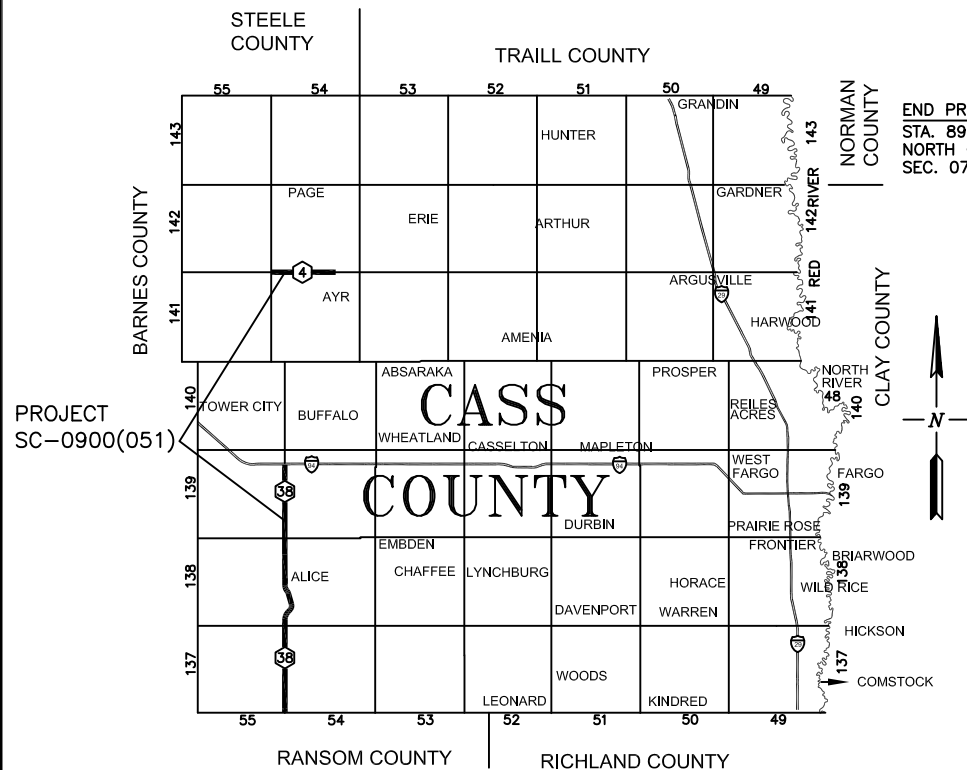


SKETCH MAP OF NORTH DAKOTA
SHOWING COUNTIES

TRAFFIC	CURRENT (2018)	FORECAST (2038)
C-4 (CMC 0918) FROM STATE 38 TO C-3	PASS 160	PASS 238
	TRUCKS 25	TRUCKS 36
	TOTAL 185	TOTAL 274
C-38 (CMC 0909) FROM STATE 46 TO INTERSTATE 94	PASS 496	PASS 740
	TRUCKS 56	TRUCKS 84
	TOTAL 552	TOTAL 824

