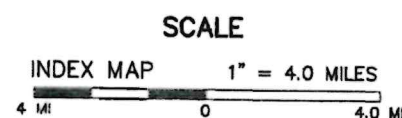
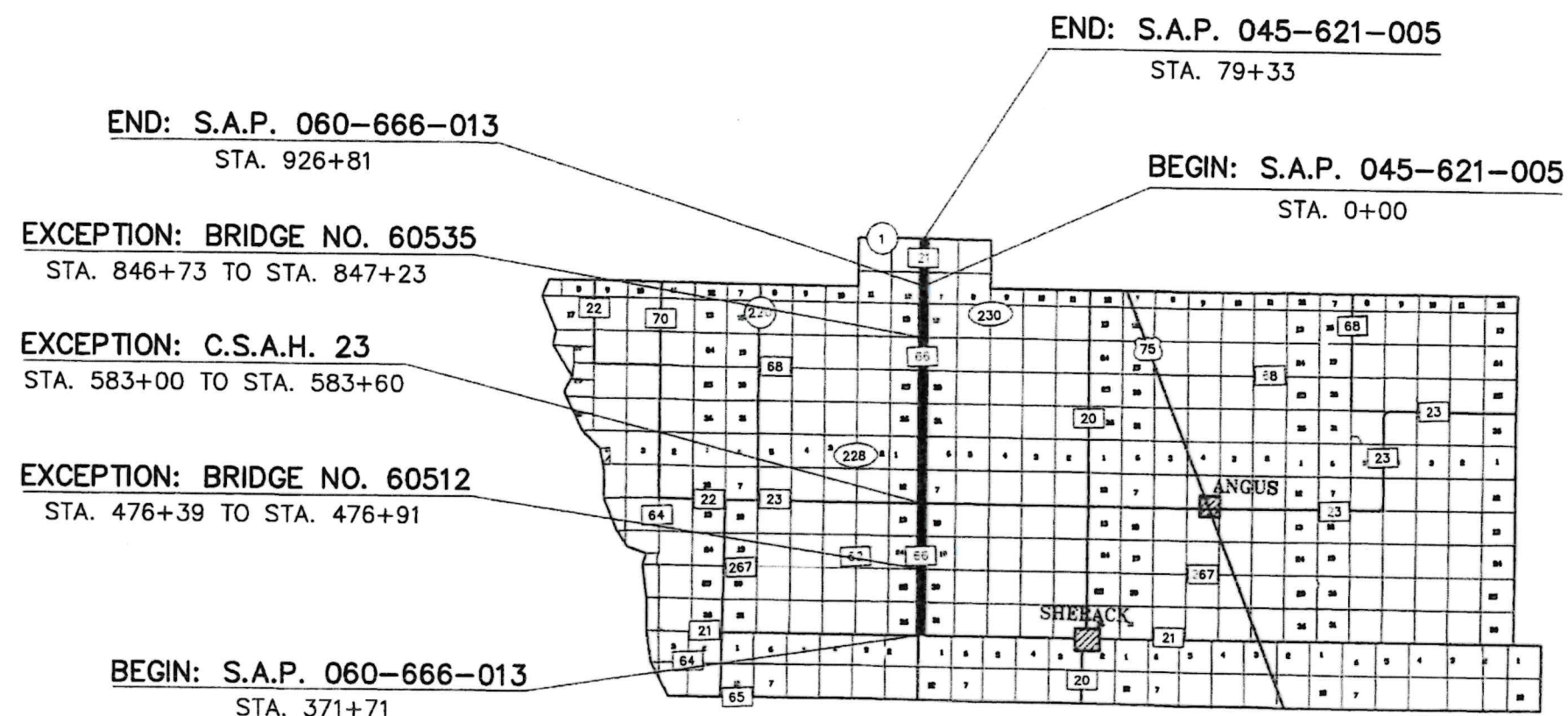


**GRADED UNDER:**  
S.A.P. 60-666-08 in 2001 } POLK COUNTY  
S.A.P. 60-666-09 in 2002 }  
S.A.P. 45-621-02 in 2002 - MARSHALL COUNTY

**SURFACED UNDER:**  
S.A.P. 60-666-11 in 2008 - POLK COUNTY  
S.A.P. 45-621-04 in 2008 - MARSHALL COUNTY



**STOPPING SIGHT DISTANCE BASED ON:**

3.5' HEIGHT OF EYE  
2.0' HEIGHT OF OBJECT

DESIGN DESIGNATION	Polk	Marshall
ADT (2025)	206	206
ADT (2045)	227	227
SHOULDER WIDTH	4.1'	4.1'
SOIL FACTOR	130	130
Ton Design	9	9
Design Speed (MPH)	55	55
CLEAR ZONE	15	15
MINOR COLLECTOR		
Design Standard 8820.9926		

All Traffic Control Devices shall conform to the latest edition of the MMUTCD, including the latest Field Manual for Temporary Traffic Control Zone Layouts.

The subsurface utility information in this plan is utility quality level D. This quality level was determined according to the guidelines of CI/ASCE 38-22, entitled "Standard Guidelines for Investigating and Documenting Existing Utilities".

### GOVERNING SPECIFICATIONS

The 2020 Edition of the Minnesota Department of Transportation "Standard Specifications for Construction" shall govern.

## MINNESOTA DEPARTMENT OF TRANSPORTATION

**CONSTRUCTION PLAN FOR: BITUMINOUS OVERLAY AND  
AGGREGATE SHOULDERING**

### POLK COUNTY

#### COUNTY STATE AID HIGHWAY NO. 66

**From** C.S.A.H. 21, 5 Miles West of Sherack, MN  
**To** Polk/Marshall County Line  
**From** a point 40 ft. N. of the S.W. cor. sec. 31,  
T. 153 N., R. 48 W  
**To** the West 1/4 cor. sec. 7, T. 154 N., R. 48 W.

GROSS LENGTH	55,510	FEET	10,513	MILES
BRIDGE LENGTH	0	FEET	0	MILES
EXCEPTIONS LENGTH	162	FEET	0.031	MILES
NET LENGTH	55,348	FEET	10,482	MILES

**STATE AID PROJECT 060-666-013**

**COUNTY PROJECT 125-66-1384**

### MARSHALL COUNTY

#### COUNTY STATE AID HIGHWAY NO. 21

**From** Polk/Marshall County Line  
**To** T.H. 1, 5 Miles West of Warren, MN  
**From** The West 1/4 cor. sec. 7, T. 154 N., R. 48 W.  
**To** a point approx. 18' South of the NW. cor. sec.  
sec. 6, T. 154 N., R. 48 W.

