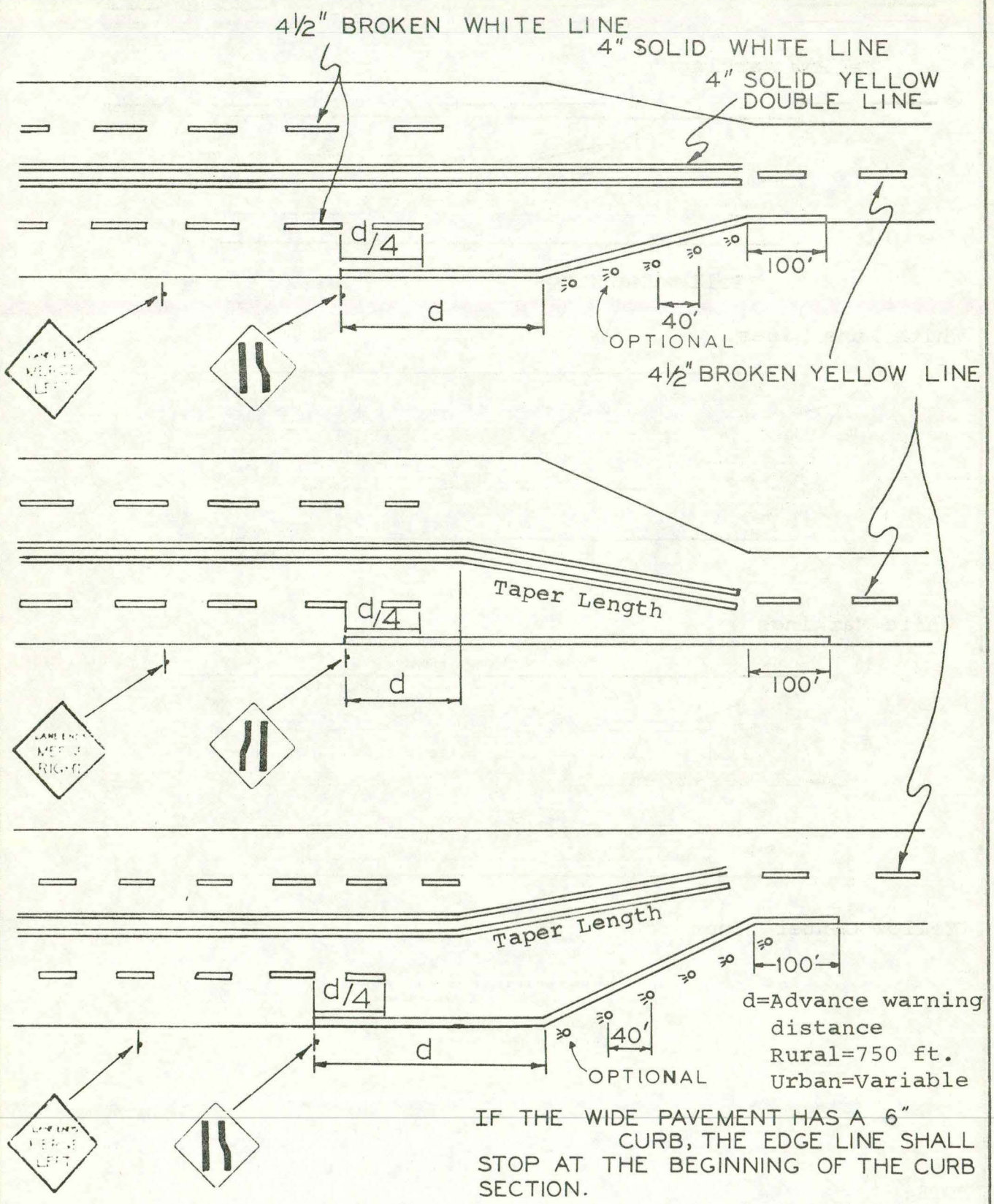


d= Advance warning distance
Rural = 750'
Urban = Variable

Taper Length - See figure 4A

Rev. 3-3-80
REV. 2-7-74

Figure 3
Standard Pavement Markings
Transition From Four-Lanes to Two-Lanes
Pavements Not in the Edge Line Program



d=Advance warning distance
Rural=750 ft.
Urban=Variable

IF THE WIDE PAVEMENT HAS A 6" CURB, THE EDGE LINE SHALL STOP AT THE BEGINNING OF THE CURB SECTION.

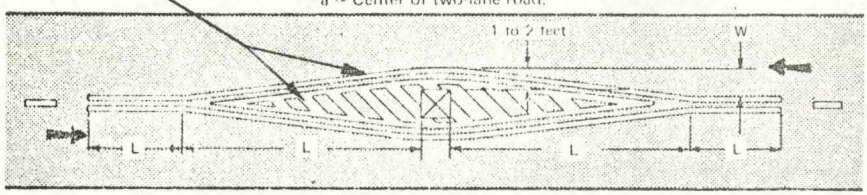
Rev.3-3-80
REV 2-7-74

Taper Length- See Figure 4A

Figure 4
Standard Pavement Markings
Approach Markings for Obstructions in the Roadway

Yellow Markings

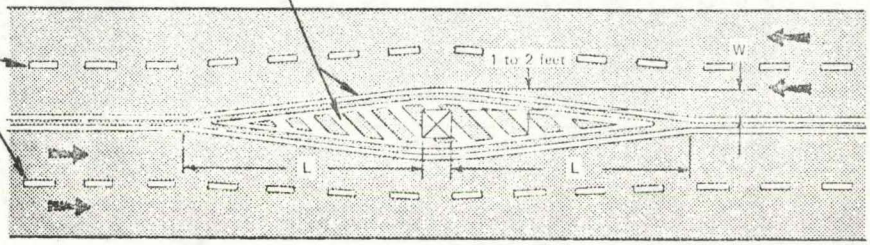
a -- Center of two-lane road.



Yellow Markings

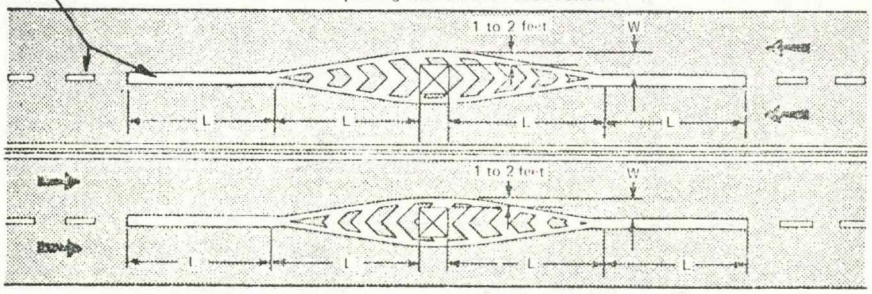
White Lane Lines

b – Center of four-lane road.



White Markings

c – Traffic passing both sides of obstruction



Yellow Center Lines

S = 85th percentile speed in miles per hour
W = Offset distance in feet

Minimum length of: L = 100 feet in urban areas
L = 200 feet in rural areas

Length "L" should be extended as required by sight distance conditions.

NOTE:

See Figure 4A for Length of L.

REV. 3-1-80

Figure 4A
Standard Pavement Markings
Taper Length (L)

W FT.	S-SPEED MPH							
	20	25	30	35	40	45	50	55
1	7	11	15	21	27	45	50	55
2	14	21	30	41	54	90	100	110
3	20	32	45	62	80	135	150	165
4	27	42	60	82	107	180	200	220
5	34	53	75	103	135	225	250	275
6	40	63	90	125	160	270	300	330
8	54	84	120	165	215	360	400	440
10	67	105	150	205	270	450	500	550
12	80	125	180	245	320	540	600	660
14	94	145	210	285	375	630	700	770
16	110	170	240	330	430	720	800	880
18	120	190	270	370	480	810	900	990
20	135	210	300	410	535	900	1000	1100

Table of Length (L) in FEET

L = Taper Length (L)

S = 85th Percentile Speed In Miles Per Hour

W = Offset Distance in Feet

For Speed 45 or More $L = S \times W$

For Speed 40 or Less $L = \frac{WS^2}{60}$

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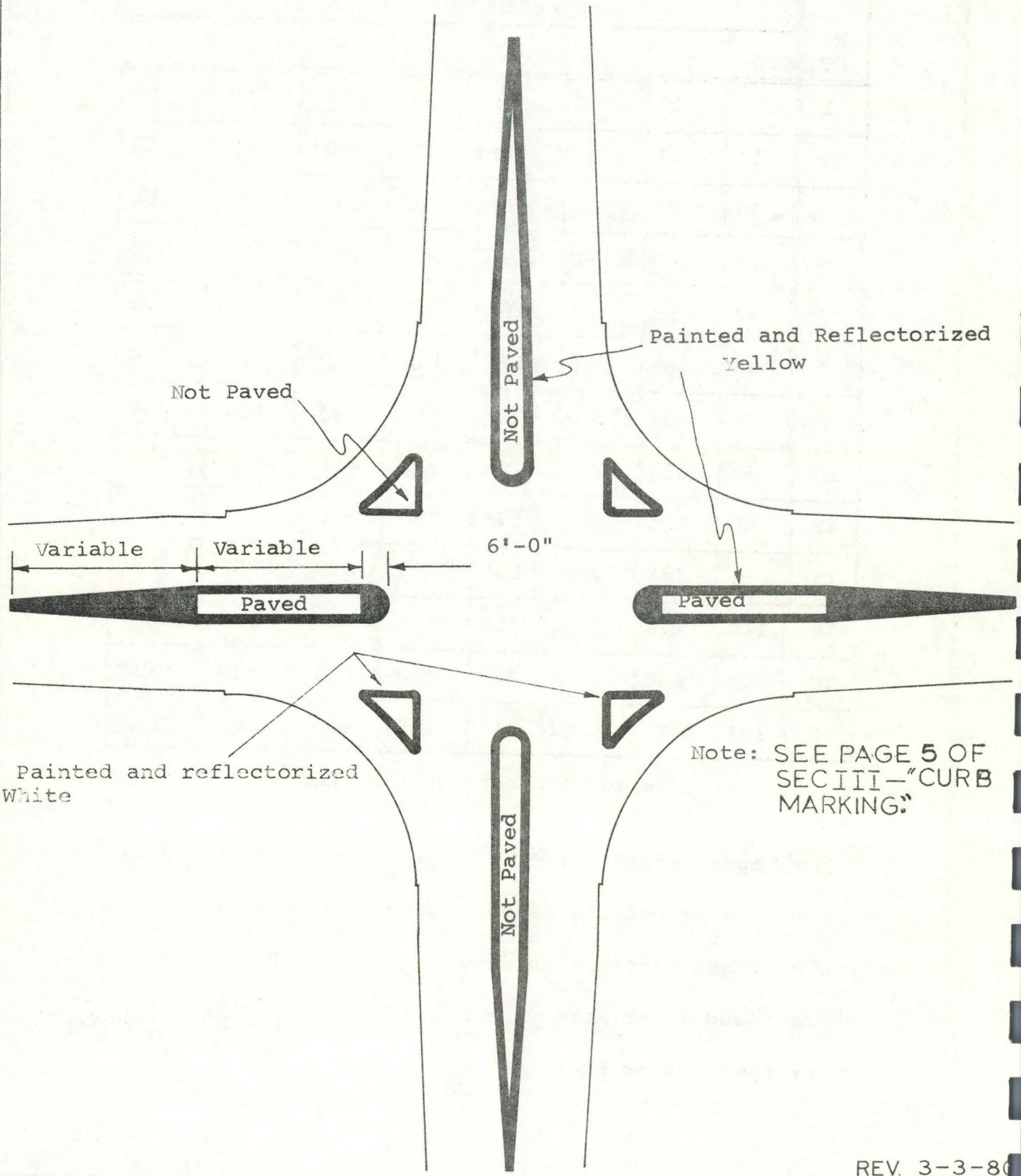
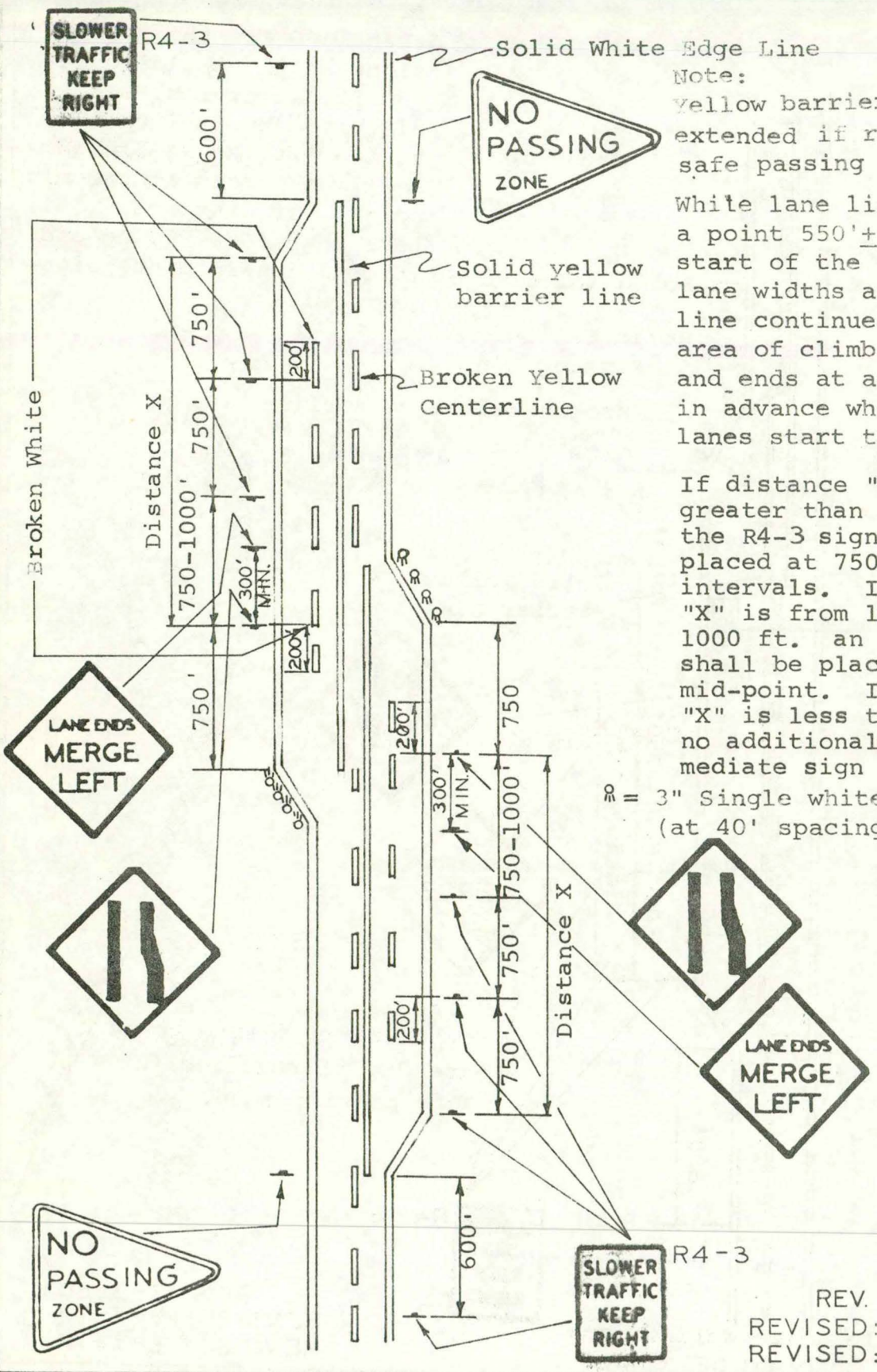
Figure 5
Standard Pavement Markings
Islands and Medians at Channelized Intersections



REV. 3-3-8

Figure 6
Signs and Pavement Markings For Climbing Lanes Pavements in Edge Line Program



Note:
Yellow barrier line to be extended if required for safe passing zone.