DESIGN SPEED 55 MPH
MINIMUM SIGHT DISTANCE (STOPPING) 495 FEET
SUPERELEVATION .06 FT/FT
HIGHWAY CROSS SLOPE 2.1%



CASS COUNTY HIGHWAY DEPARTMENT

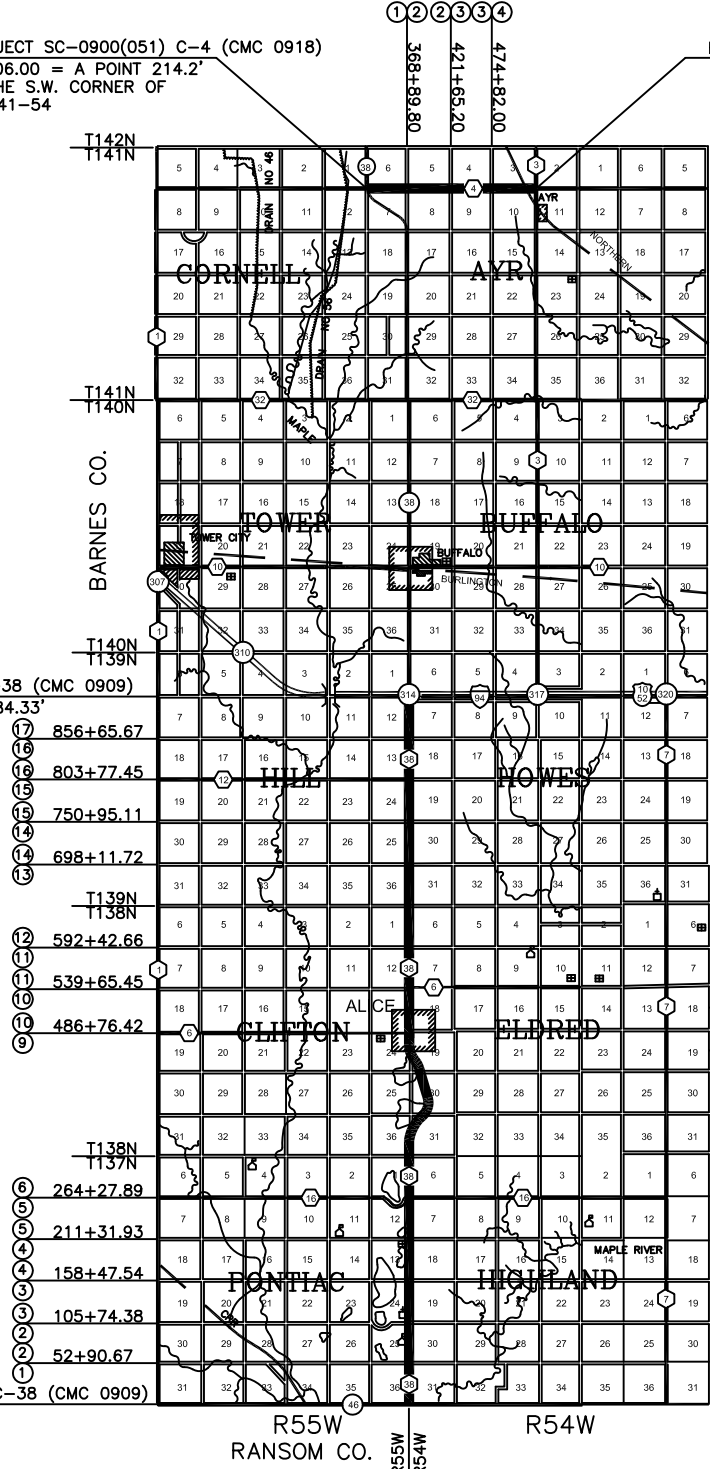
PLANS

FOR THE PROPOSED IMPROVEMENT OF A
COUNTY HIGHWAY
FEDERAL AID PROJECT NO. SC-0900(051)
MILL & HMA OVERLAY

CASS CO. HWY 4 (CMC 0918); FROM STATE HWY 38 TO CASS CO. HWY 3
CASS CO. HWY 38 (CMC 0909); FROM STATE HWY 46 TO INTERSTATE 94

BEGIN PROJECT SC-0900(051) C-4 (CMC 0918)
STA. 319+06.00 = A POINT 214.2'
EAST OF THE S.W. CORNER OF
SEC. 06-141-54

END PROJECT SC-0900(051) C-4 (CMC 0918)
STA. 527+76.50 = S.W. CORNER
SEC. 02-141-54



END PROJECT SC-0900(051) C-38 (CMC 0909)
STA. 897+50.00 = A POINT 4,084.33'
NORTH OF THE S.W. CORNER OF
SEC. 07-139-54

BEGIN PROJECT SC-0900(051) C-38 (CMC 0909)
STA. 0+00.00 = S.W. CORNER
SEC. 31-137-54

	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
PCN 21950	N.D.	SC-0900(051)	1	23

JOB # 1

GOVERNING SPECIFICATIONS:
2014 STANDARD SPECIFICATIONS ADOPTED BY THE
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION AND
THE SUPPLEMENTAL SPECIFICATIONS EFFECTIVE ON THE
DATE THE PROJECT IS ADVERTISED.