GROSS LENGTH	7,933	FEET	1,502	MILES
BRIDGE LENGTH	0	FEET	0	MILES
EXCEPTIONS LENGTH	0	FEET	0	MILES
NET LENGTH	7,933	FEET	1,502	MILES

**STATE AID PROJECT 045-621-005**

**COUNTY PROJECT 125-21-1454**

### SHEET INDEX

- 1 TITLE SHEET
- 2-4 ESTIMATED QUANTITIES & TYPICAL SECTIONS
- 5-7 TRAFFIC CONTROL PLAN & DETAILS
- 8 PAVEMENT MARKING DETAILS
- 9 RUMBLE STRIP DETAILS

THIS PLAN CONTAINS 9 SHEETS

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Approved by: Polk County Engineer

Richard C. Sanders, P. E.  
Name

23169  
Reg. No.

Approved by: Marshall County Engineer

Lon Aune, P.E.  
Name

23385  
Reg. No.

STATE AID APPROVALS:

**Brian Ketring**

Digitally signed by Brian Ketring  
DN: CN=Brian Ketring  
Date: 2025.04.07 06:33:01-05'00'

District State Aid Engineer: Reviewed for  
Compliance with State Aid Rules/Policy

Date: \_\_\_\_\_

**Brian Ketring**

Digitally signed by Brian Ketring  
DN: CN=Brian Ketring  
Date: 2025.04.07 06:33:26-05'00'

Approved For State Aid Funding:  
State Aid Engineer

Date: \_\_\_\_\_

**SHEET 1 OF 9 SHEETS**

ESTIMATED QUANTITIES

ITEM NUMBER	ITEM	UNIT	POLK COUNTY QUANTITIES	MARSHALL COUNTY QUANTITIES	TOTAL EST. QUANTITIES
2221.509	SHOULDER BASE AGGREGATE CLASS 1	TON	10,200	1,500	11,700
① 2232.504	MILL BITUMINOUS SURFACE (1.5")	SQ YD	7,000	4,800	11,800
2232.506	MILLED RUMBLE STRIPS	LIN FT	99,600	14,500	114,100
2360.509	TYPE SP 9.5 WEARING COURSE MIX FOR PAVER LEVEL(2,B)	TON	7,800	1,000	8,800
② 2360.509	TYPE SP 9.5 WEARING COURSE MIXTURE (2,B)	TON	13,200	1,900	15,100
2563.601	TRAFFIC CONTROL	LUMP SUM	0.87	0.13	1
2580.503	INTERIM PAVEMENT MARKING	LIN FT	8,800	650	9,450
④ 2582.503	4" SOLID LINE PAINT	LIN FT	2,250	1,000	3,250
③ 2582.503	6" SOLID LINE PAINT	LIN FT	109,300	15,600	124,900
④ 2582.503	4" BROKEN LINE PAINT	LIN FT	11,100	1,600	12,700

- ① MILLING AT PROJECT ENDS, BRIDGES, RAILROAD TRACKS, PAVEMENT OVERFLOW AREAS AND AS DETERMINED BY THE ENGINEER. REMOVAL AND DISPOSAL OF MILLINGS SHALL BE CONSIDERED INCIDENTAL.
- ② INCLUDES APPROXIMATELY 200 TONS FOR FULL DEPTH PATCHING AT VARIOUS LOCATIONS AS DIRECTED BY ENGINEER. REMOVAL AND DISPOSAL OF BITUMINOUS PAVEMENT SHALL BE CONSIDERED INCIDENTAL.
- ③ WHITE PAINT
- ④ YELLOW PAINT

BASIS FOR ESTIMATED QUANTITIES

BITUMINOUS WEARING COURSE

BITUMINOUS MIXTURE – 110 POUNDS/SQ. YD./INCH OF DEPTH

BITUMINOUS TACK COAT

SEE SPECIAL PROVISIONS.

AGGREGATE SHOULDERING

AGGREGATE MATERIAL COMPUTED AT 135 POUNDS/CU. FT.

NOTES

S.A.P. 060-666-013

ADDITIONAL MATERIAL FOR 19 ROAD APPROACHES, 74 ENTRANCES, 4 MAILBOX APPROACHES HAS BEEN PROVIDED FOR IN ITEMS 2221.509 (1200 TONS) AND 2360.509 (1000 TONS).

S.A.P. 045-621-005

ADDITIONAL MATERIAL FOR 2 ROAD APPROACHES, 10 ENTRANCES AND 1 MAILBOX APPROACH HAS BEEN PROVIDED FOR IN ITEMS 2221.509 (150 TONS) AND 2360.509 (150 TONS).

CERTIFIED BY:

RICHARD C. SANDERS, P.E.

#23169

Date

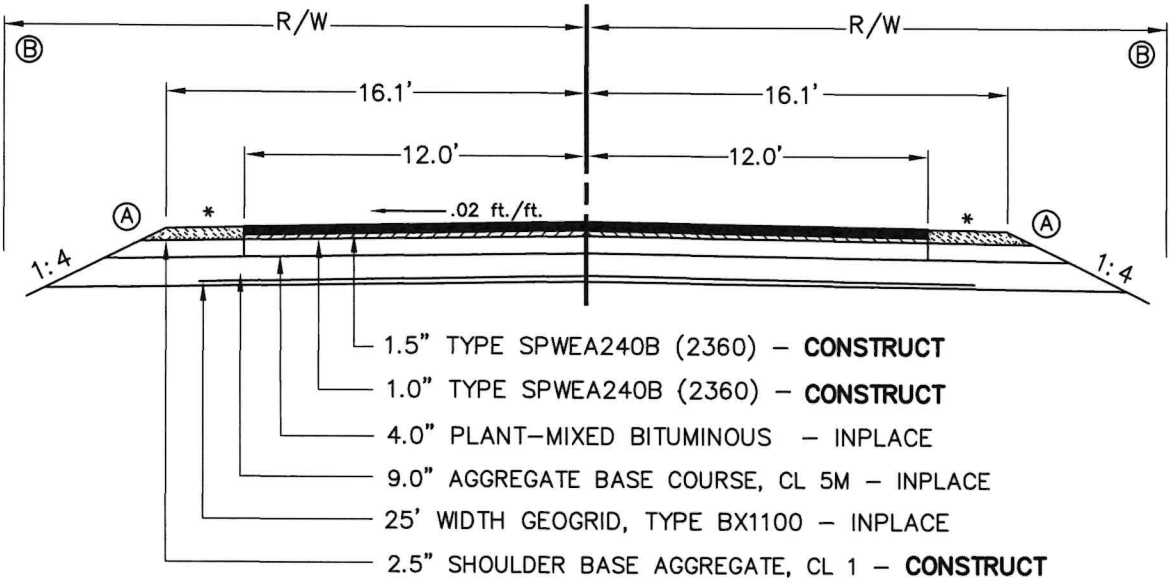
C.S.A.H. 66  
C.S.A.H. 21

POLK COUNTY, MN.  
MARSHALL COUNTY, MN.

S.A.P. 060-666-013  
S.A.P. 045-621-005

SHEET 2 OF 9 SHEETS

TYPICAL SECTION



THIS TYPICAL APPLIES TO THE ENTIRE PROJECT EXCEPT FOR MILLING SECTIONS SHOWN ON SHEET 3.