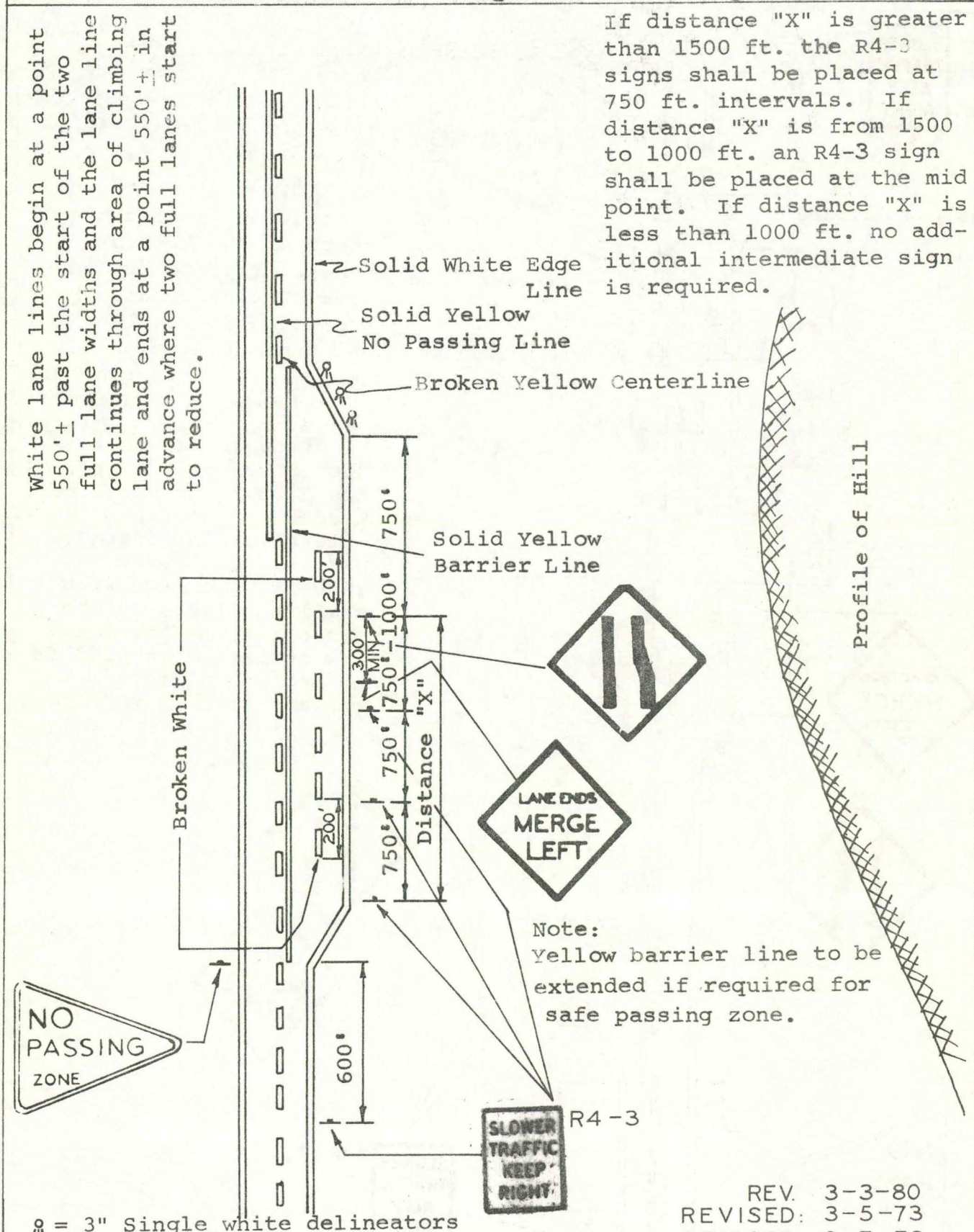
White lane lines begin at a point 550'± past the start of the two full lane widths and the lane line continues through area of climbing lane and ends at a point 550'± in advance where two full lanes start to reduce.

If distance "X" is greater than 1500 ft. the R4-3 signs shall be placed at 750 ft. intervals. If distance "X" is from 1500 to 1000 ft. an R4-3 sign shall be placed at the mid-point. If Distance "X" is less than 1000 ft. no additional intermediate sign is required.

= 3" Single white delineators (at 40' spacing) OPTIONAL

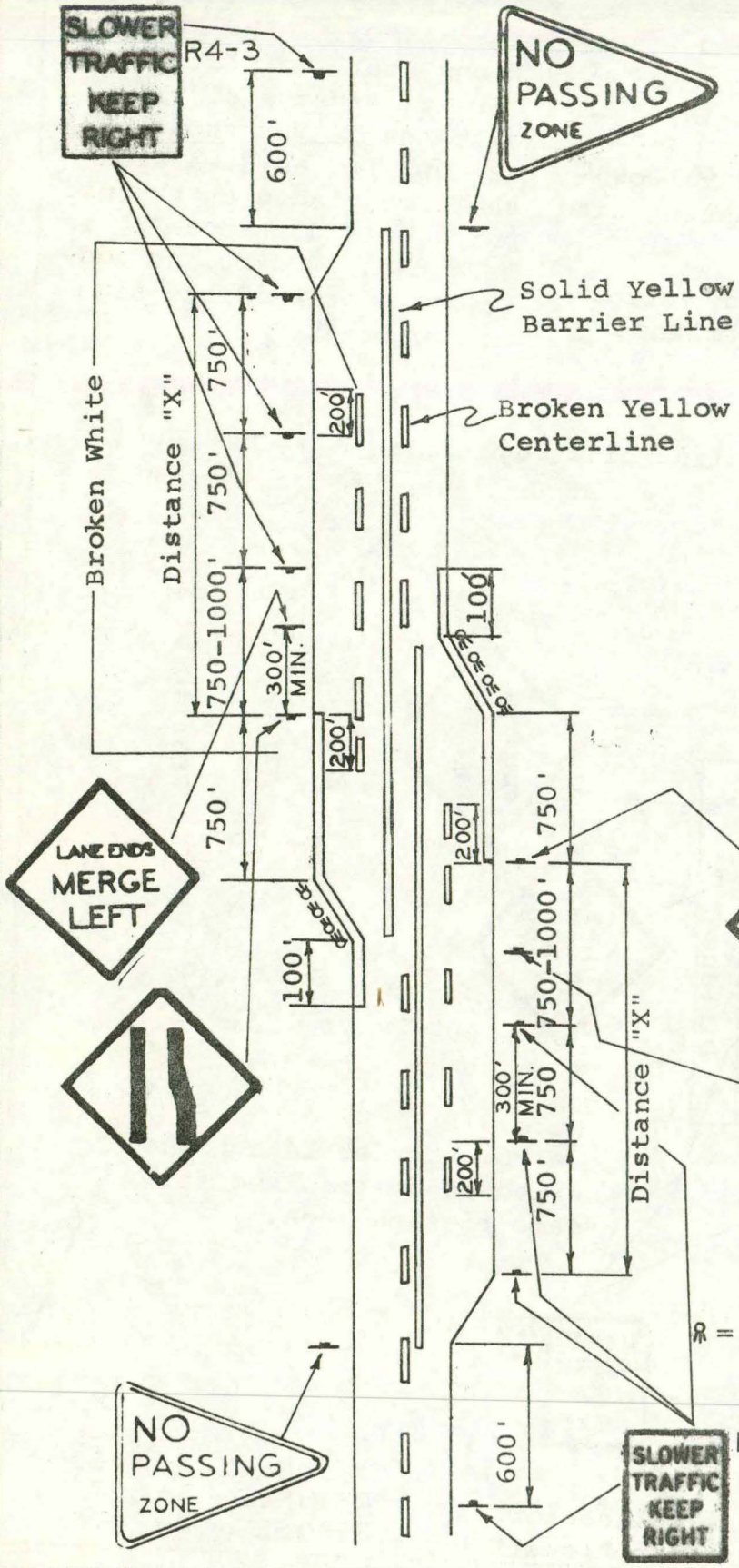
REV. 3-3-80
REVISED: 3-5-73
REVISED: 2-7-72

Figure 7
Signs and Pavement Markings For Climbing Lanes Pavements in Edge Line Program



REV. 3-3-80
REVISED: 3-5-73
REVISED: 2-7-72

Figure 8
Signs and Pavement Markings
For Climbing Lanes
Pavements Not in Edge Line Program



Note:
Yellow barrier line to be extended if required for safe passing zone.

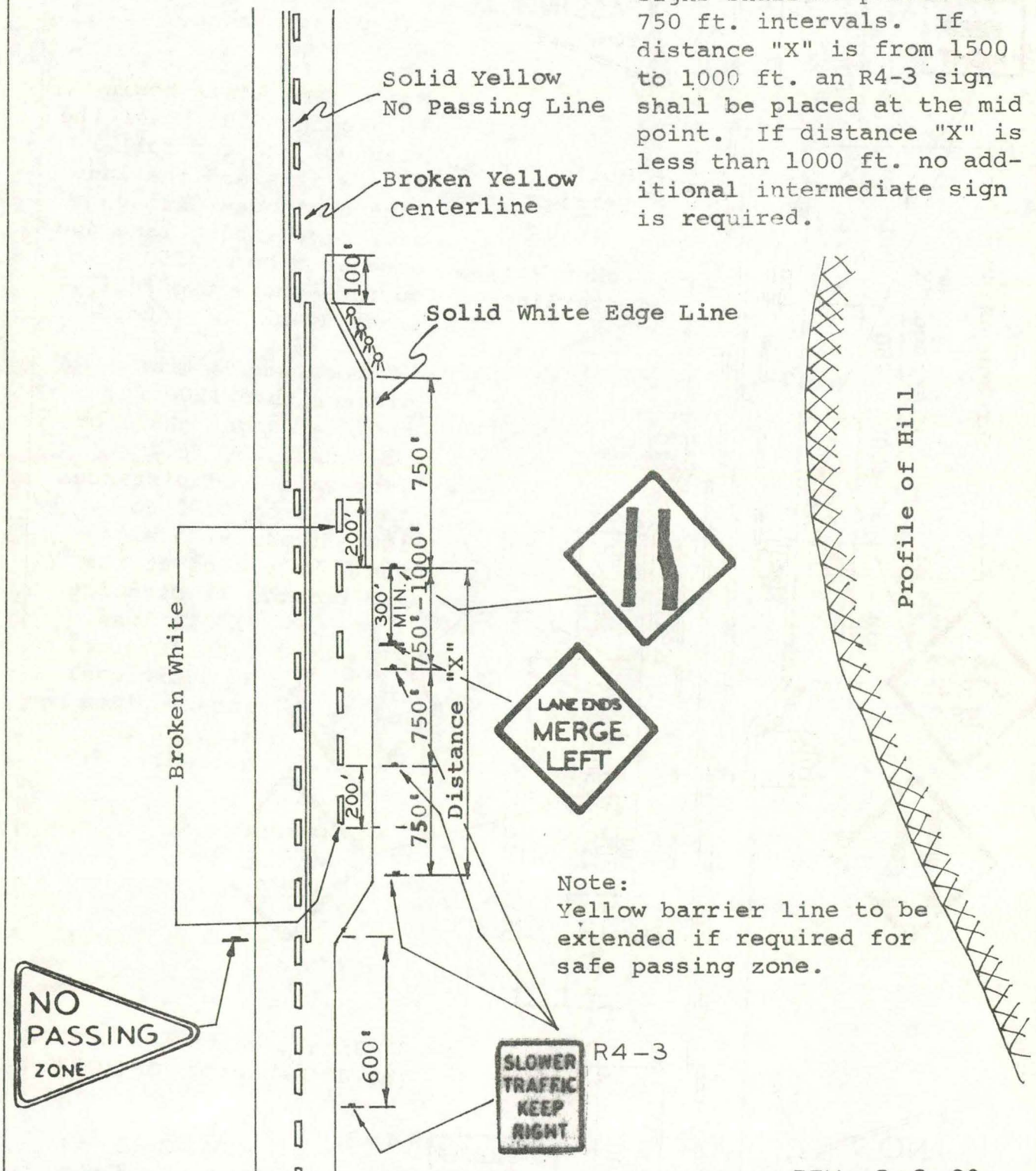
White lane lines begin at a point 550'± past the start of the two full lane widths and the lane line continues through area of climbing lane and ends at a point 550'± in advance where two full lanes start to reduce.

If distance "X" is greater than 1500 ft. the R4-3 signs shall be placed at 750 ft. intervals. If distance "X" is from 1500 to 1000 ft. an R4-3 sign shall be placed at the mid-point. If Distance "X" is less than 1000 ft. no additional intermediate sign is required.

R = 3" Single white delineators (at 40' spacing) OPTIONAL

REV. 3-3-80
REVISED: 3-5-73
REVISED: 3-24-72
REVISED: 2-7-72

Figure 9
Signs and Pavement Markings
For Climbing Lanes
Pavements Not in Edge Line Program

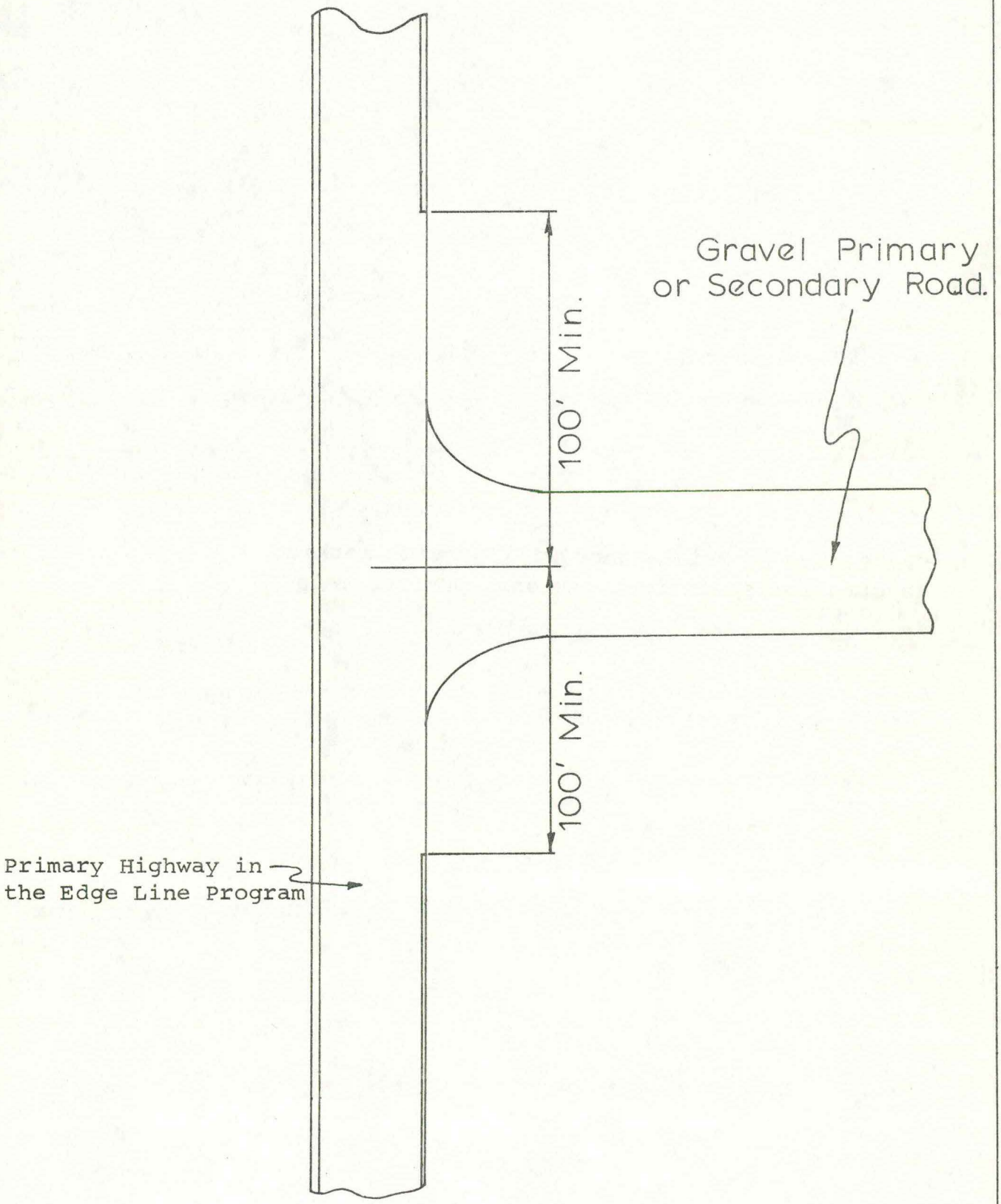


REV. 3-3-80
REVISED: 3-5-73
REVISED: 2-7-72

Figure 10
Pavement Markings
Approach to Medians

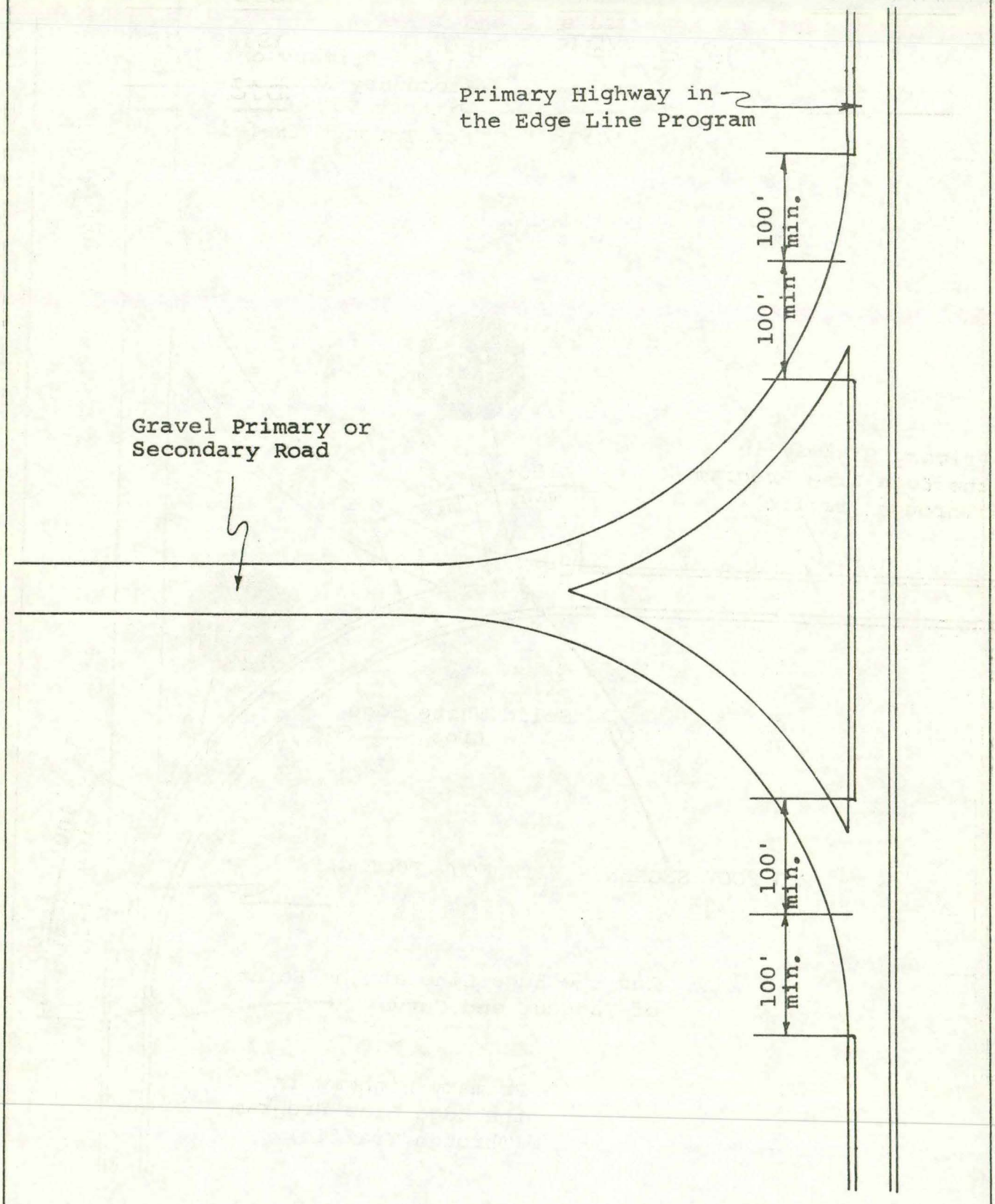
The Office of Maintenance will provide marking layouts for specific locations upon requests.