SHEET NO.	TITLE
1	COVER SHEET
2-3	SCOPE OF WORK
4-5	CONSTRUCTION NOTES
6-8	BASIS OF ESTIMATE
9	ESTIMATED QUANTITIES
10-13	TYPICAL SECTIONS
14-16	INTERSECTION DETAILS
17-19	APPROACH DETAILS
20	RUMBLE STRIPS DETAILS
21-23	CONSTRUCTION SIGNING

NUMBER	TITLE
D-704-8,9,11	CONSTRUCTION SIGNING
11A,14,22,26,56	& BARRICADE DETAILS
D-762-1	PAVEMENT MARKING MESSAGE DETAILS
D-762-4	PAVEMENT MARKING
D-762-11	SHORT TERM PVMT. MARKING

PROJECT	MILES GROSS	MILES NET
SC-0009(051) C-4 (CMC 0918)	3.95	3.95
SC-0009(051) C-38 (CMC 0909)	17.00	17.00
TOTAL	20.95	20.95

DESIGN PS&E JANUARY 2018
JANUARY 2018

NUMBER	TITLE
SP 0706(14)	FLEXIBLE PAVEMENT SURFACE TOLERANCE

THIS DOCUMENT WAS ORIGINALLY ISSUED
AND SEALED BY
JASON P. BENSON
N.D. REG. NO. 7490
ON 8/10/2018 AND THE ORIGINAL
DOCUMENT IS STORED AT THE CASS COUNTY
HIGHWAY DEPARTMENT, WEST FARGO, ND

THIS DOCUMENT WAS ORIGINALLY ISSUED
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N.D. REG. NO. 4038
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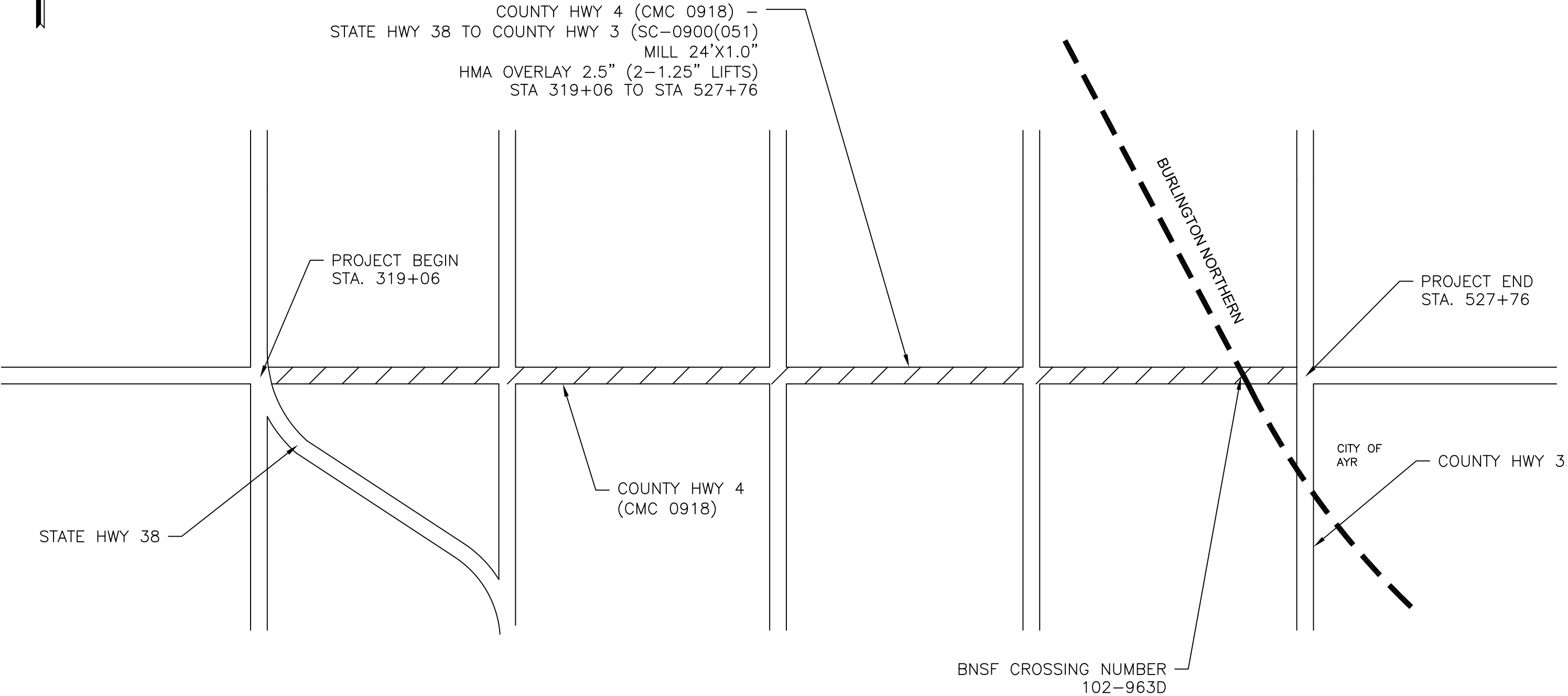
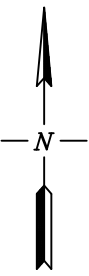
CASS COUNTY HIGHWAY DEPARTMENT