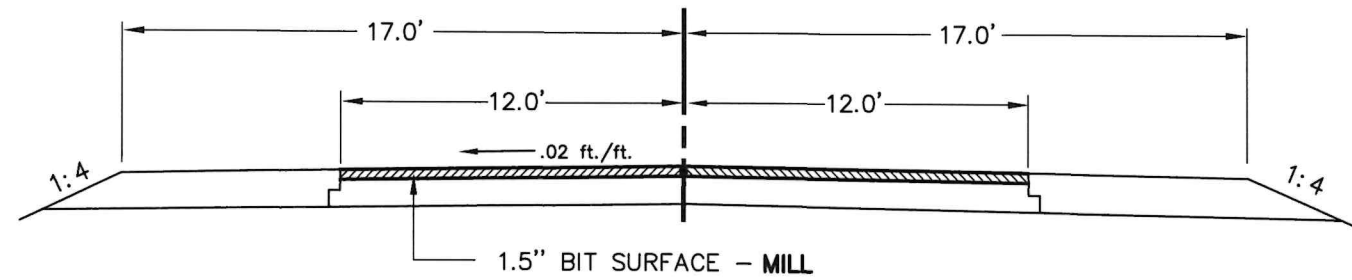
- Ⓐ SLOPE THE NEW SHOULDER FROM THE SHOULDER P.I. TO BLEND INTO THE EXISTING SLOPE. ALL AGGREGATE MATERIAL SHALL BE COMPACTED COMPLETELY.
- Ⓑ RIGHT OF WAY DISTANCE VARIABLE THROUGHOUT PROJECT.

\* SHOULDER CROSS SLOPE = 0.02 FT/FT

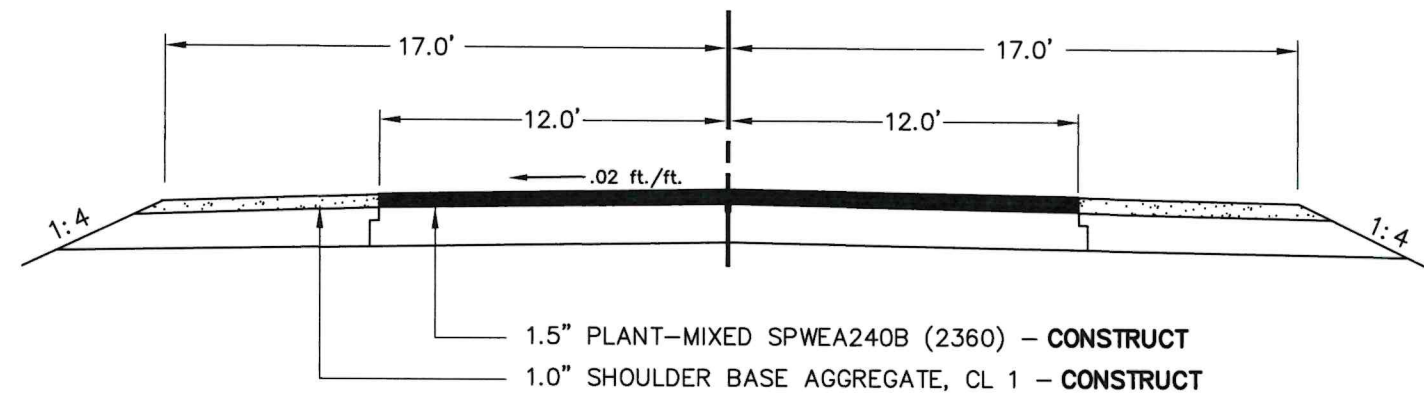
THE FOLLOWING STANDARD PLATES APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY.

PLATE NO.	STANDARD PLATES
	DESCRIPTION
8000 K	TEMPORARY CHANNELIZERS – TYPE A

# TYPICAL MILLING SECTION (PAVEMENT OVERFLOW AREAS)



# TYPICAL SURFACING SECTION



# SECTIONS APPLY FROM APPROXIMATELY:

STA 396+00 TO STA 405+00  
STA 887+00 TO STA 896+00  
STA 903+00 TO STA 910+00  
STA 0+00 TO STA 5+00  
STA 66+00 TO STA 74+00

CERTIFIED BY:

RICHARD C. SANDERS, P.E.

#23169

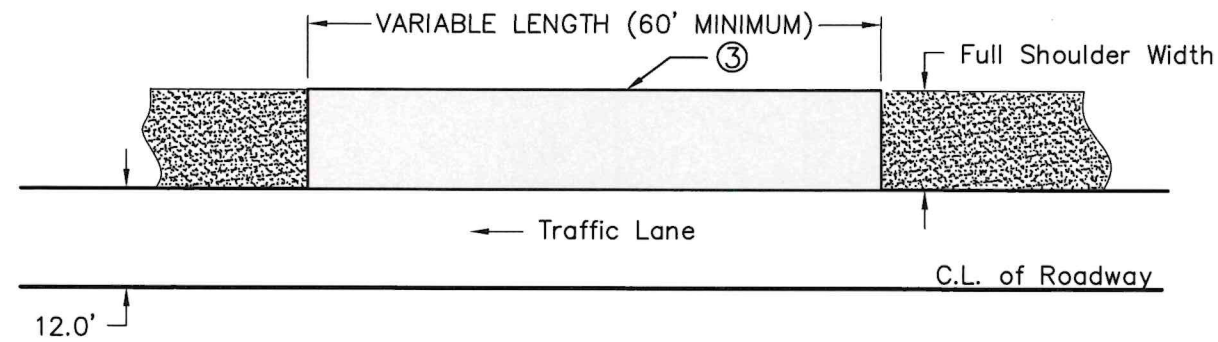
Date

C.S.A.H. 66 POLK COUNTY, MN.  
C.S.A.H. 21 MARSHALL COUNTY, MN.