Figure 11
Standard Edge Line Marking at Intersection With Gravel Road



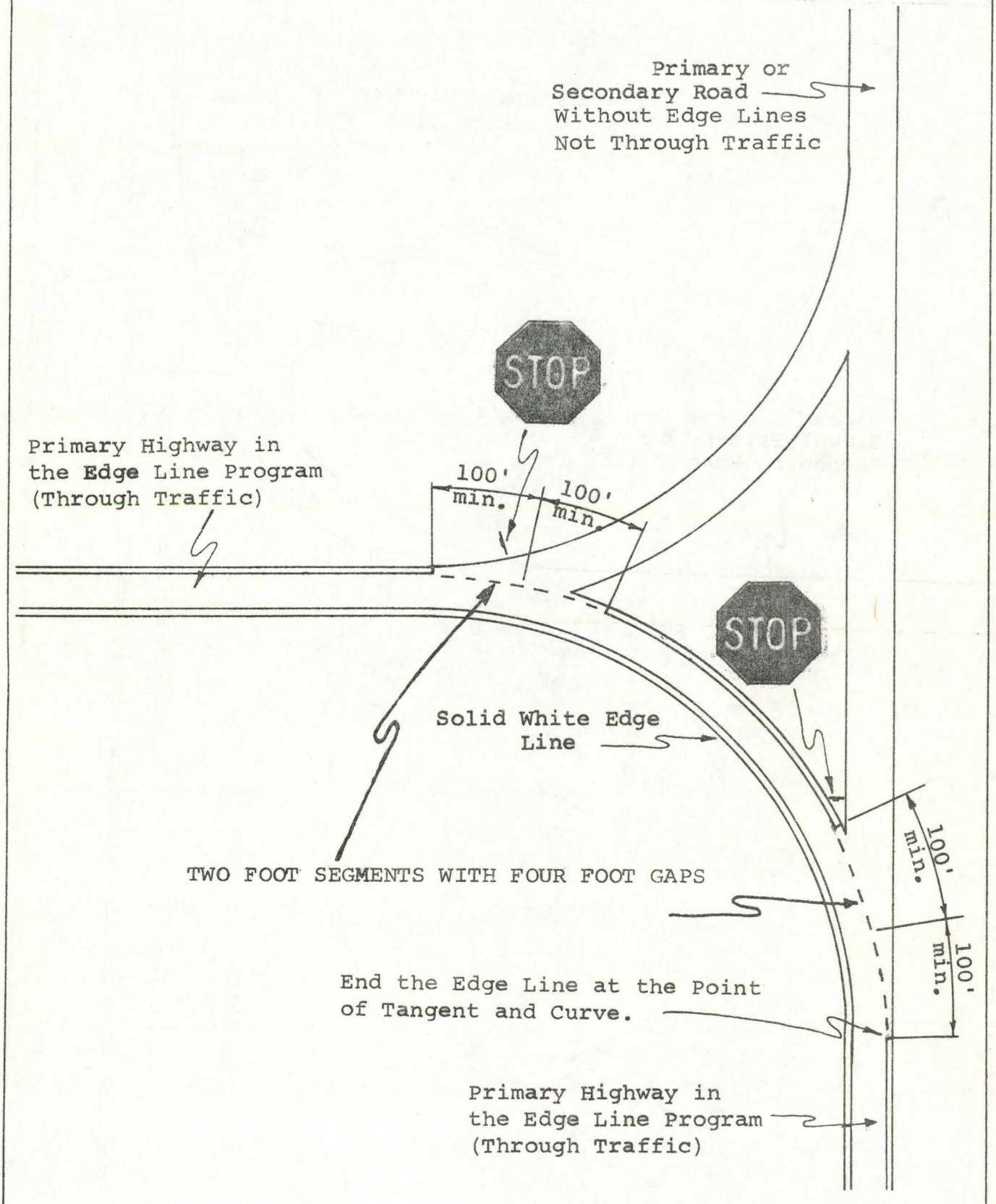
REV. 3-3-80

Figure 12
Standard Edge Line Marking at Intersection With Gravel Road



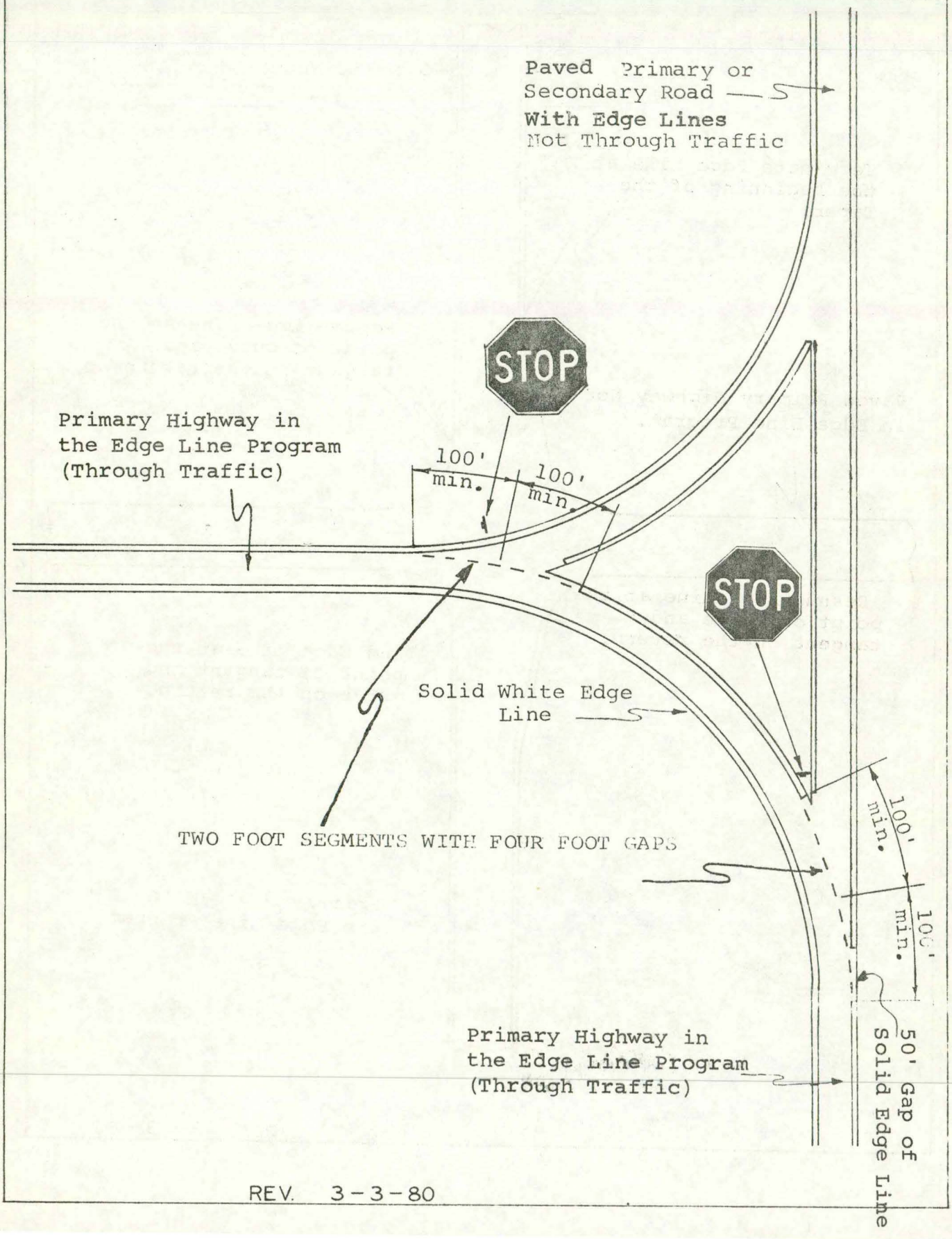
REV. 3-3-80

Figure 13
Standard Edge Line Marking at Intersection With Local Road Without Solid Edge Lines



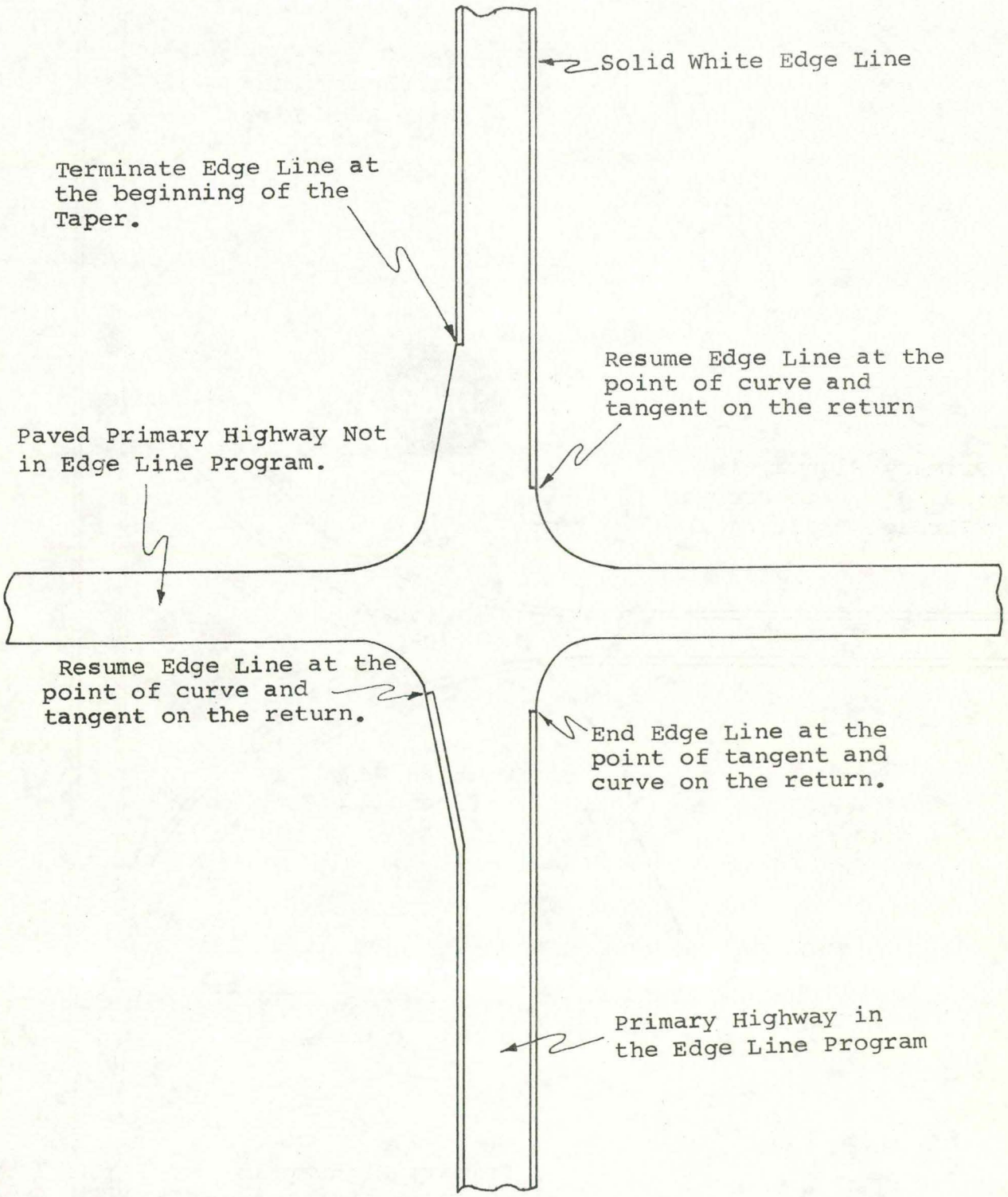
REV. 3-3-80

Figure 14
Standard Edge Line Marking at Intersection With Local Road With Solid Edge Lines



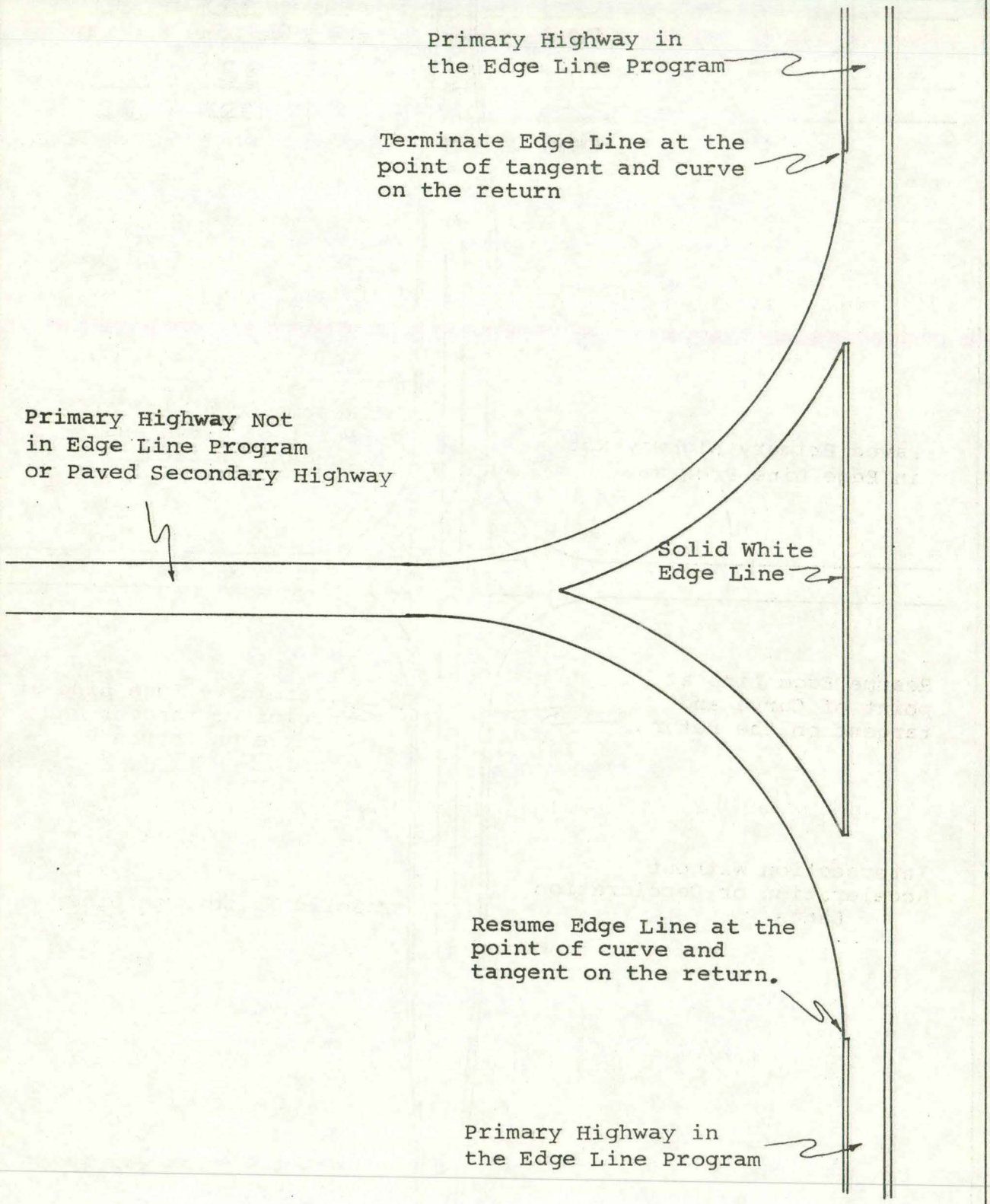
REV. 3-3-80

Figure 15
Standard Edge Line Marking at Intersection of Primary Highway in Edge Line Program and Highway Not in Edge Line Program