PROJECT NO. SC-0900(051)

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

JASON P. BENSON /S/ DATE: 08/10/2018
JASON P. BENSON N.D. REG. NO. 7490
THOMAS B. SOUCY /S/ DATE: 08/10/2018
THOMAS B. SOUCY N.D. REG. NO. 4038

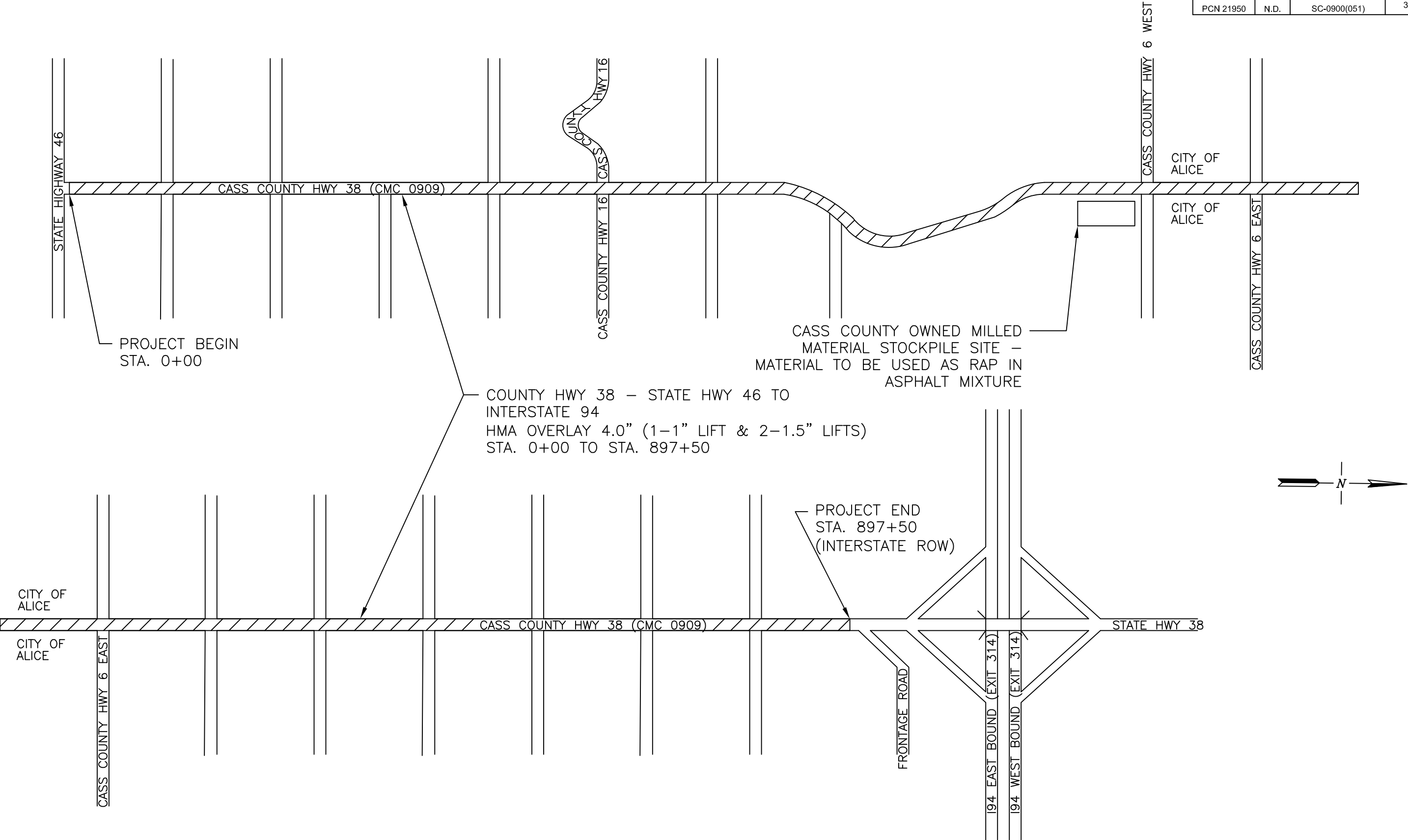
	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
PCN 21950	N.D.	SC-0900(051)	2	23