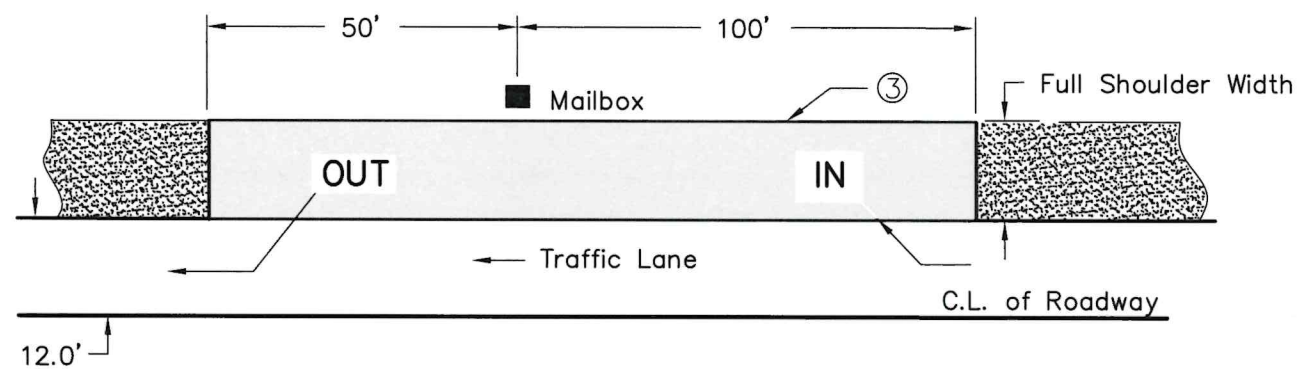
S.A.P. 060-666-013  
S.A.P. 045-621-005

SHEET 3 OF 9 SHEETS

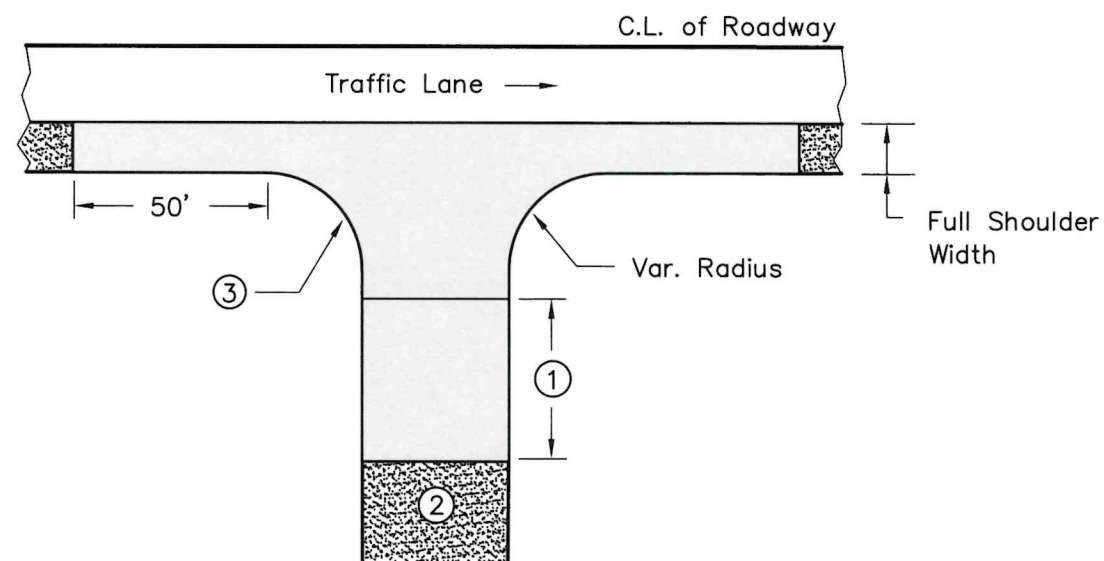
### TYPICAL ENTRANCE DETAIL (PLAN VIEW)



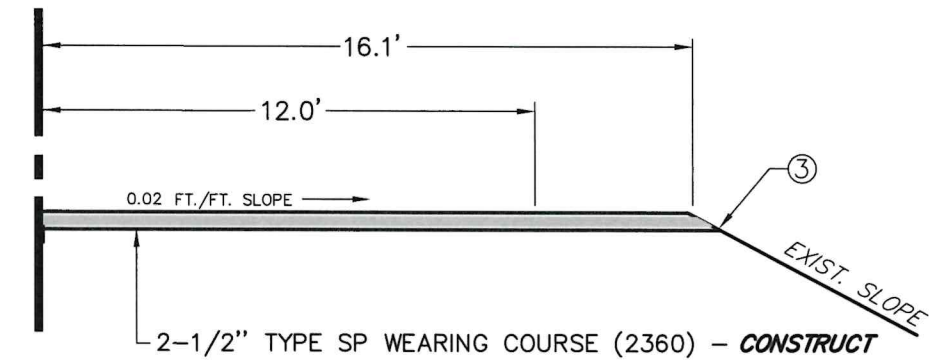
### TYPICAL MAILBOX DETAIL (PLAN VIEW)



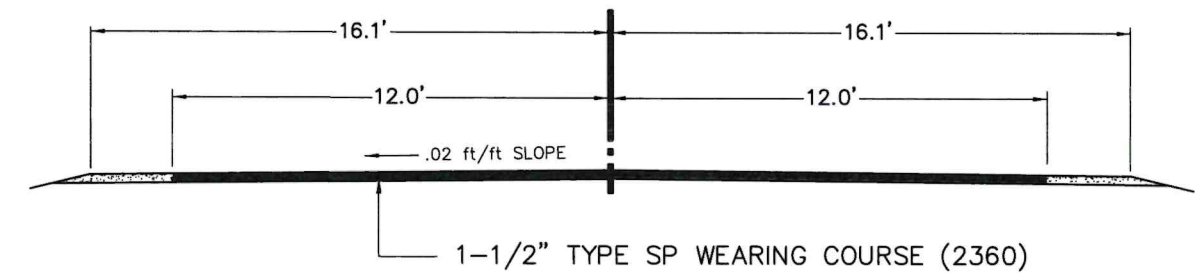
### COUNTY AND TOWNSHIP ROAD APPROACH DETAIL (PLAN VIEW)



### TYPICAL ENTRANCE AND MAILBOX SECTION



### TYPICAL FUTURE SECTION



THIS SECTION APPLIES TO THE ENTIRE PROJECT

#### NOTES:

- ① DETERMINED BY THE ENGINEER
- ② PLACE AGGREGATE BEYOND BITUMINOUS SURFACING
- ③ SLOPE PAVEMENT EDGE TO 1:4 SLOPE
- DESIGNATES BITUMINOUS SURFACING
- DESIGNATES AGGREGATE SURFACING
- ALL DIMENSIONS AND SLOPES SHOWN ON THE TYPICAL SECTIONS ARE APPROXIMATE

CERTIFIED BY:  #23169

RICHARD C. SANDERS, P.E.

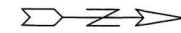
Date

C.S.A.H. 66  
C.S.A.H. 21

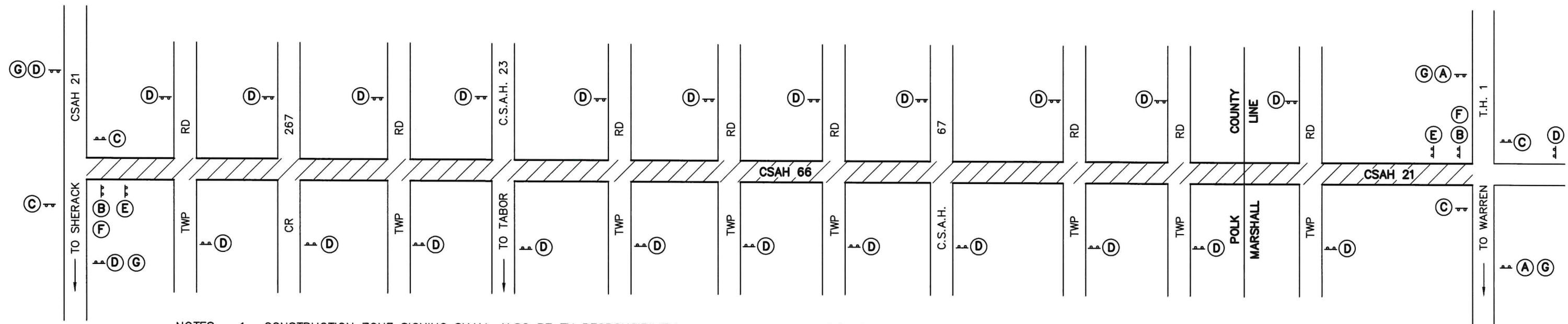
POLK COUNTY, MN.  
MARSHALL COUNTY, MN.