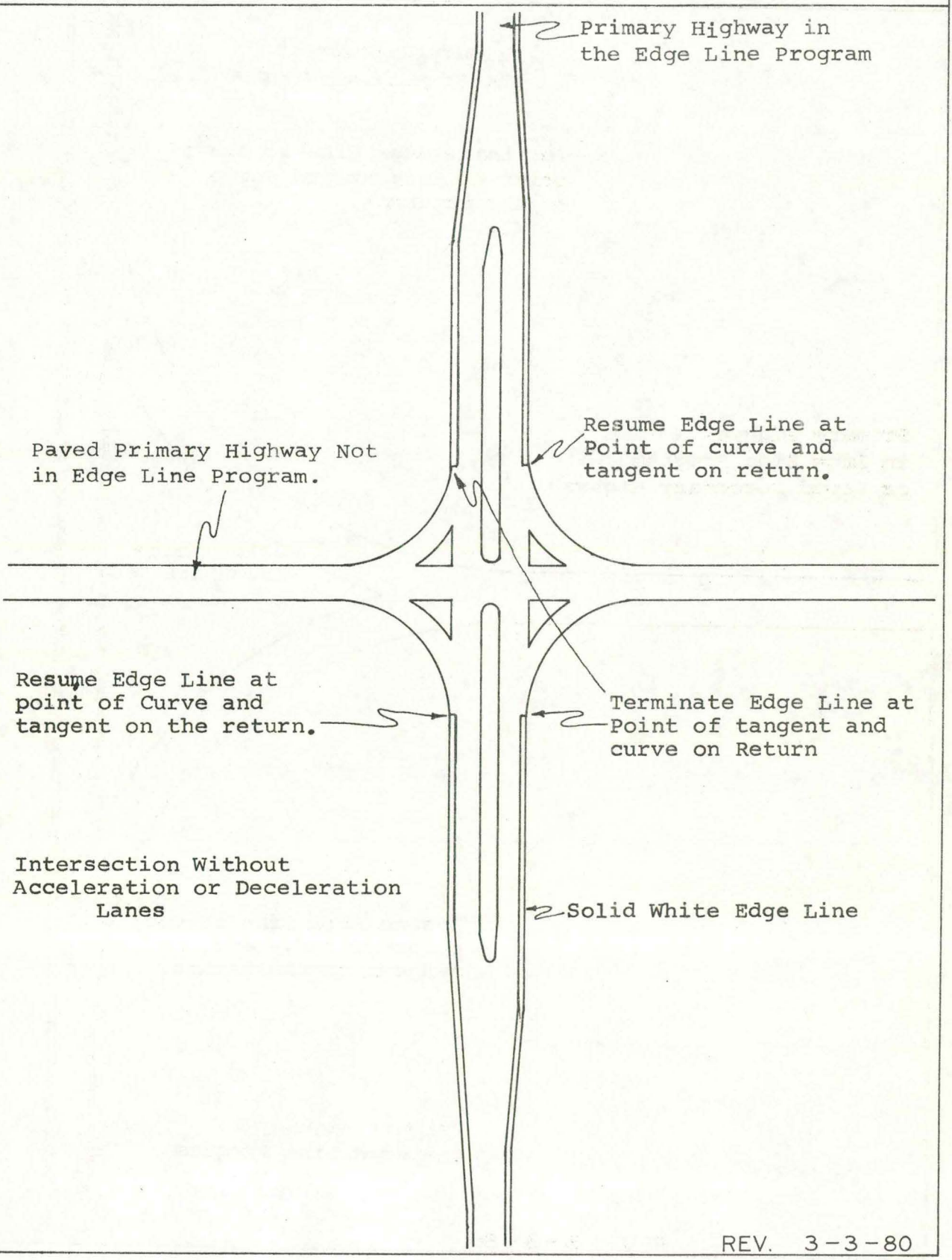
REV. 3-3-80

Figure 16
Standard Edge Line Marking at Intersection with a Paved Highway Not in the Edge Line Program



REV. 3-3-80

Figure 17
Standard Edge Line Marking at Intersection with a Paved Highway Not in the Edge Line Program



REV. 3-3-80

Figure 18
Standard Edge Line Marking at Intersection with a Paved Highway Not in the Edge Line Program

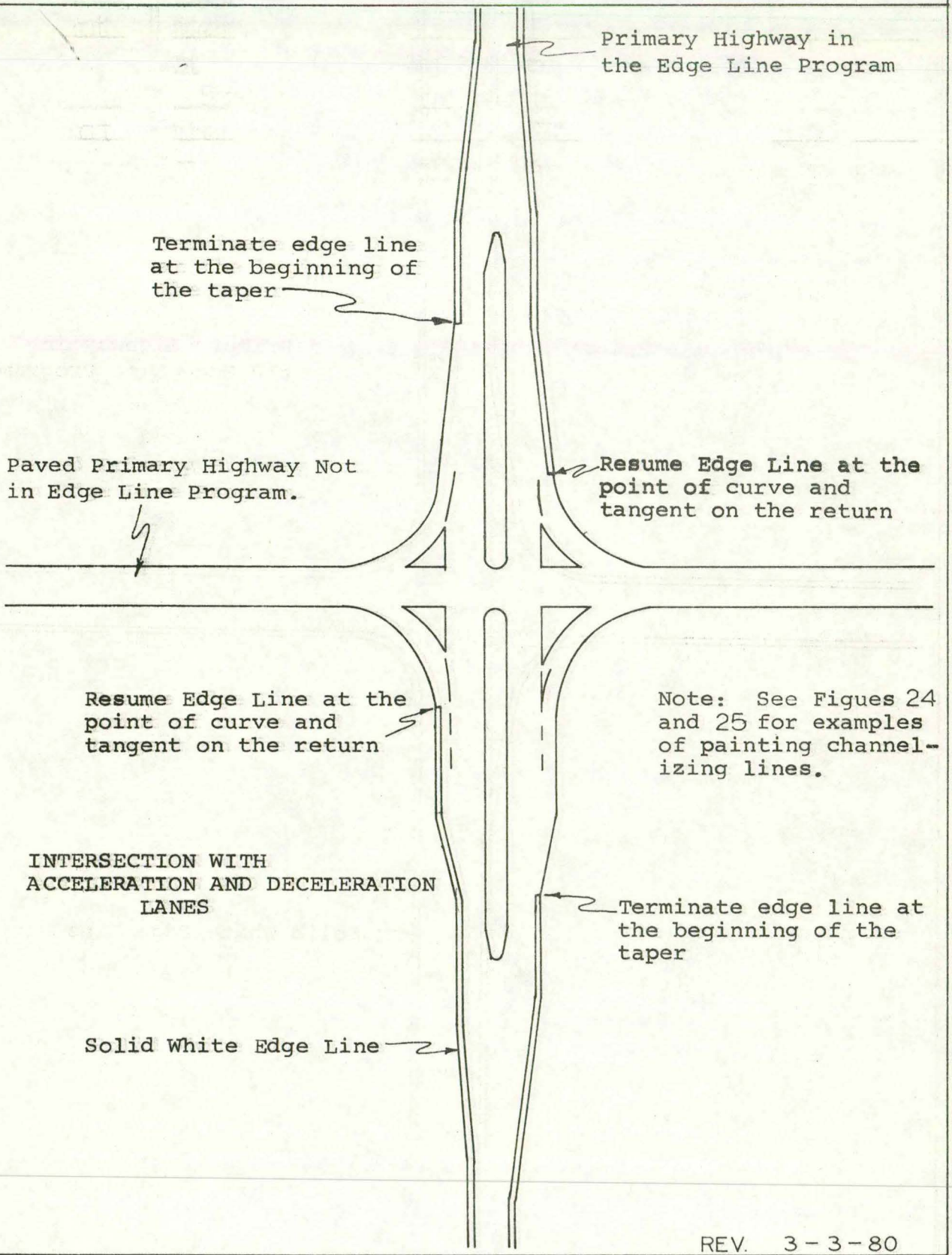


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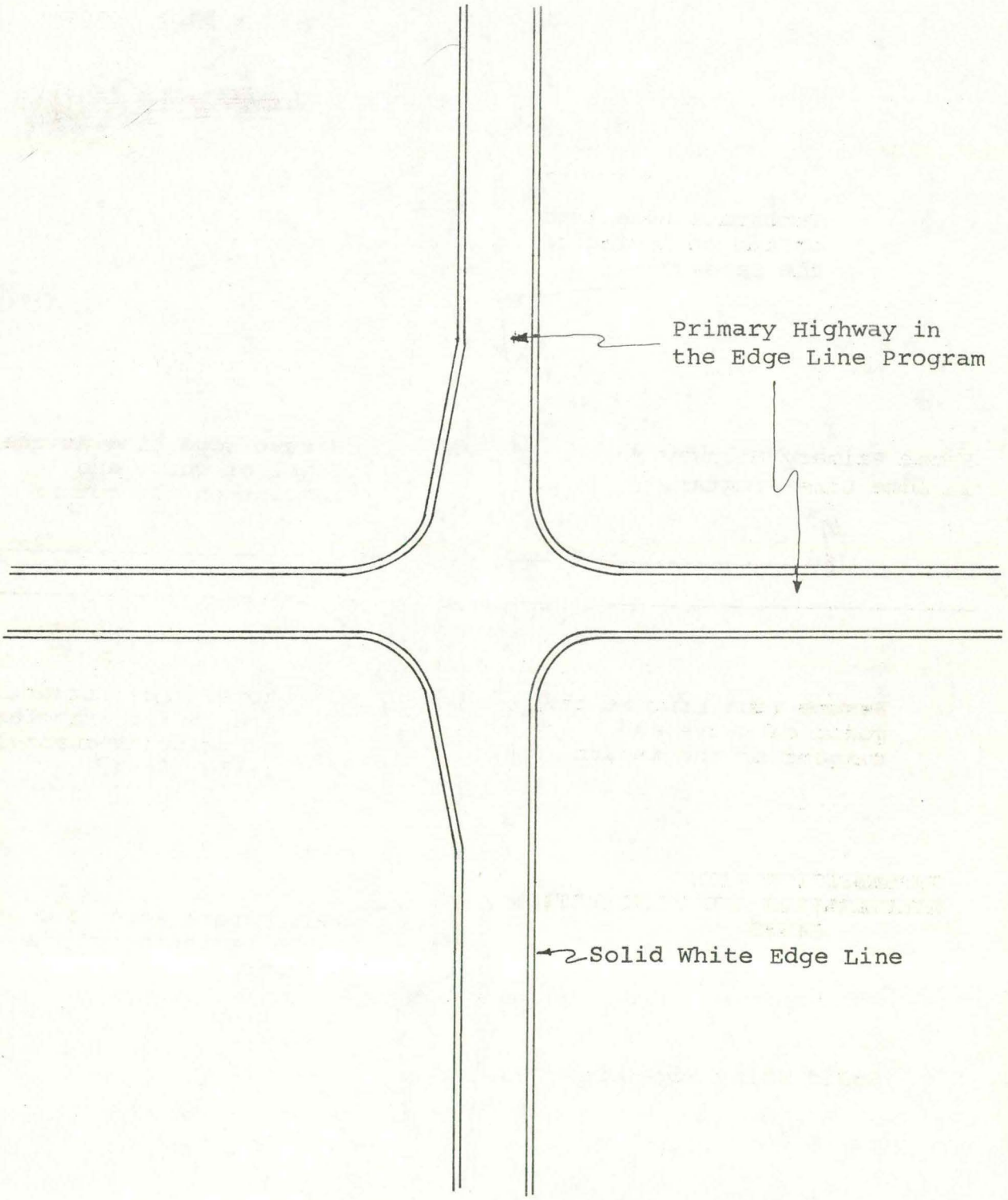
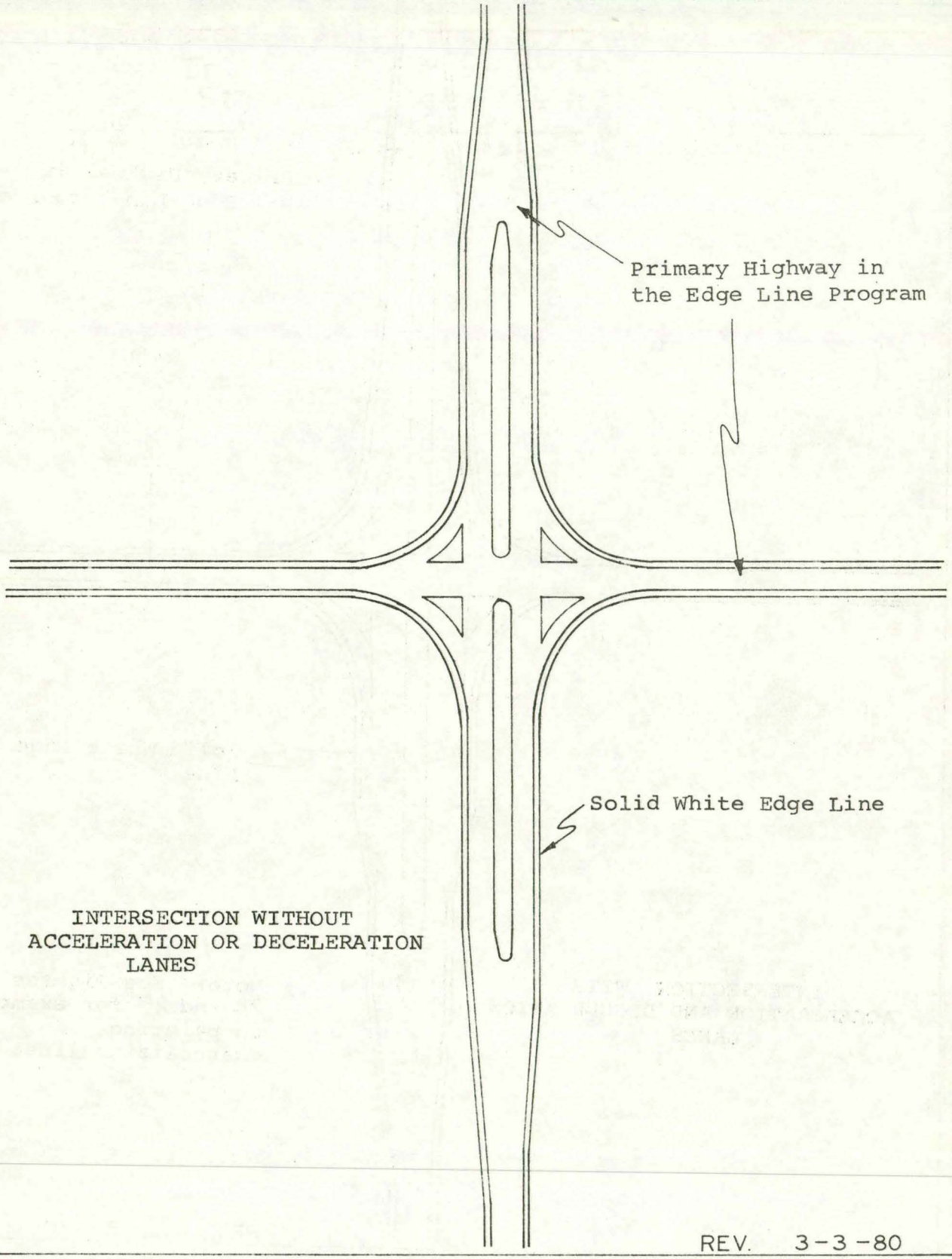
Figure 19
Standard Edge Line Marking
at Intersection of Paved Primary Highway
In the Edge Line Program



REV. 3-3-80

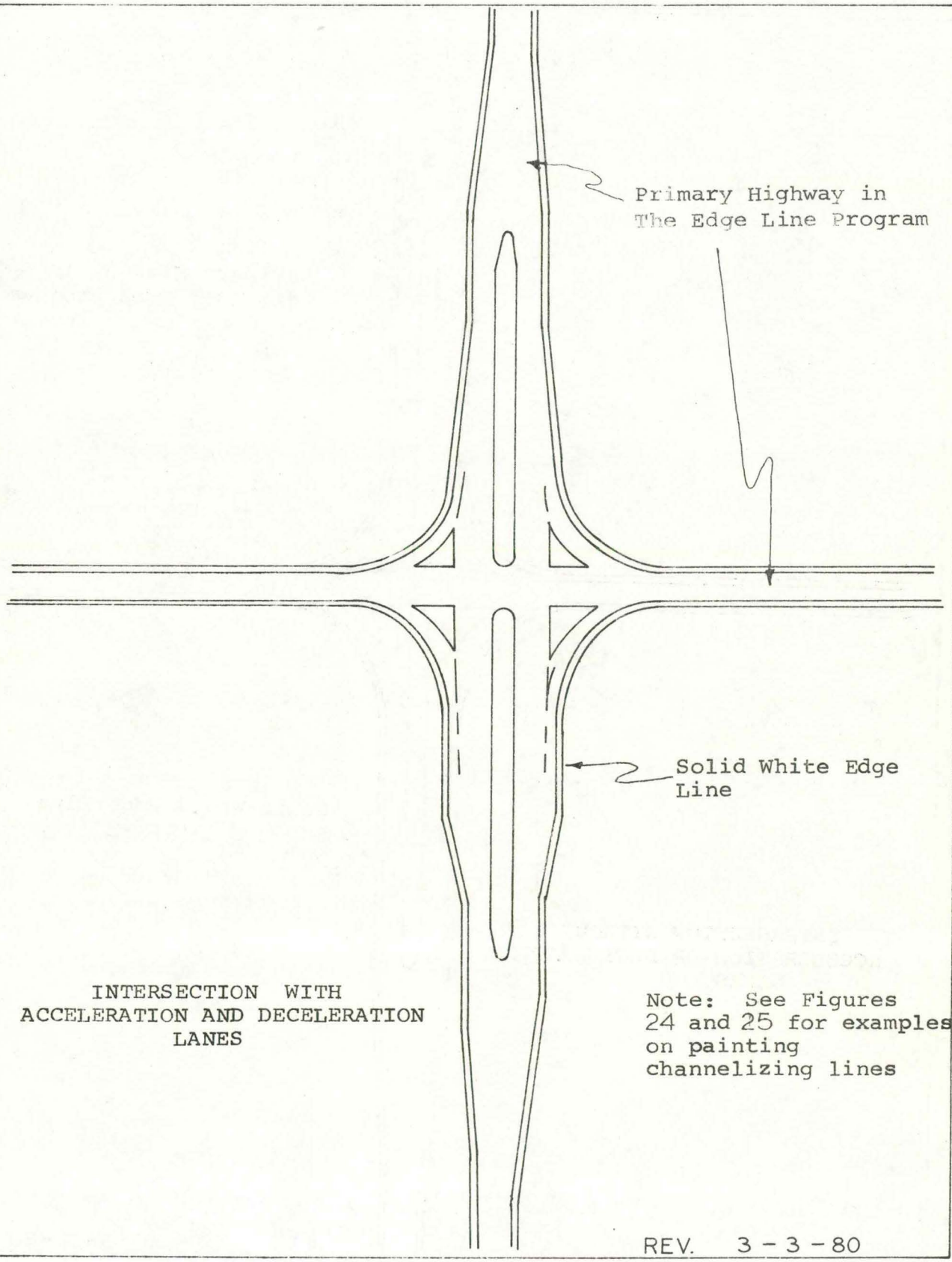
Figure 20
Standard Edge Line Marking at Intersection of Paved Primary Highway In the Edge Line Program