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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
SCOPE OF WORK

PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	3	23



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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
SCOPE OF WORK

	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
PCN 21950	N.D.	SC-0900(051)	5	23

WARM MIX ASPHALT (WMA):

Warm Mix Asphalt (WMA) may be substituted for Hot Mix Asphalt (HMA) at the Contractor’s choosing. The WMA additive or technology is at the Contractor’s choosing, and to be approved by the Engineer. All costs and savings associated with WMA shall be included in the unit cost for "RAP – SUPERPAVE FAA 42."

CONTRACTOR MIX DESIGN:

The mix design will be a laboratory mix design determined by the Contractor and approved by the Engineer. The mix design will be developed according to NDDOT mix design procedures and will meet the requirements of Section 430 of the NDDOT Standard Specifications. The mix design will be developed using the aggregate source, RAP source, and asphalt cement that is to be used on the project.

RECYCLED ASPHALT PAVEMENT (RAP):

Contractor may add up to 15% recycled asphalt pavement (RAP), in the Superpave FAA 42 mixture.

RAP must be utilized in accordance with Section 430.03 E of the Standard Specification.

CONTRACTOR CORING:

Before placing bituminous material into core holes, apply a tack coat on all sides of the core holes.

PAVING SEAMS:

All seams must be at least 11.5’ from the centerline of the roadway unless a hot seam is used. Hot seams can be located at any offset distance. A hot seam will be defined as a seam created when two pavers are paving at the same time, with no more than 300’ between the pavers. The seam must be rolled in a way to join and hide the seam so it is not visible to the traveling public.

HOT MIX ASPHALT:

The "RAP – SUPERPAVE FAA 42" shall have the following aggregate and mix design properties:

Test	Criteria	Reference
Course Aggregate Angularity	75% min	NDDOT Field Sampling/Testing Manual
Fine Aggregate Angularity	42% min	AASHTO T 304
Gyratory Effort, # Gyration	Nini=7, Ndes=75, Nmax=115	AASHTO R 35
Voids Filled with Asphalt	65–78%	AASHTO M 323, T 166
%Gmm @ Nini	90.5% max	AASHTO M 323, T 166

BITUMINOUS LABORATORY:

Replace 706.02C, Number 8, with the following: A forced draft oven with an interior capacity of 6 cubic feet and that is capable of maintaining a temperature range from 250°F to 350°F + 5°F.

TRAFFIC CONTROL FOR RUMBLE STRIPS:

The contractor shall use Standard Drawing D–704–15 layout A or Standard Drawing D–704–56 for shoulder rumble strips. Any other method of traffic control must be requested by the Contractor and approved by the Engineer prior to use in the field. All costs for this work shall be included in the price bid for "RUMBLE STRIPS – ASPHALT SHOULDER".

STRIPING:

All striping must be 4” wide (both temporary or permanent). If the temporary striping is measured at a thinner width, the prorated amount of width will be paid for the quantity placed. If permanent striping is measured less than 4” width, section must be re–striped at contractor’s cost.