S.A.P. 060-666-013  
S.A.P. 045-621-005



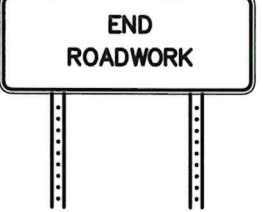




SHEET 4 OF 9 SHEETS



# TRAFFIC CONTROL PLAN



- NOTES:
1. CONSTRUCTION ZONE SIGNING SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR WHICH WILL INCLUDE BUT NOT LIMITED TO FLAGMAN AHEAD, BUMP, SHOULDER WORK, AND LOW SHOULDER. THE NUMBER AND LOCATION WILL BE DETERMINED BY THE CONTRACTOR'S OPERATION.
  2. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST MMUTCD, INCLUDING THE LATEST "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS".
  3. ALL STRUCTURES, SIGNS AND TRAFFIC CONTROL DEVICES SHALL BE CERTIFIED AS NCHRP 350 CRASH TESTED.
  4. SIGN FACE MATERIAL FOR ALL SIGN PANELS SHALL BE HIGH PERFORMANCE SIGN SHEETING FOR RIGID PERMANENT SIGNS, DELINEATORS, AND MARKERS, FROM MNDOT OFFICE OF TRAFFIC SAFETY, SECURITY, AND OPERATIONS QUALIFIED PRODUCTS LIST. MUST MEET MINIMUM LEVELS FOR RETROREFLECTIVITY STATED IN TABLE 2A-3 OF MUTCD MANUAL.
  5. IF CONSTRUCTION IS NOT STARTED WITHIN 10 WORKING DAYS AFTER THE INSTALLATION OF THE TRAFFIC CONTROL DEVICES, ALL SIGNS SHALL BE COVERED UNTIL WORK BEGINS. THE DEVICES SHALL BE REMOVED AS SOON AS THE WORK IS COMPLETED AND NO LONGER NEEDED.
  6. TRAFFIC CONTROL DEVICES 48" X 48" AND LARGER ON T.H. 1 REQUIRE FLASHERS.

INSTALLATION CODE	(A)	(B)	(C)	(D)	(E)	(F)	(G)
QUANTITY	4	2	4	24	2	2	4
MMUTCD REF.	W20-1	G20-1	G20-2A	W20-1	W20-X5	W13-1	M1-X4
SIZE	48" X 48"	60" X 36"	48" X 24"	36" X 36"	36" X 36"	24" X 24"	24" X 24"
SIGN							
NOTES	PLACE 1000' INTERVALS FROM INTERSECTION	PLACE ON TYPE III BARRICADE AT PROJECT TERMINI	PLACE 200 FT. FROM INTERSECTION	PLACE 750 FT. FROM INTERSECTION	PLACE 200' FROM INSTALLATION CODE (B)	PLACE ON OR NEXT TO SIGN INSTALLATION CODE (B)	PLACE ON OR NEXT TO SIGN INSTALLATION CODE (A)

CERTIFIED BY:  #23169 4/2/25  
RICHARD C. SANDERS, P.E. Date

C.S.A.H. 66  
C.S.A.H. 21

POLK COUNTY, MN.  
MARSHALL COUNTY, MN.

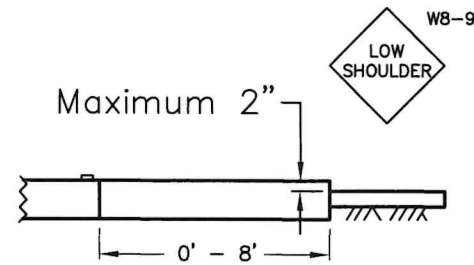
S.A.P. 060-666-013  
S.A.P. 045-621-005

SHEET 5 OF 9 SHEETS

## SHOULDER EDGE DROP-OFF

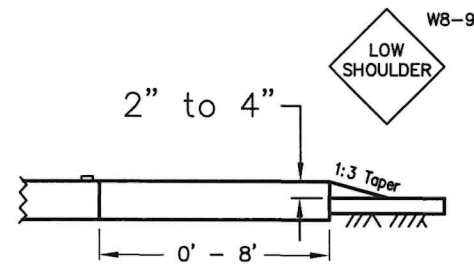
(SHOULDER - OPEN)

SHOULDER TO REMAIN OPEN  
WITH APPROPRIATE WARNING SIGNS.



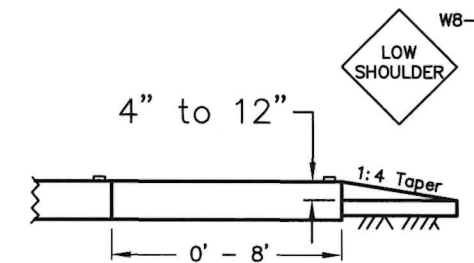
(SHOULDER - OPEN)

SHOULDER TO REMAIN OPEN  
WITH APPROPRIATE WARNING SIGNS.



EDGE DROP-OFF WITH TAPER  
(SHOULDER - OPEN)

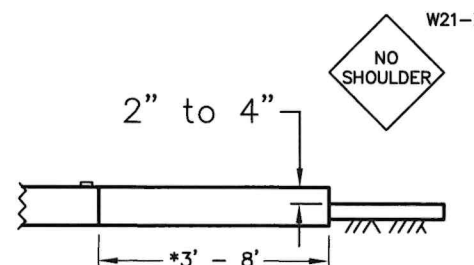
THIS CONDITION WILL NOT BE PERMITTED  
UNLESS THE SLOPE IS COMPACTED  
SO THAT A VEHICLE MAY SAFELY DRIVE  
ONTO IT WITHOUT LOSING CONTROL AND  
IN THE OPINION OF THE ENGINEER THERE  
ARE NO OTHER HAZARDOUS CONDITIONS.



(SHOULDER - CLOSE)

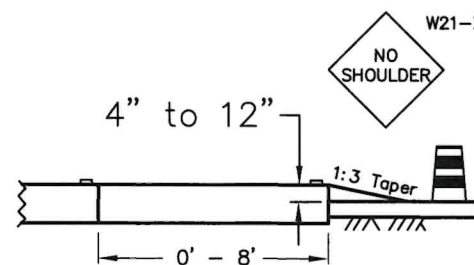
SHOULDER TO REMAIN CLOSED  
WITH APPROPRIATE WARNING SIGNS.

FOR DISTANCES LESS THAN 3 FEET,  
TUBULAR MARKERS ARE REQUIRED AS  
PER FIELD MANUAL.