INTERSECTION WITHOUT ACCELERATION OR DECELERATION LANES

REV. 3-3-80

Figure 21
Standard Edge Line Marking at Intersection of Paved Primary Highway In the Edge Line Program

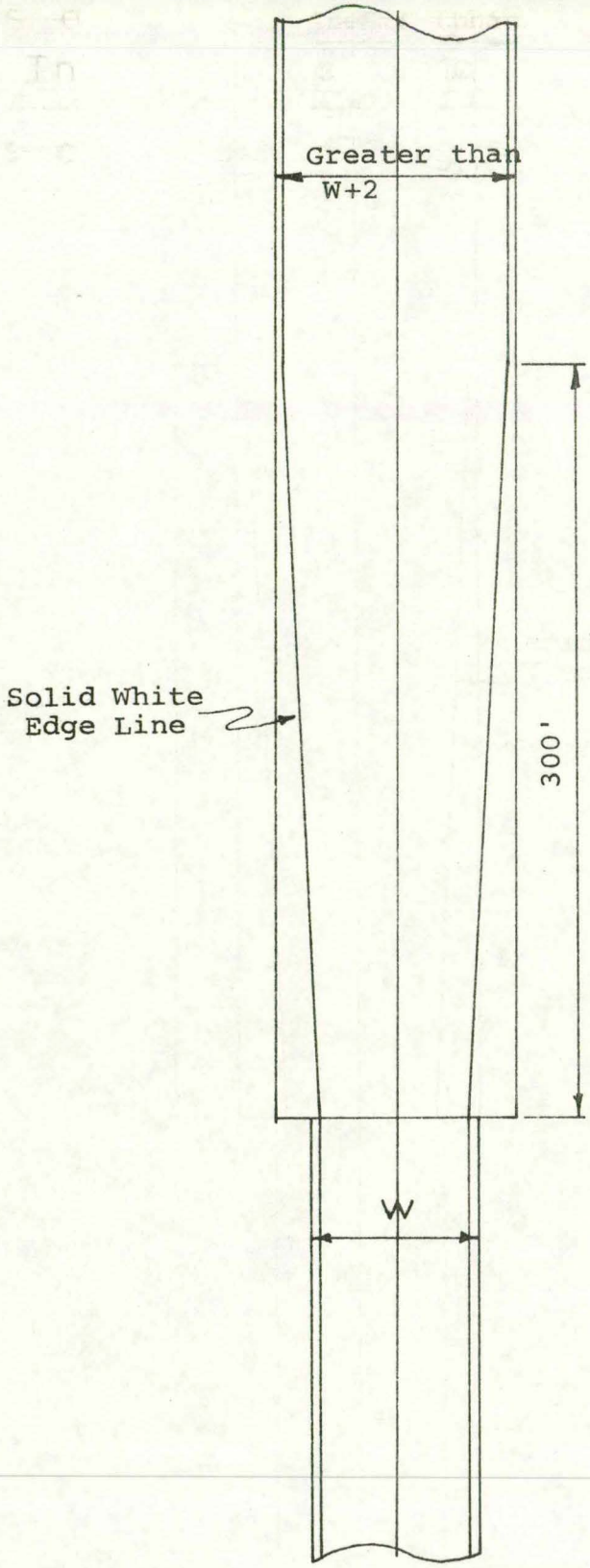


INTERSECTION WITH ACCELERATION AND DECELERATION LANES

Note: See Figures 24 and 25 for examples on painting channelizing lines

REV. 3 - 3 - 80

Figure 22
Edge Line
Transitions at Abrupt Changes in Pavement Width In the Edge Line Program



REV. 3-3-80

Figure 23
Edge Line
Transitions at Abrupt Changes in Pavement Width
Not in the Edge Line Program

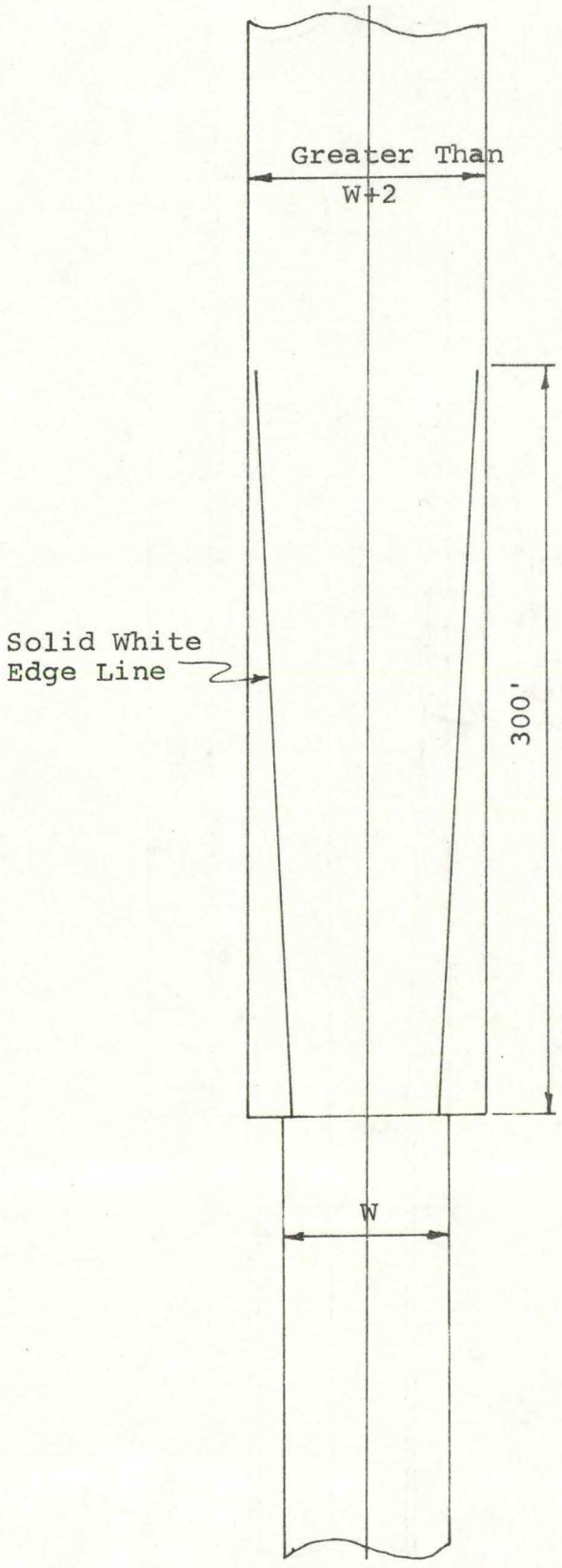


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Figure 24
Channelizing and Edge Line Markings for
Typical Entrance Ramps (With Curb)

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REV. 7-12-74
3-23-73

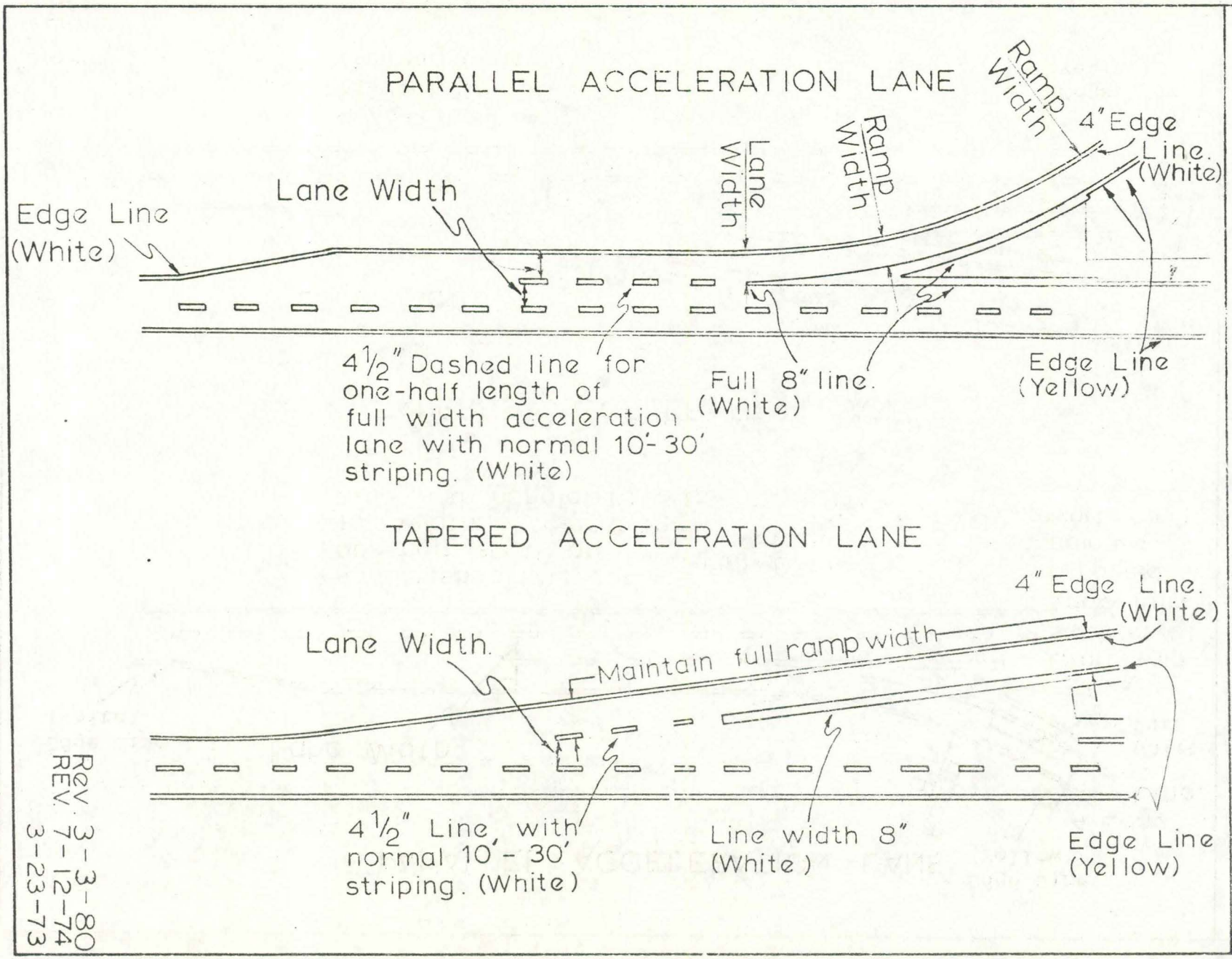

Figure 24A
Channelizing and Edge Line Markings for Typical Entrance (With no curb in gore)

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REV. 7-12-74
3-23-73

Figure 25
Channelizing and Edge Line Markings for
Typical Exit Ramps

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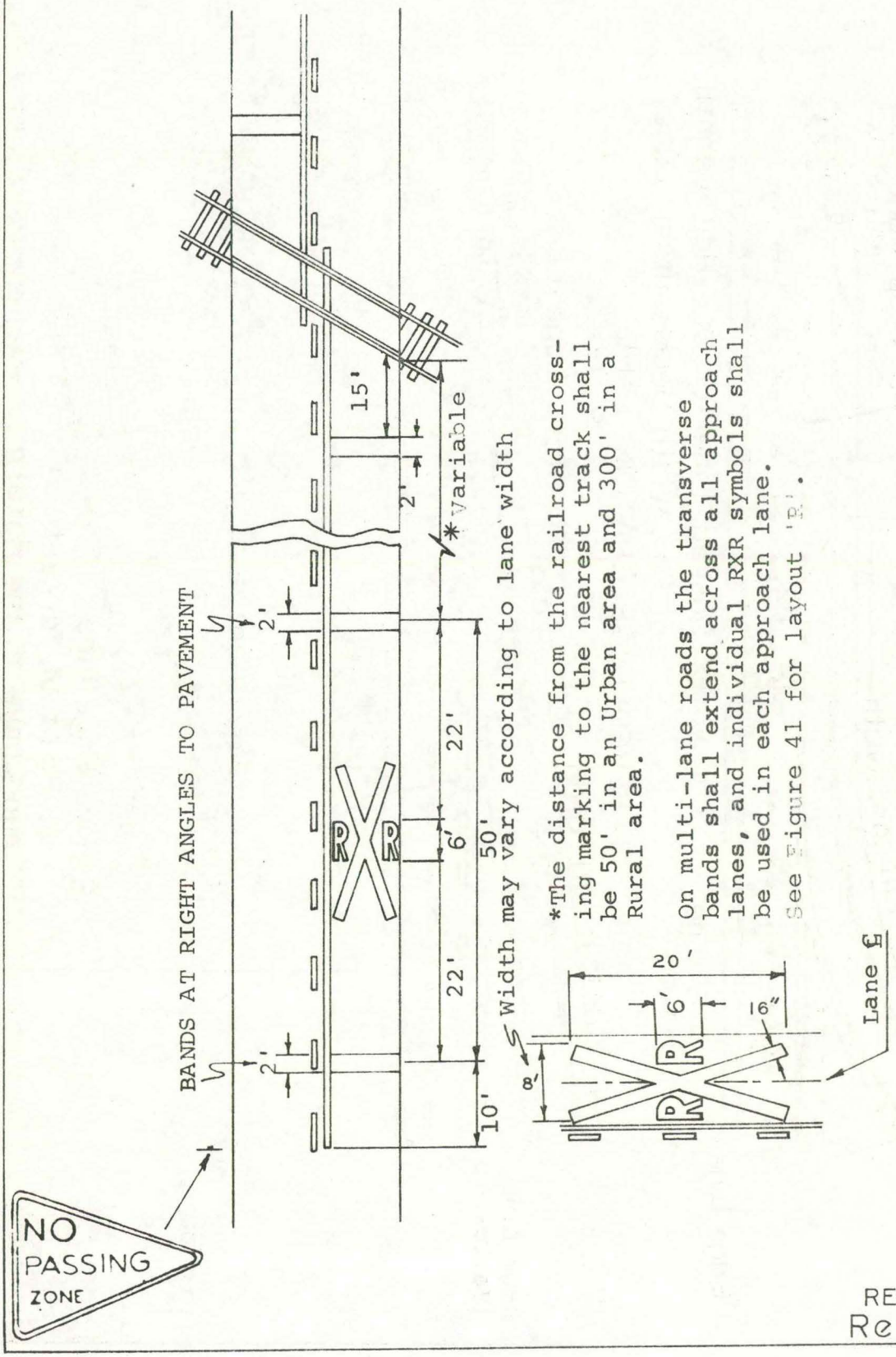
Rev. 1-4-78
Rev 1-5-77
Rev 1-21-74
1-23-73

Figure 26
Standard Pavement Markings at Railroad and Highway Grade Crossing



*The distance from the railroad crossing marking to the nearest track shall be 50' in an Urban area and 300' in a Rural area.

On multi-lane roads the transverse bands shall extend across all approach lanes, and individual RXR symbols shall be used in each approach lane.

See Figure 41 for layout 'B'.