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC–0900(051)
CONSTRUCTION NOTES

BASIS OF ESTIMATE	
MATERIAL	BASIS OF ESTIMATE
AGGREGATE BASE COURSE - CLASS 5	1.875 TON/CY
SHRINKAGE FOR CLASS 5	COMPACTED VOLUME IN PLACE PLUS 25%
CLASS 5 FOR APPROACHES	23 TONS/APPROACH
HOT BITUMINOUS PAVEMENT	2 TON/CY
ADDED ASPHALT CEMENT	5.0% OF HBP BY WEIGHT
EMULSIFIED ASPHALT FOR TACK COAT - MILLED SURFACE	0.10 GAL/SY
EMULSIFIED ASPHALT FOR TACK COAT - NON MILLED SURFACE	0.05 GAL/SY
EMULSIFIED ASPHALT FOR RUMBLE STRIPS	0.10 GAL/SY
EMULSIFIED ASPHALT FOR FOG COAT	0.05 GAL/SY
WATER	
AGGREGATE BASE CLASS 5 COMPACTION	30 GAL/TON
AS A DUST PALLATIVE ON HAUL ROADS	30 M GAL PER DAY OF HAULING
	(ESTIMATED TO BE 15 DAYS)
TRAFFIC CONTROL	
FLAGGING	12 HOURS FLAGGING/FLAGGER/2,000 TONS FAA 42
PILOT CAR	12 HOURS PILOT CAR/2000 TONS FAA 42

OVERLAYING APPROACHES						
PROJECT SC-0900(051) - HWY 4 (CMC 0918)						
DESCRIPTION	PRIVATE DRIVE		SECTION LINE		FIELD APPROACH	
AMOUNT	1		6		15	
RECYCLED ASPHALT PAVEMENT - FAA 42	20	TON	30	TON	5	TON
ASPHALT CEMENT	1	TON	1.5	TON	0.25	TON
AGGREGATE BASE - CLASS 5	23	TON	23	TON	23	TON
EMULS. ASPH. FOR TACK COAT	10	GAL.	15	GAL.	5	GAL.

OVERLAYING APPROACHES						
PROJECT SC-0900(051) - HWY 38 (CMC 0909)						
DESCRIPTION	PRIVATE DRIVE		SECTION LINE		FIELD APPROACH	
AMOUNT	48		26		68	
RECYCLED ASPHALT PAVEMENT - FAA 42	25	TON	40	TON	5	TON
ASPHALT CEMENT	1.25	TON	2	TON	0.25	TON
AGGREGATE BASE - CLASS 5	23	TON	23	TON	23	TON
EMULS. ASPH. FOR TACK COAT	10	GAL.	15	GAL.	5	GAL.

MAXIMUM SIZE OF AGGREGATES		
DESCRIPTION	TYPE OF AGGR.	MAXIMUM SIZE
RECYCLED ASPHALT PAVEMENT - FAA 42	CRUSHED	5/8"
AGGREGATE BASE & SHOULDERS - CLASS 5	CRUSHED	1"

PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	6	23

EMULSIFIED ASPHALT FOR TACK COAT						
SC-0900(051) - HWY 4 (CMC 0918)						
LOCATION	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT - 0.1 GAL/SY	319+06	527+76	20,870	24	55,653	5,565
MAINLINE - 2ND LIFT - 0.05 GAL/SY	319+06	527+76	20,870	30	69,567	3,478
APPROACHES/INTERSECTIONS						283
TOTAL =					125,220	9,326
EMULSIFIED ASPHALT FOR FOGGING						
SC-0900(051) - HWY 4 (CMC 0918)						
LOCATION	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 0.05 GAL/SY	319+06	527+76	20,870	24	55,653	2,783
RUMBLE STRIPS - 0.10 GAL/SY	319+06	527+76	20,870	4	9,276	928
TOTAL =					9,276	3,710