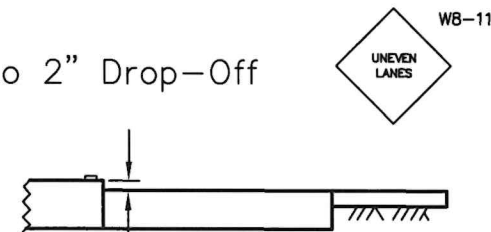
(SHOULDER - CLOSED)

SHOULDER SHALL BE CLOSED  
WITH APPROPRIATE WARNING  
SIGNS AND CHANNELIZING DEVICES  
AS PER FIELD MANUAL.



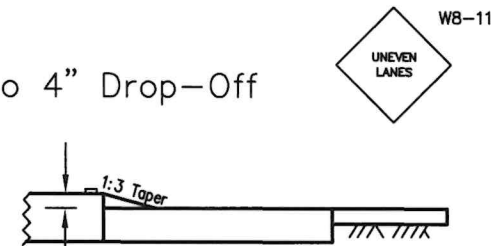
## UNEVEN LANES

0.5" to 2" Drop-Off

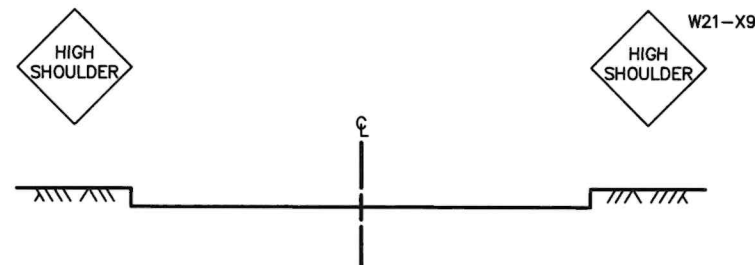


UNEVEN LANES - WITH TAPER

2" to 4" Drop-Off



## MILLED EDGE



Note: Milled Edges greater than 2" require tapers and/or delineation  
as detailed for Edge Drop-Offs in addition to the High Shoulder signs.

## GUIDELINES

These guidelines are intended to increase traffic safety using traffic control devices, safety related appurtenances, and construction techniques for uneven lanes, milled edges, and edge drop-offs that occur in highway work zones. The best way to increase traffic safety is to make every attempt to minimize exposure to uneven lanes, milled edges, and drop-offs. Only when uneven lanes, milled edges, or drop-offs are deemed necessary, shall the appropriate portion(s) of these guidelines be applied to enhance traffic safety.

Tapered slopes shall be adequately compacted to provide a firm driving surface.

Appropriate uneven lane warning signs or shoulder warning signs shall be repeated after each intersection.

Maximum warning sign spacing shall be:

- a - 1 mile when the speed limit is greater than 30 mph and
- b - 1/4 mile when the speed limit is 30 mph or less.

1. Drop-offs of 4"- 12" adjacent to traffic carrying lanes are permitted without tapers or portable concrete barriers for:
  - a - projects within urban areas when the speed limit is 30 mph or less; or
  - b - short term (3 calendar days or less) concrete or utility repair, less than 50 feet in length when the speed limit is greater than 30 mph.
2. Weather permitting, all milling and paving operations shall be required to complete the full width of the section under construction at the end of each work period. At no time shall there be more than one uneven lane condition between the traffic carrying lanes which include auxiliary lanes, turn lanes, and ramp access or egress areas.
3. For any excavations or drop-offs in excess of 12" see the latest Minnesota Manual on Uniform Traffic Control Devices.

Traffic Control Treatment of  
Longitudinal Joints and  
Edge Drop-offs in Work Zones

CERTIFIED BY: #23169 4/14/25  
DATE

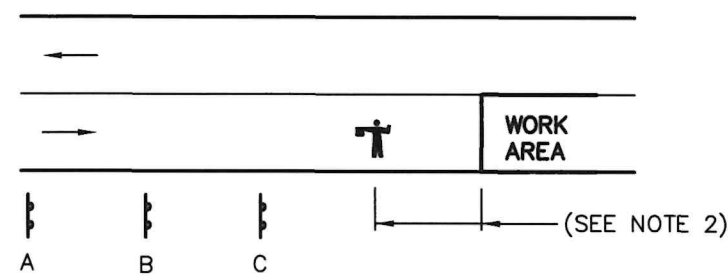
C.S.A.H. 66  
C.S.A.H. 21

POLK COUNTY, MN.  
MARSHALL COUNTY, MN.




S.A.P. 060-666-013  
S.A.P. 045-621-005

SHEET 6 OF 9 SHEETS

TYPICAL LAYOUT FOR PAVING AND SHOULDERING OPERATIONS



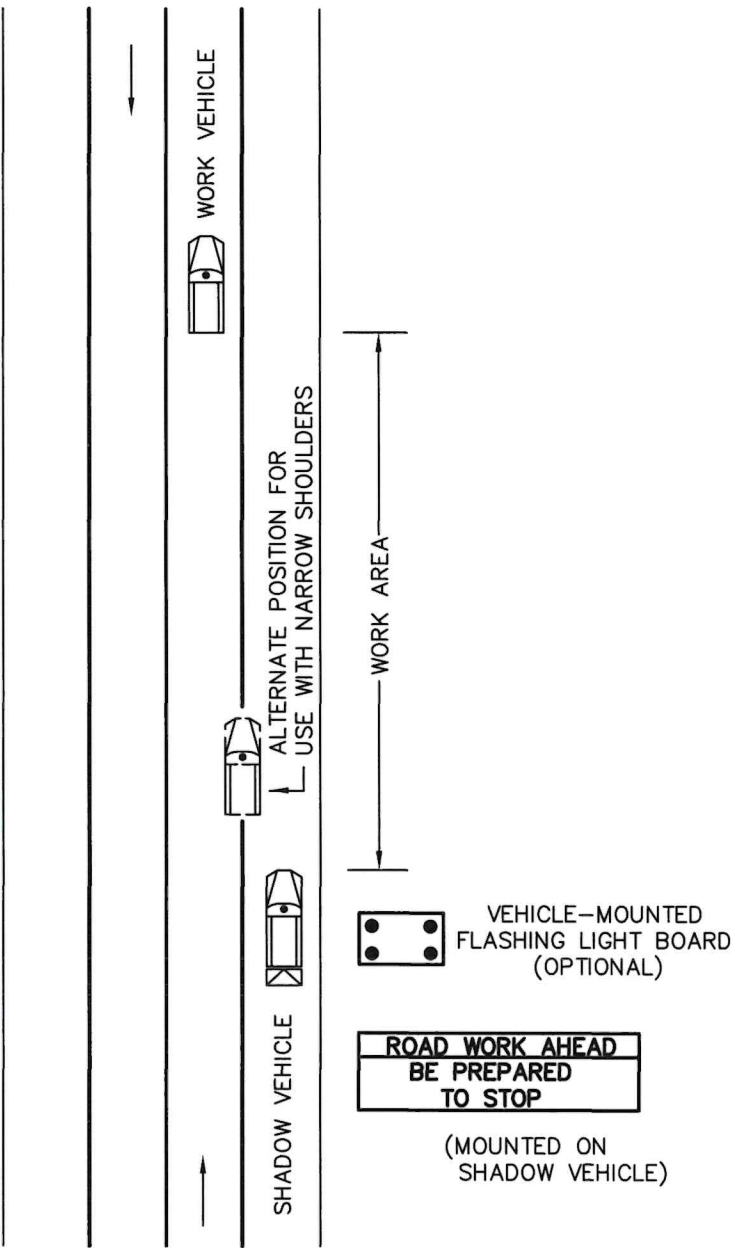
LAYOUT IS TYPICAL FOR THE OPPOSITE SIDE OF THE WORK AREA

INSTALL. CODE	MMUTCD REFERENCE	SIZE	SIGN	NOTES
A	W20-1	36"X36"		PLACE AT 750' INTERVALS
B	W20-4	36"X36"		PLACE AT 750' INTERVALS
C	W20-7A	36"X36"		PLACE AT 750' INTERVALS