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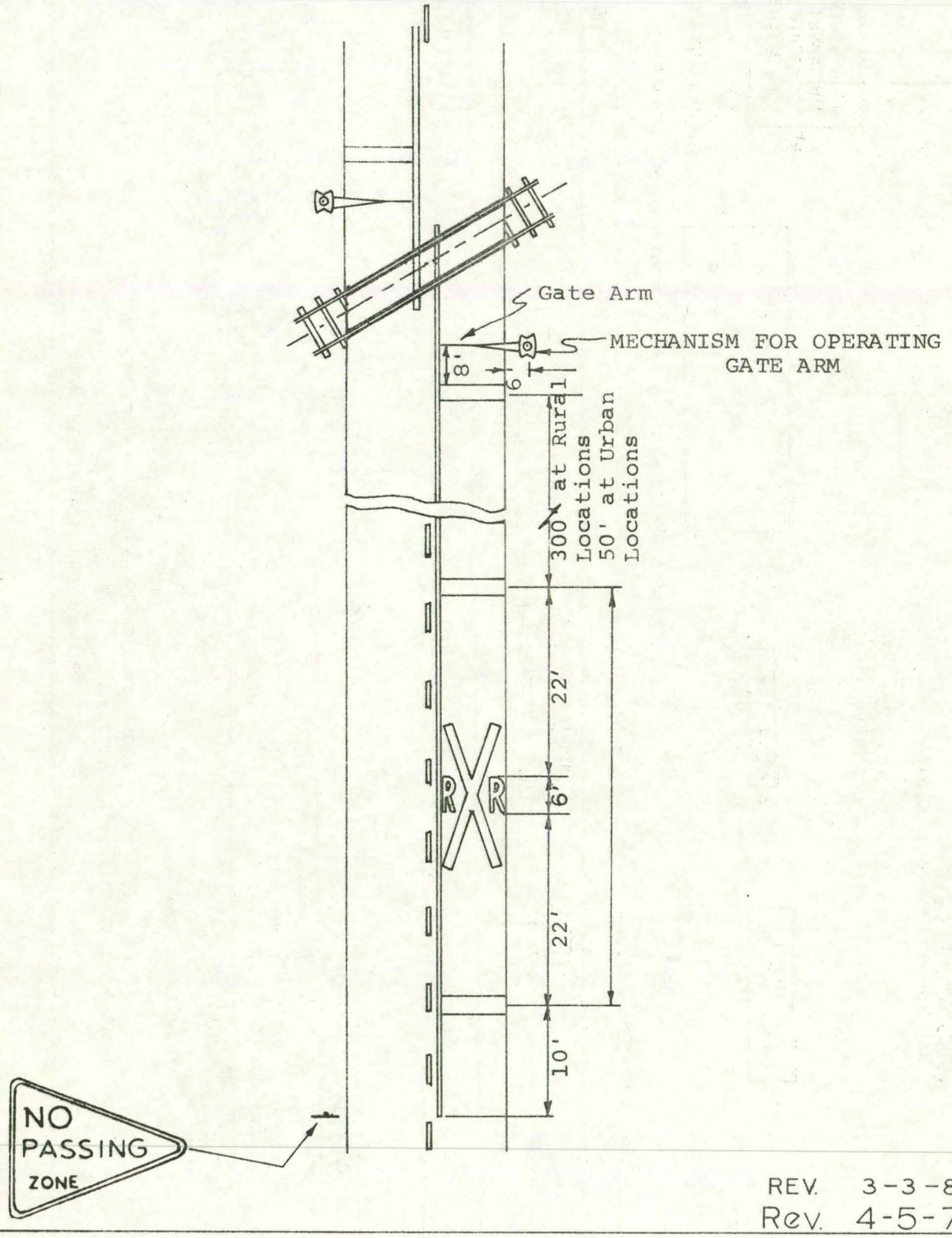
Rev. 4-5-74

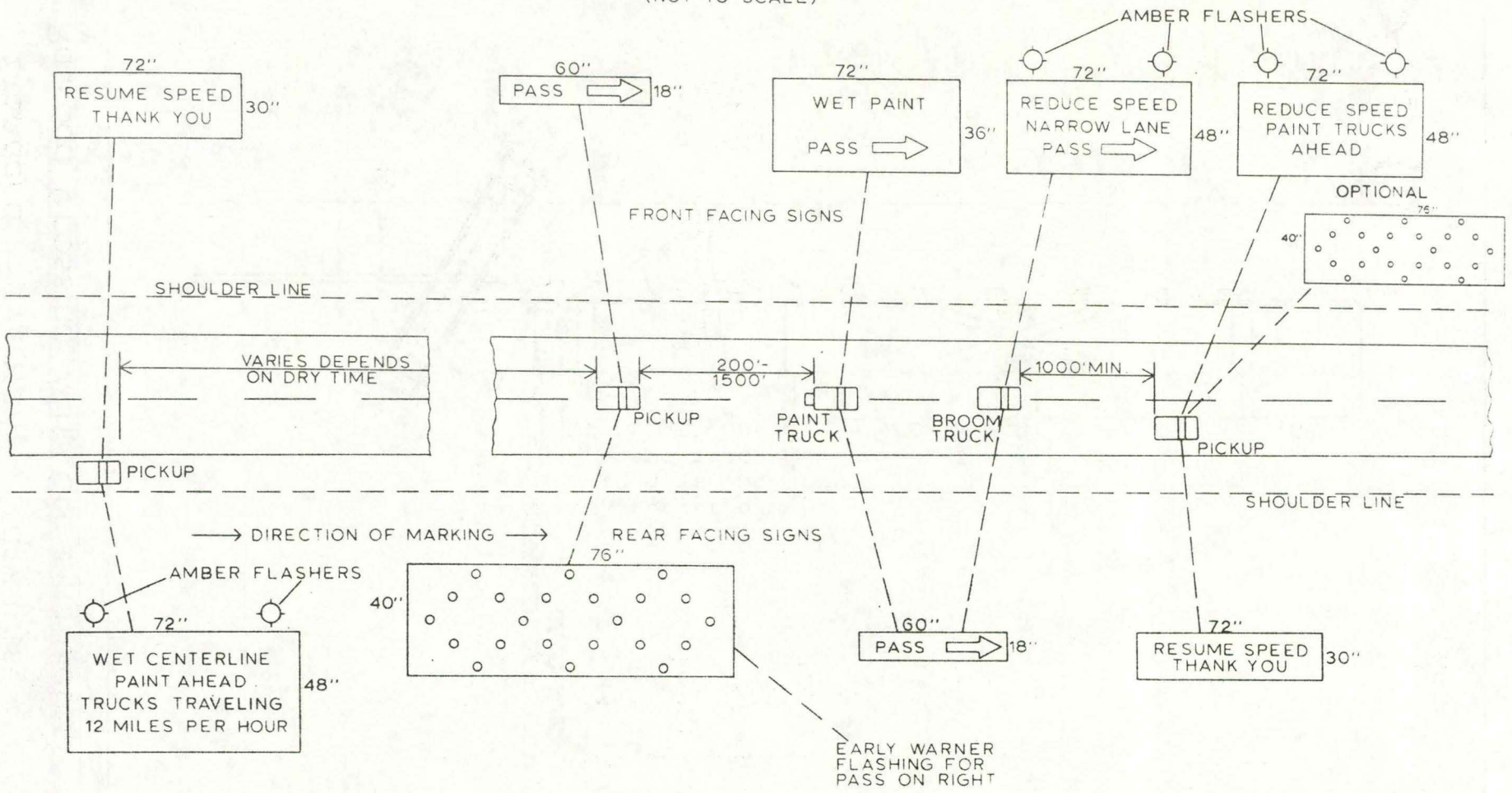
Figure 27
Standard Pavement Markings at Railroad Crossing with Crossing Gates



REV. 3-3-80
Rev. 4-5-74

SIGNS FOR TRAFFIC LINE PAINTING
CENTERLINE
ON
TWO LANE AND FOUR LANE UNDIVIDED PAVEMENT
(NOT TO SCALE)

NOTE USE YELLOW-ORANGE COLOR IN SIGNS



NOTE FOR AMBER FLASHER USE
SEAL BEAM BULB NO 4434A
D O T STOCK NO 012-041900

FIGURE 28
REV. 3/77

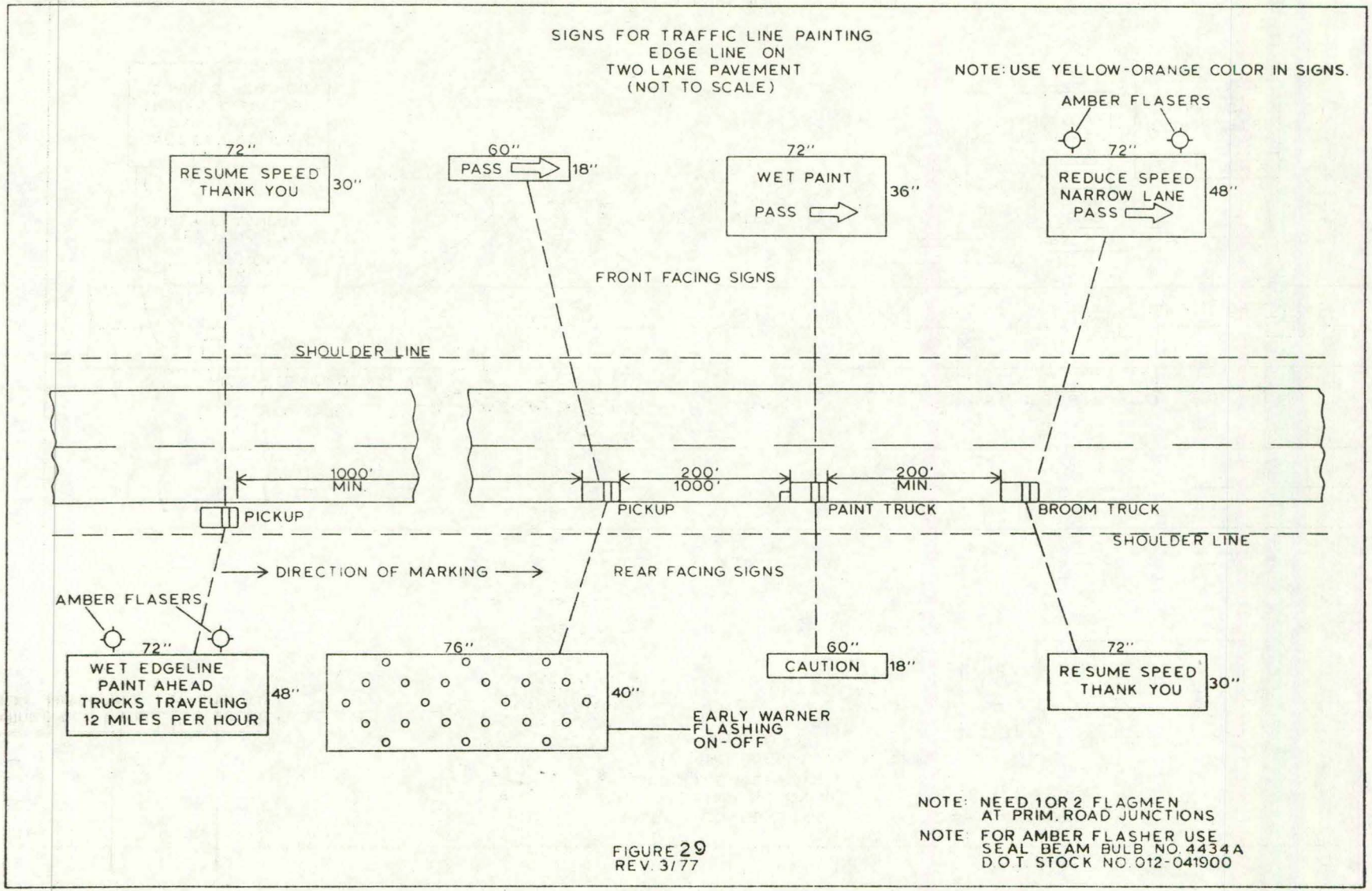


FIGURE 29
REV. 3/77

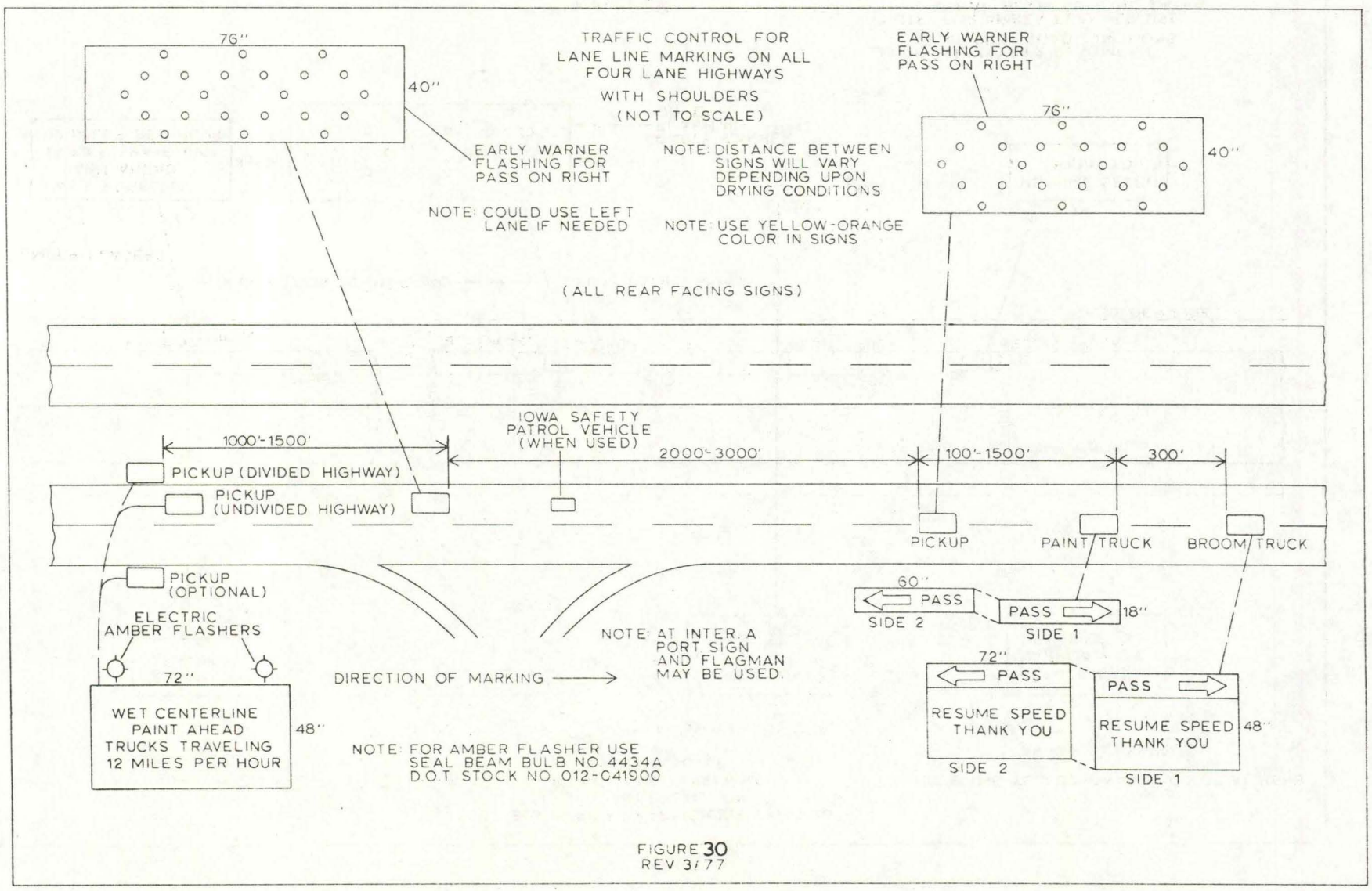


FIGURE 30
REV 3/77

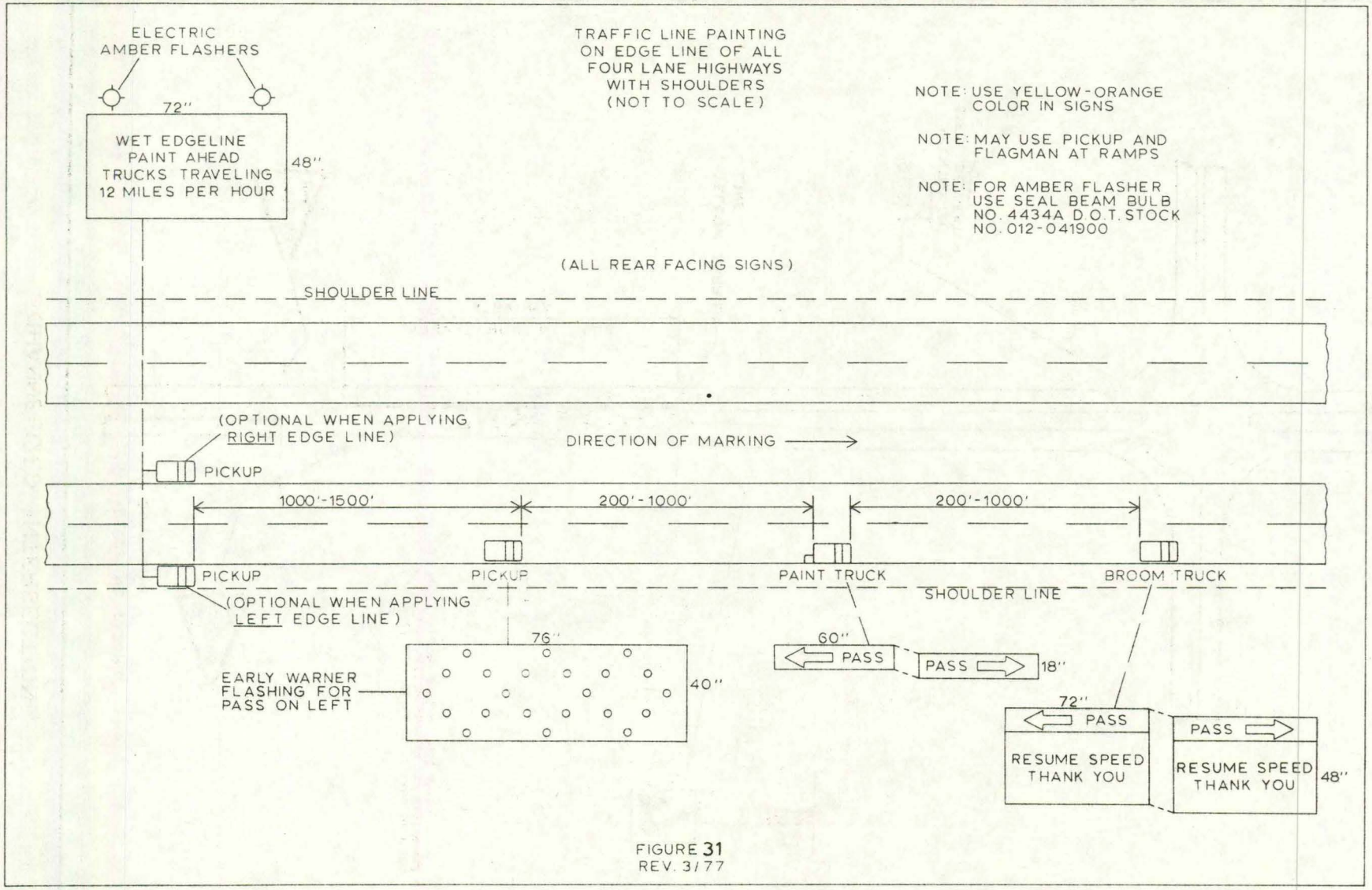


FIGURE 31
REV. 3/77

Figure 32

TYPICAL APPLICATION OF BARRIER LINE

AT

CHANNELIZED INTERSECTION

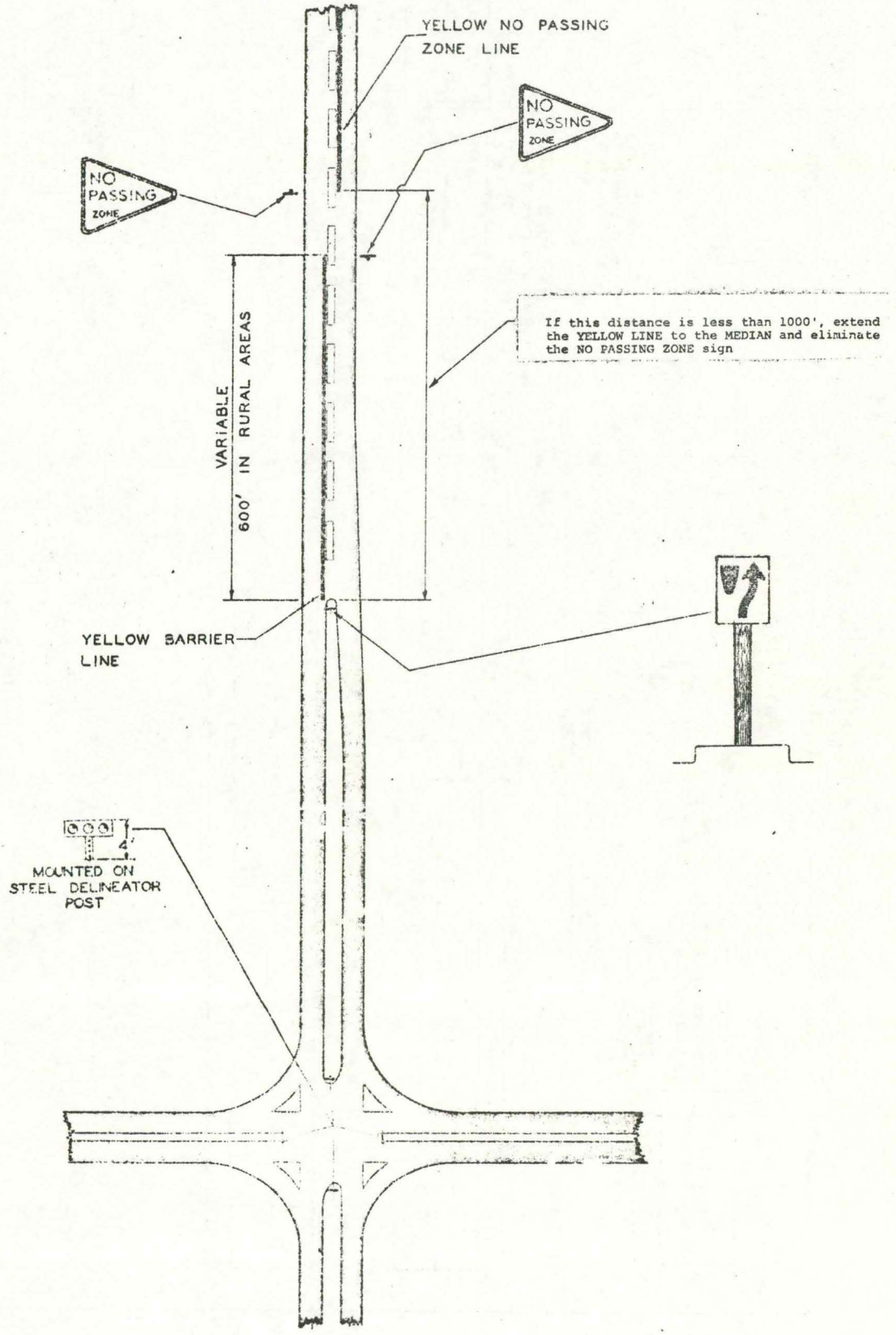


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Figure 33

TYPICAL EXTENSION OF NO PASSING ZONE

AT

A STOP CONDITION

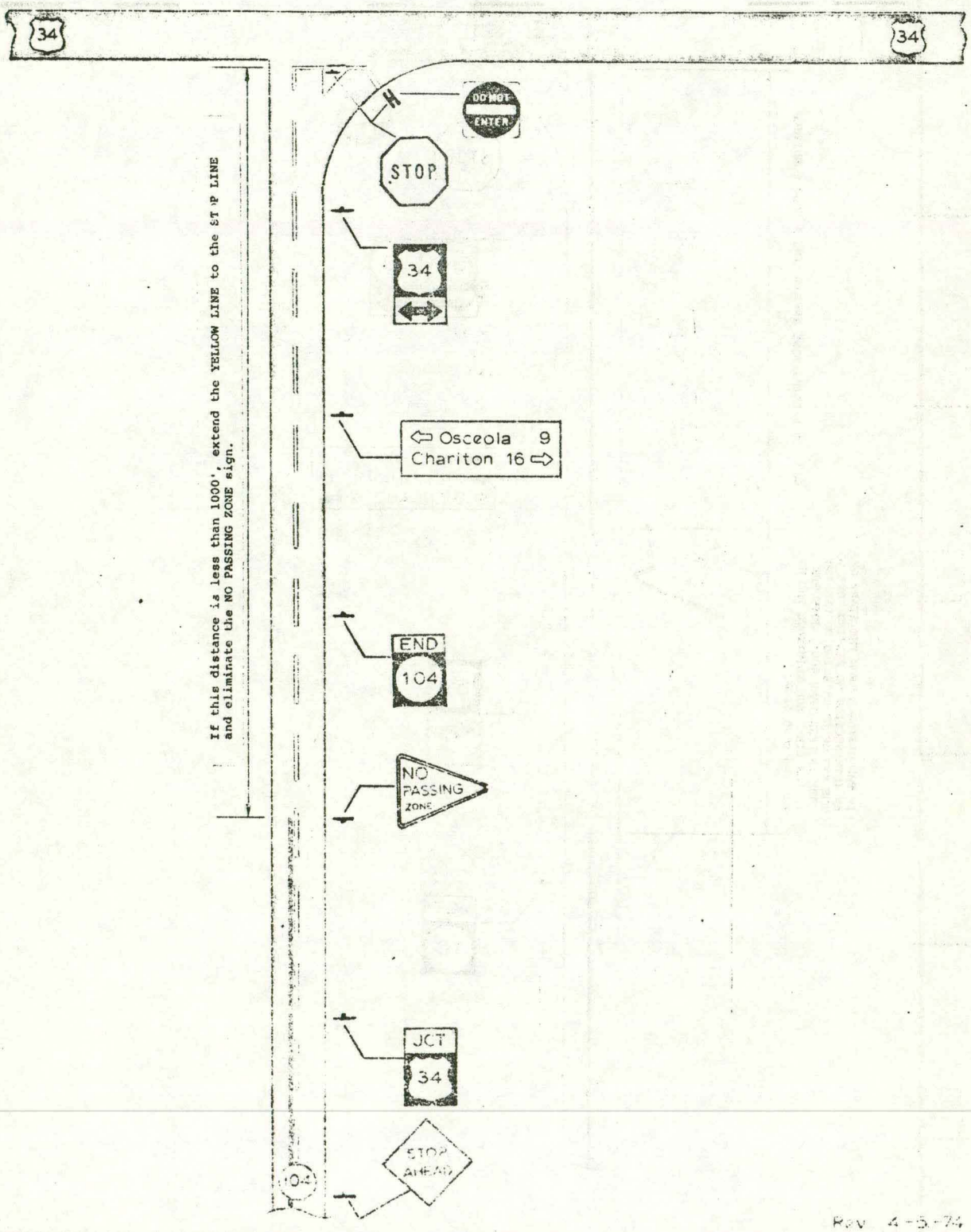

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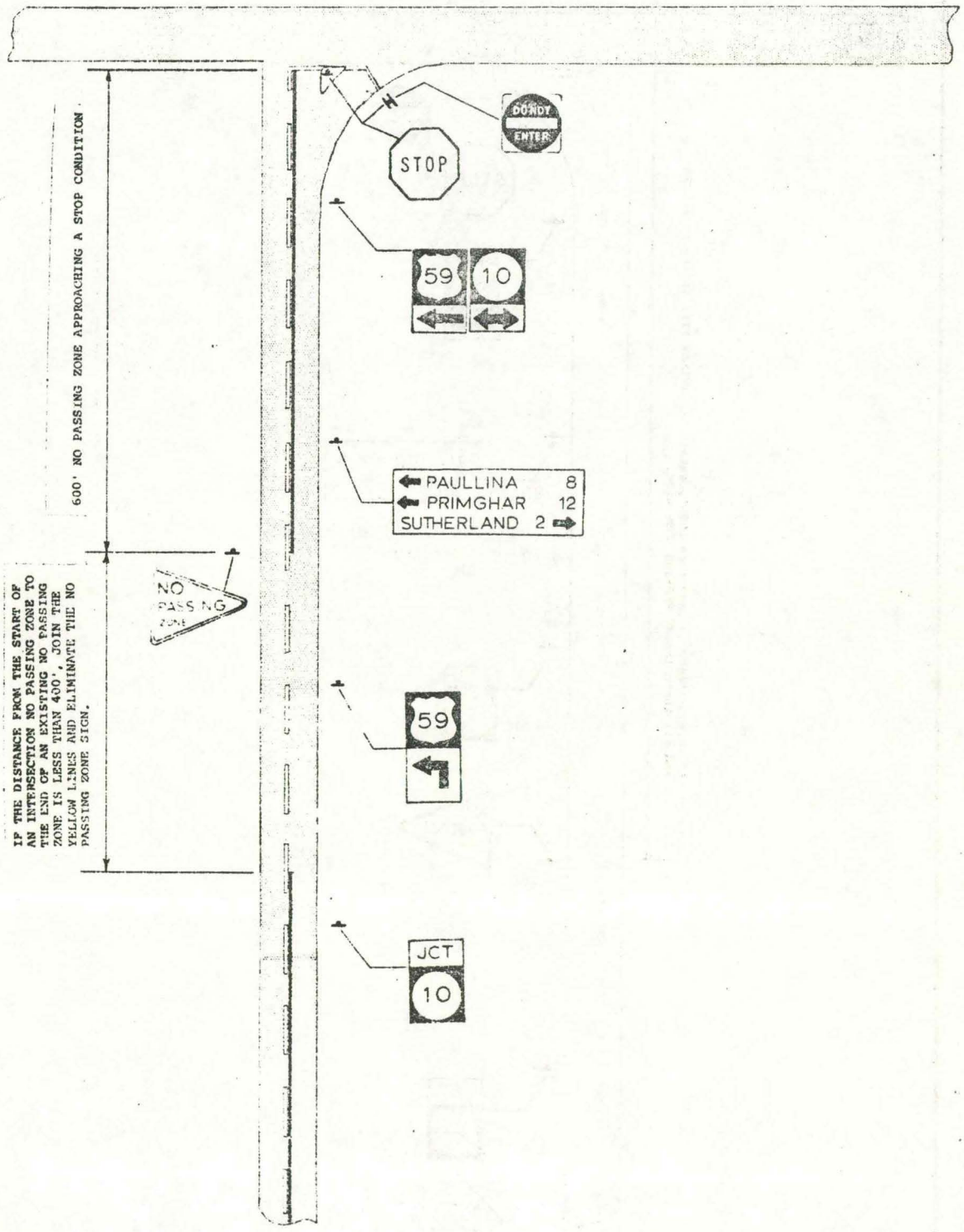
Figure 34