- NOTES:
- ALL SIGNS FURNISHED BY THE CONTRACTOR SHALL CONFORM TO SPECIFICATION 3352.2A.3.
  - THE SIGNING LAYOUT AND THE FLAGMAN SHALL BE STATIONED AS CLOSE AS POSSIBLE BUT NO MORE THAN ONE MILE FROM THE WORK AREA.
  - SIGNS PLACED ON PORTABLE SUPPORTS ON THE SHOULDER SHALL BE A MINIMUM OF ONE FOOT ABOVE THE PAVEMENT.

LAYOUT A

TYPICAL LAYOUT FOR SHOULDERING OPERATIONS  
DAYLIGHT USE ONLY WITH GOOD VISIBILITY



- NOTES:
- ALL VEHICLES SHALL DISPLAY A 360 DEGREE FLASHING BEACON.
  - SIGNS SHALL HAVE BLACK LETTERS ON ORANGE BACKGROUND AND SHALL CONFORM TO SPECIFICATION 3352.2A.3.
  - IF THE APPROACH SITE DISTANCE IS RESTRICTED, A FLAGGER SHOULD BE USED TO PROTECT THE WORK AREA AND TO WARN THE DRIVER.
  - ADVANCED WARNING SIGNS SHOULD BE MOVED OR RESET AFTER EACH MAJOR ROAD INTERSECTION OR AFTER EACH MILE WHICH EVER COMES FIRST.
  - A COMPACT WORK AREA SHALL BE MAINTAINED. WHEN THE WORK AREA EXTENDS BEYOND 500 FT IN LENGTH, OTHER TRAFFIC CONTROL LAYOUTS SHOULD BE CONSIDERED.

LAYOUT B

CERTIFIED BY:  #23169 4/2/25  
RICHARD C. SANDERS, P.E. DATE

C.S.A.H. 66 POLK COUNTY, MN.  
C.S.A.H. 21 MARSHALL COUNTY, MN.

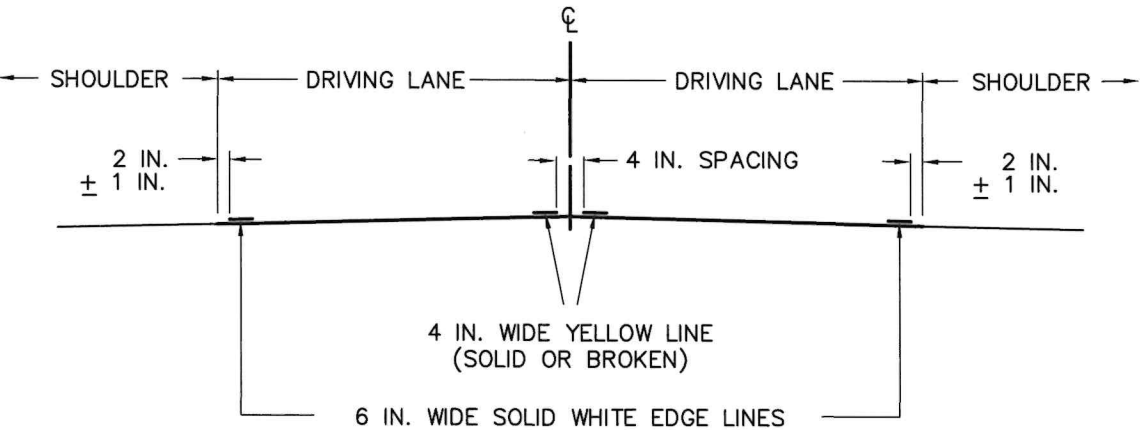
S.A.P. 060-666-013  
S.A.P. 045-621-005 SHEET 7 OF 9 SHEETS

PAVEMENT MARKING

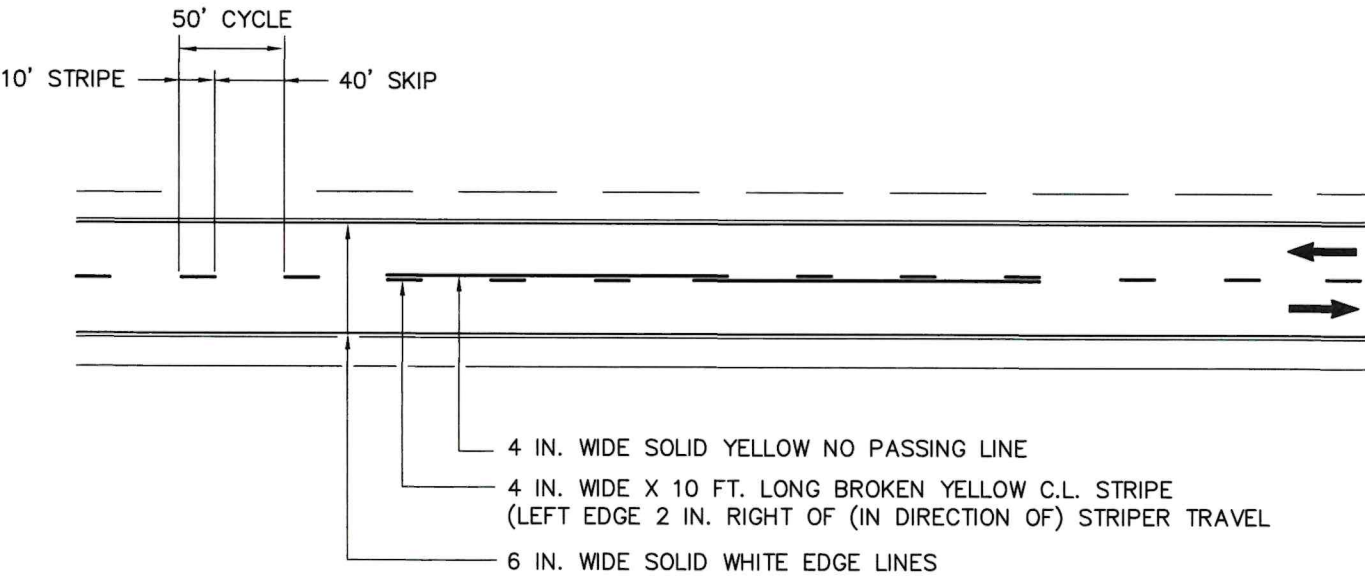
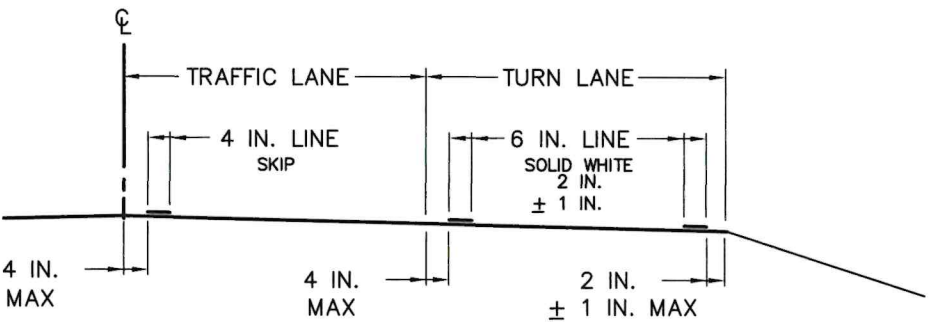
GENERAL REQUIREMENTS