TYPICAL PLACEMENT OF NO PASSING ZONE

APPROACHING

A STOP CONDITION



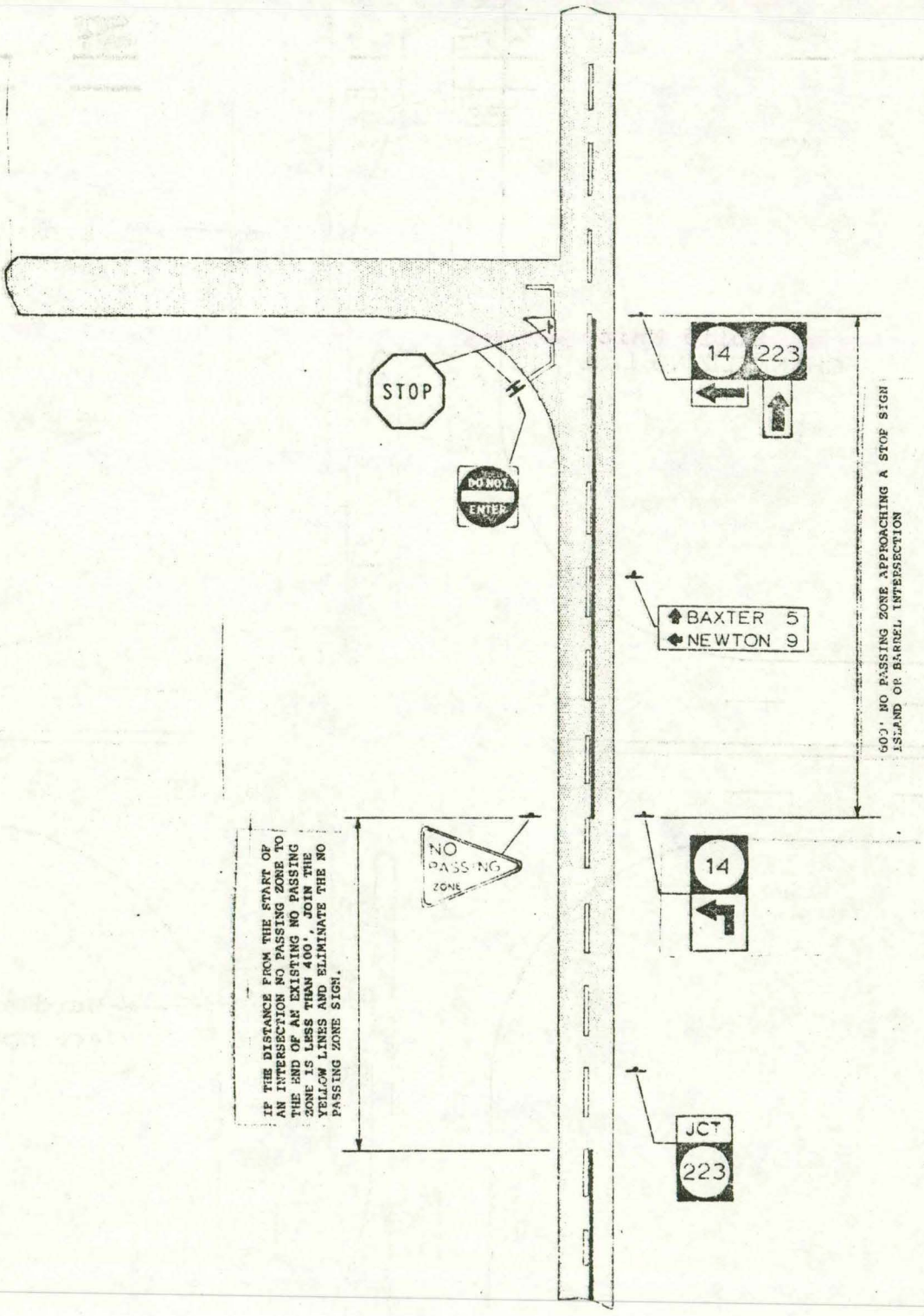
Rev. 4-5-14

Figure 35

TYPICAL PLACEMENT OF NO PASSING ZONE

APPROACHING A

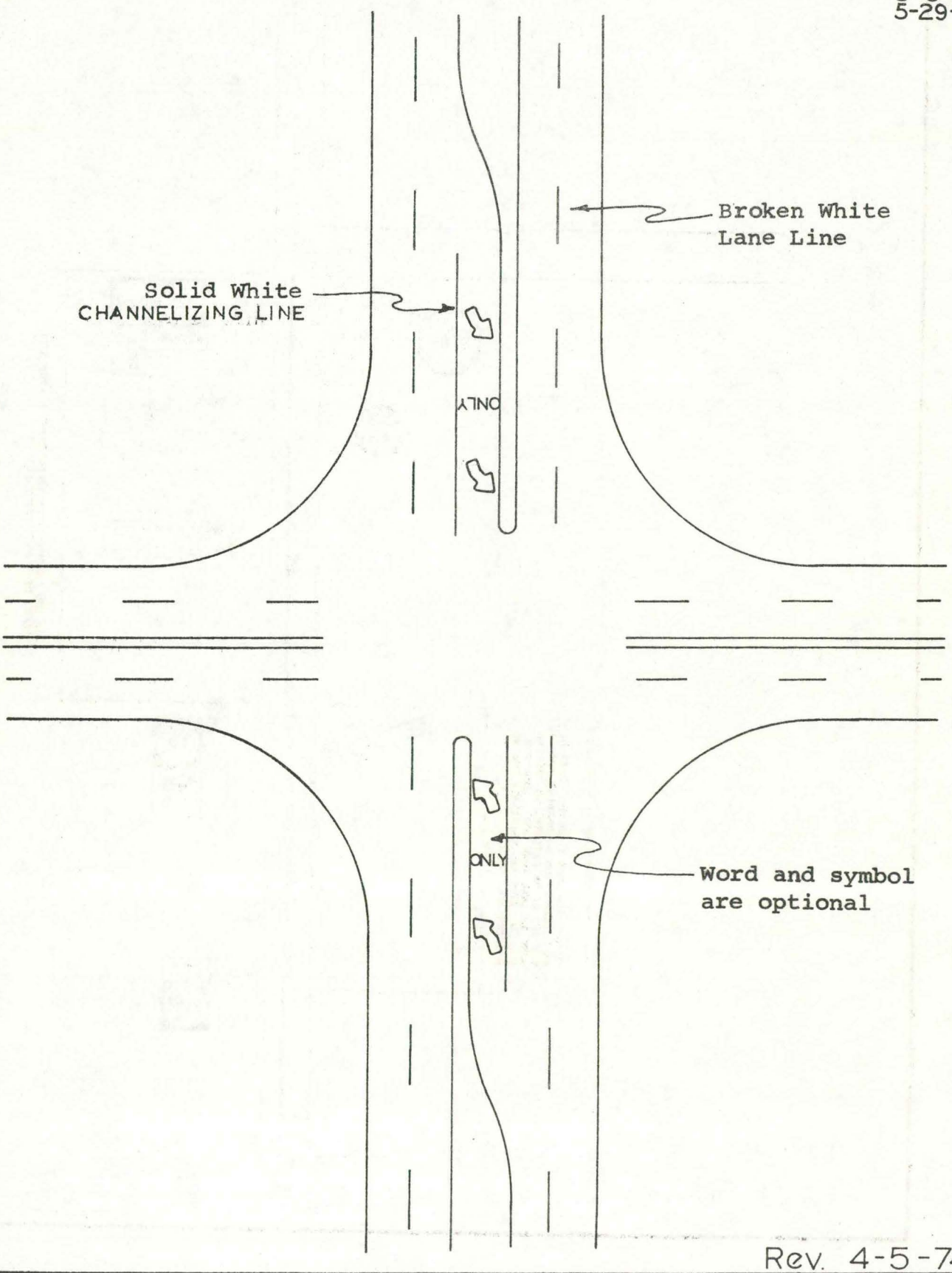
STOP SIGN ISLAND OR BARREL INTERSECTION



Rev 4-5-71

Figure 36
Pavement Markings
for Left Turn Storage Lanes

3-5-73
5-29-73



Rev. 4-5-74

Figure 37
Pavement Markings for Right Turn Storage Lane

5-29-73

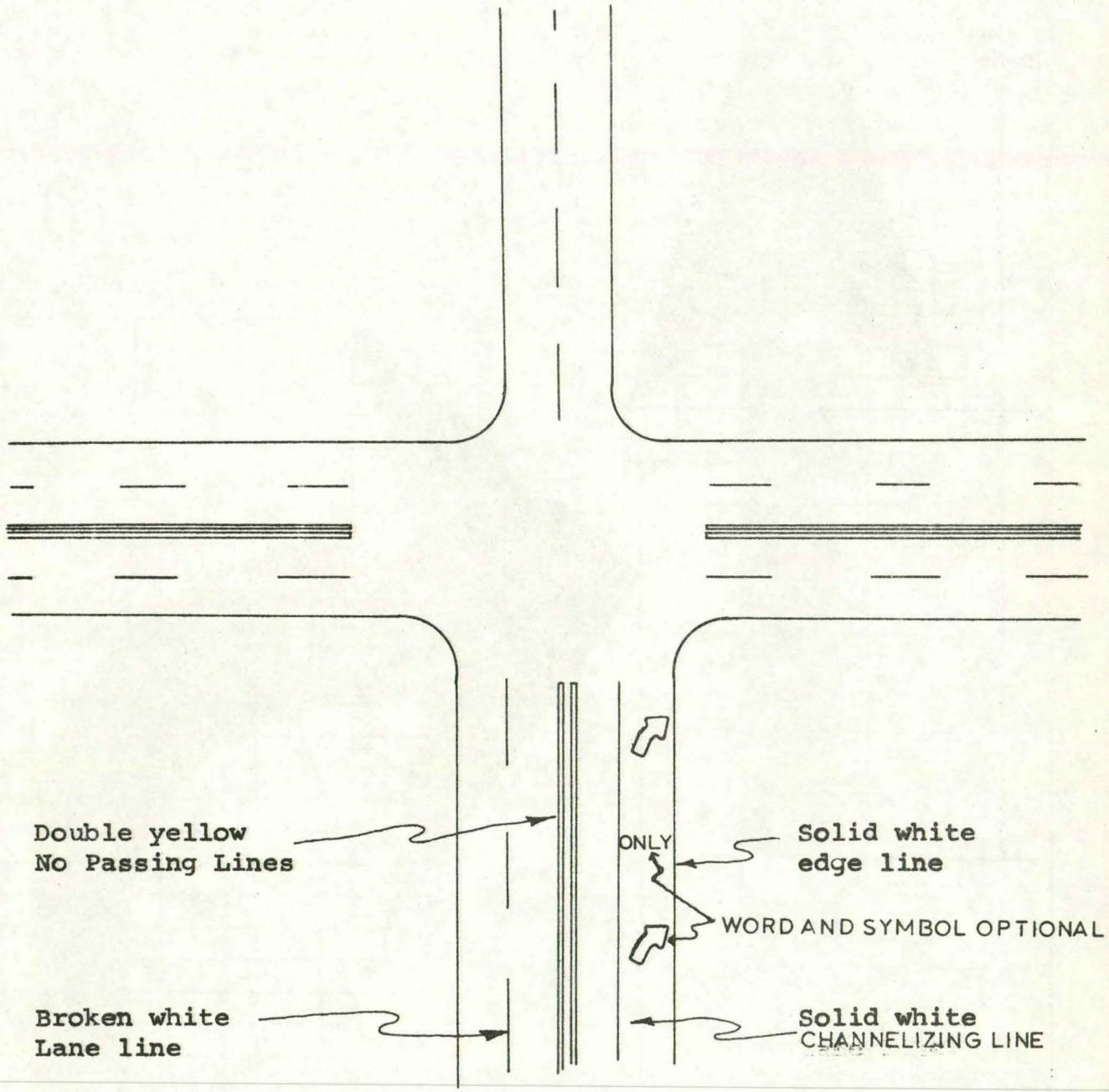


Figure 38
Pavement Markings
Straight and Curve Arrows

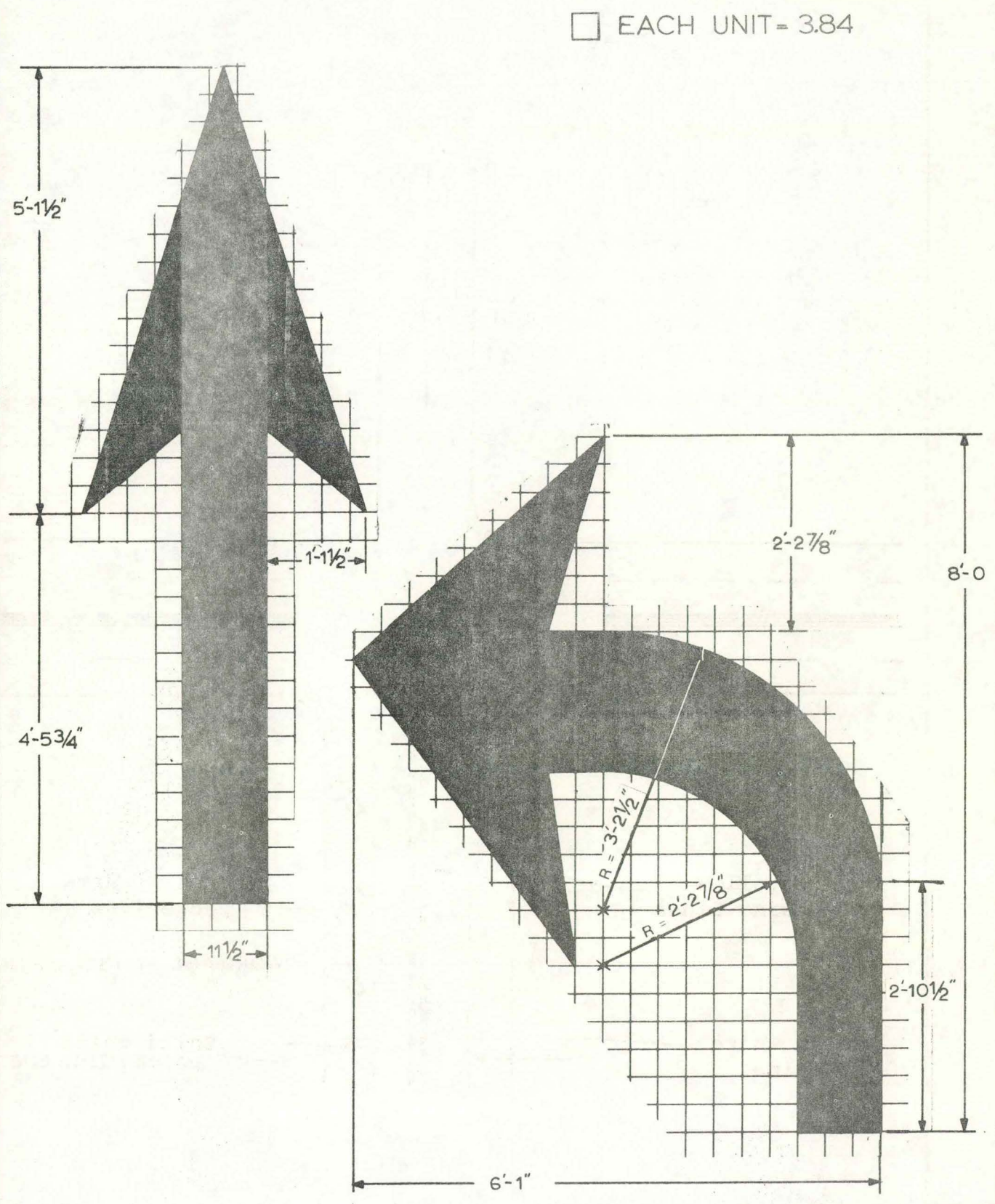


Figure 39
Pavement Markings
Combine Straight and Curve Arrow

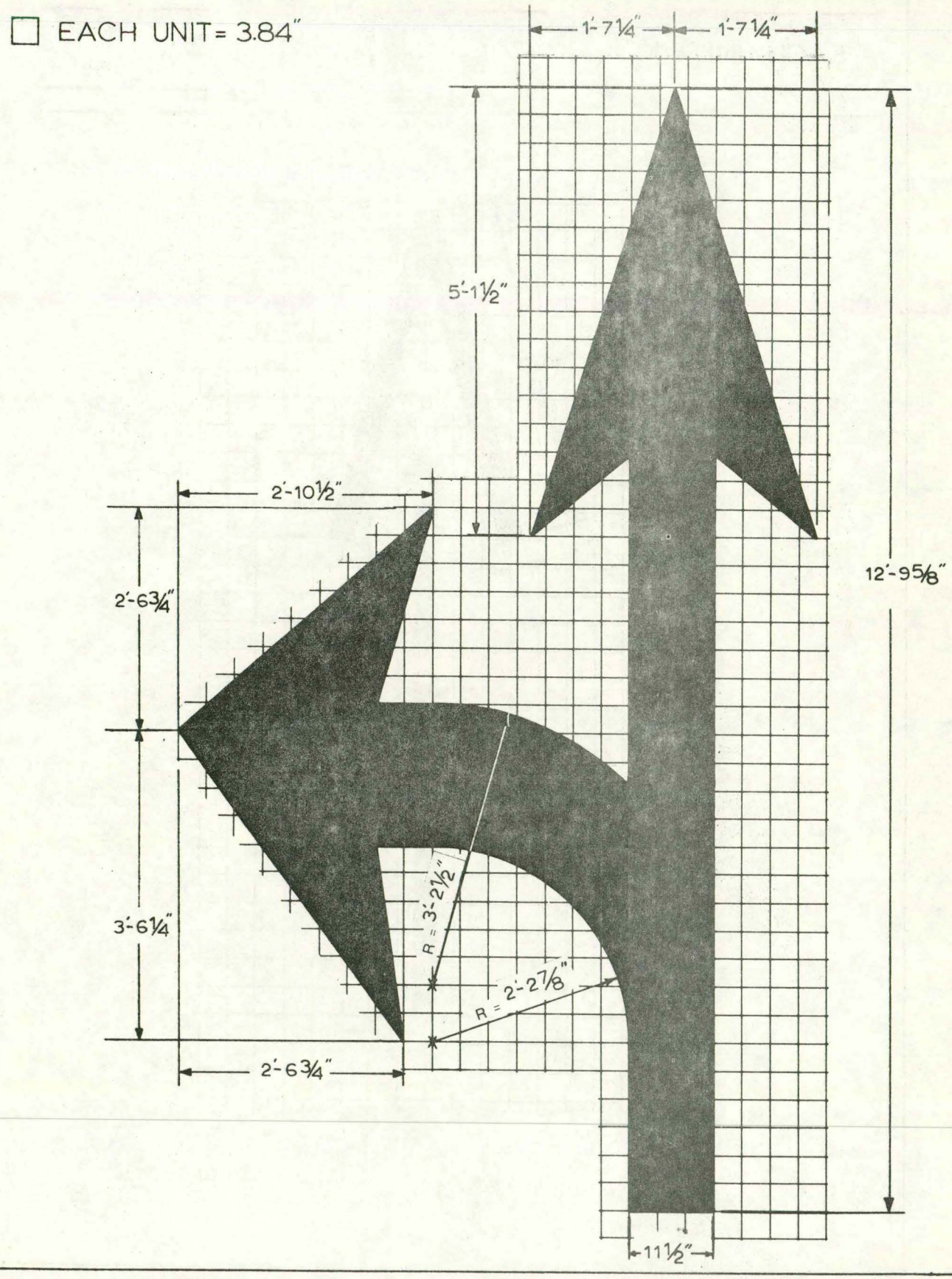


Figure 40
Pavement Markings
Freeway, Expressway Ramp Pavement Arrow

EACH UNIT = 10″

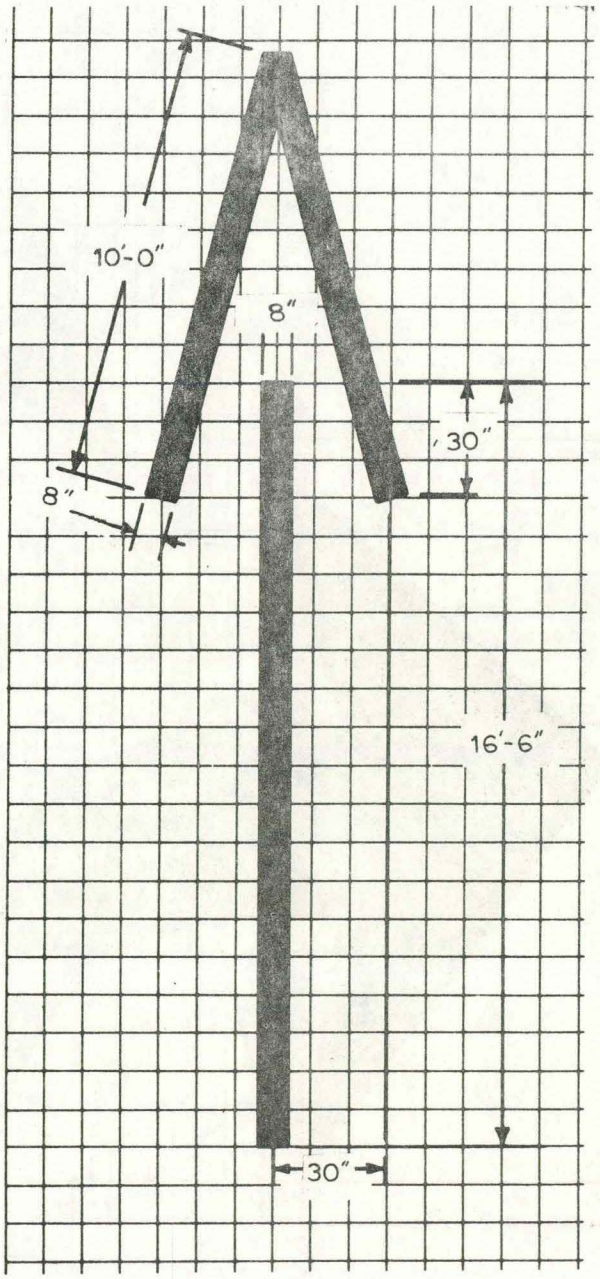


Figure 41

Pavement Marking

'R' for Railroad Crossing

o=Radius Point