THE ENGINEER'S INVOLVEMENT IN THE APPLICATION OF THE MATERIAL SHALL BE LIMITED TO FIELD SPOTTING, LOCATION, AND INSPECTION. THE ENGINEER WILL PLACE NECESSARY "SPOTTING" AT APPROPRIATE POINTS TO PROVIDE HORIZONTAL CONTROL FOR STRIPING AND TO DETERMINE NECESSARY STARTING AND CUTOFF POINTS. BROKEN LINE INTERVALS WILL NOT BE MARKED. LONGITUDINAL JOINTS, PAVEMENT EDGES, AND EXISTING MARKINGS SHALL SERVE AS HORIZONTAL CONTROL WHEN SO DIRECTED. EDGE LINES AND LANE LINES ARE TO BE BROKEN ONLY AT INTERSECTIONS WITH PUBLIC ROADS AND AT PRIVATE ENTRANCES IF THEY ARE CONTROLLED BY A YIELD SIGN, STOP SIGN, OR TRAFFIC SIGNAL. THE BREAK POINT IS TO BE AT THE START OF THE RADIUS FOR THE INTERSECTION OR AT MARKED STOP LINES OR CROSSWALKS.

TWO-LANE TWO-WAY TRAFFIC MARKINGS



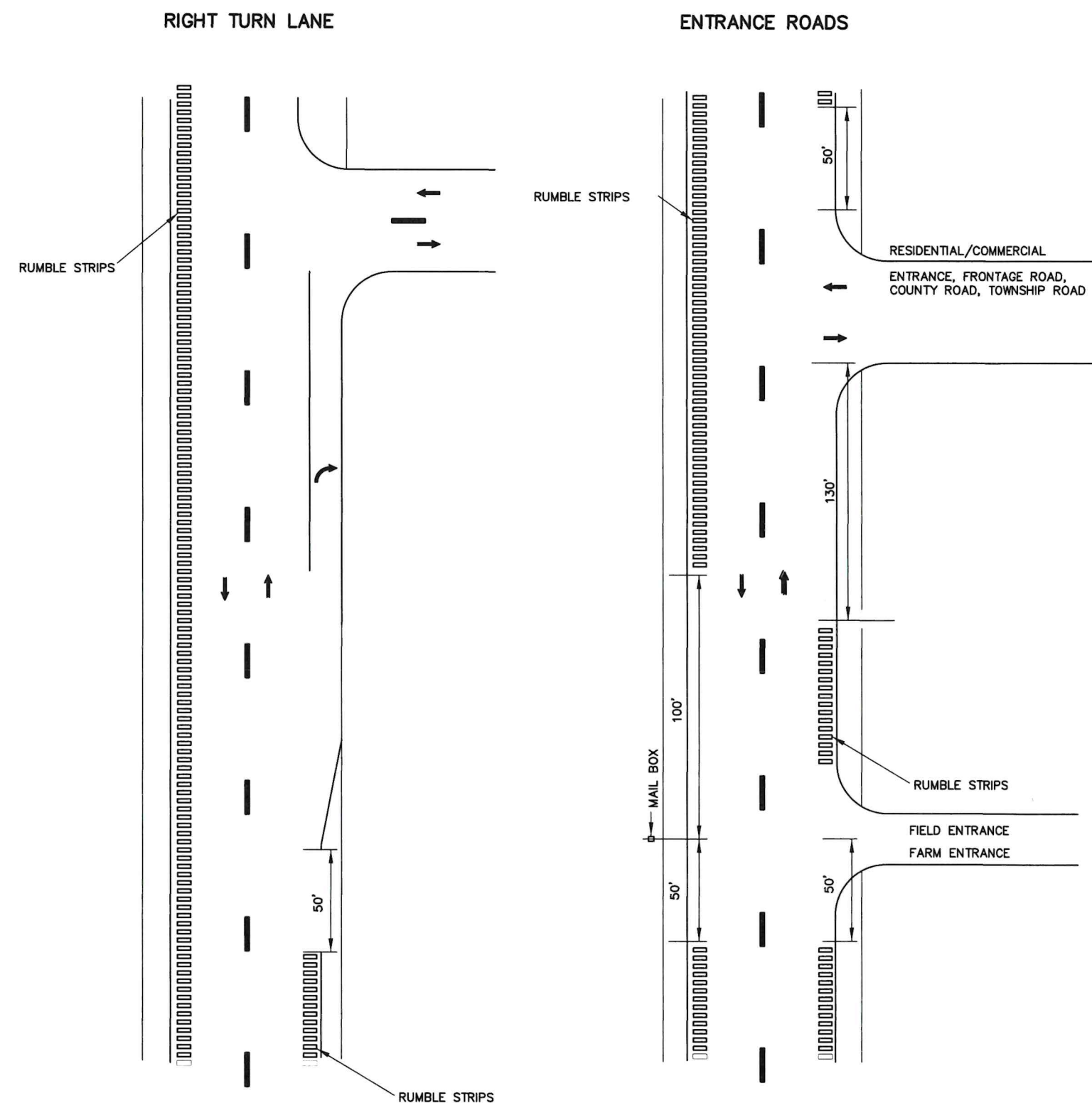
TYPICAL RIGHT TURN LANE



CERTIFIED BY:  #23169 4/2/25  
PROFESSIONAL ENGINEER DATE

## SHOULDER RUMBLE STRIP – APPROPRIATE BREAKS

- (1) THE ITEM 2232.603, MILLED RUMBLE STRIP, SHALL BE PAID BY THE LIN. FT. OF RUMBLE STRIP INSTALLED AS SHOWN IN THE DETAILS.
- (2) MILLING SHALL BE THE ONLY ACCEPTABLE METHOD OF CONSTRUCTING THE RUMBLE STRIPS.



CERTIFIED BY:

RICHARD C. SANDERS, P.E.

#23169

DATE \_\_\_\_\_

C.S.A.H. 66  
C.S.A.H. 21

POLK COUNTY, MN  
MARSHALL COUNTY, MN

S.A.P. 060-666-013  
S.A.P. 045-621-005

SHEET 9 OF 9 SHEETS