EMULSIFIED ASPHALT FOR TACK COAT						
SC-0900(051) - HWY 38 (CMC 0909)						
LOCATION	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 1ST LIFT - 0.05 GAL/SY	0+00	486+00	48,600	40	216,000	10,800
MAINLINE - 2ND LIFT - 0.05 GAL/SY	0+00	486+00	48,600	40	216,000	10,800
MAINLINE - 3RD LIFT - 0.05 GAL/SY	0+00	486+00	48,600	40	216,000	10,800
MAINLINE - 1ST LIFT - 0.05 GAL/SY	486+00	507+00	2,100	32	7,467	373
MAINLINE - 2ND LIFT - 0.05 GAL/SY	486+00	507+00	2,100	32	7,467	373
MAINLINE - 3RD LIFT - 0.05 GAL/SY	486+00	507+00	2,100	32	7,467	373
MAINLINE - 1ST LIFT - 0.05 GAL/SY	507+00	897+50	39,050	40	173,556	8,678
MAINLINE - 2ND LIFT - 0.05 GAL/SY	507+00	897+50	39,050	40	173,556	8,678
MAINLINE - 3RD LIFT - 0.05 GAL/SY	507+00	897+50	39,050	40	173,556	8,678
APPROACHES/INTERSECTIONS						1,210
TOTAL =					1,191,069	60,763
EMULSIFIED ASPHALT FOR FOGGING						
SC-0900(051) - HWY 38 (CMC 0909)						
LOCATION			LENGTH (FT)	WIDTH (FT)	AREA (SY)	GAL
MAINLINE - 0.05 GAL/SY	0+00	486+00	48,600	36	194,400	9,720
MAINLINE - 0.05 GAL/SY	486+00	507+00	2,100	28	6,533	327
MAINLINE - 0.05 GAL/SY	507+00	897+50	39,050	36	156,200	7,810
RUMBLE STRIPS - 0.1 GAL/SY			87,300	4	38,800	3,880
TOTAL =					395,933	21,737

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
BASIS OF ESTIMATE

BASIS OF ESTIMATE (SURFACING INTERSECTIONS/APPROACHES)												
DESCRIPTION	C-4 & ST-38		C-38 & ST-46		C-38 & C-16		C-38 & C-6W		C-38 & C-6E		C-38 & C-12	
RECYCLED ASPHALT PAVEMENT - FAA 42	200	TON	200	TON	400	TON	300	TON	300	TON	200	TON
ASPHALT CEMENT	10	TON	10	TON	20	TON	15	TON	15	TON	10	TON
EMULS. ASPH. FOR TACK COAT	108	GAL.	54	GAL.	54	GAL.	54	GAL.	108	GAL.	108	GAL.
INTERSECTION/APPROACH RECYCLED ASPHALT PAVEMENT - FAA 42 TOTALS = 1,600 TONS												

MILLING BITUMINOUS PAVEMENT - 1.5"				
SC-0900(051) - HWY 38 (CMC 0909)				
STATION	WIDTH (FT)	LENGTH (FT)	AREA (SY)	TONS
TIE IN POINTS	VARIES	VARIES	250	21
TOTAL			250	21

MILLING BITUMINOUS PAVEMENT - 1.0"				
SC-0900(051) - HWY 4 (CMC 0918)				
STATION	WIDTH (FT)	LENGTH (FT)	AREA (SY)	TONS
319+06 TO 527+76	24	20,870	55,653	4,638
TIE IN POINTS	VARIES	VARIES	100	8
TOTAL			55,753	4,646

PAVING TONNAGE ESTIMATE SC-0900(051) - HWY 4 (CMC 0918)							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	319+06	527+76	20,870	24	500,880	2.5	7,730
SLOUGH	319+06	527+76	20,870	3	62,610	2.5	966
TOTAL							8,696
APPROACHES/INT							475
GRAND TOTAL							9,171

PAVING TONNAGE ESTIMATE SC-0900(051) - HWY 38 (CMC 0909)							
TYPE	STA START	STA END	LENGTH (FT)	WIDTH (FT)	AREA (SF)	THICKNESS (IN)	TONS
MAINLINE	0+00	486+00	48,600	36	1,749,600	4	43,200
SLOUGH	0+00	486+00	48,600	2	97,200	4	2,400
MAINLINE	486+00	507+00	2,100	28	58,800	4	1,452
SLOUGH	486+00	507+00	2,100	2	4,200	4	104
MAINLINE	507+00	897+50	39,050	36	1,405,800	4	34,711
SLOUGH	507+00	897+50	39,050	2	78,100	4	1,928
TOTAL							83,795
APPROACHES/INT.							3,980
GRAND TOTAL							87,775

PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	7	23

PREFORMED PATTERNED PVMT MK-MESSAGE (GROOVED)		
SC-0900(051) - HWY 4 (CMC 0918)		
STATION	ARROW TYPE	SF
502+76 RT	RR CROSSING	132.5
526+26 LT	RR CROSSING	132.5
TOTAL		265.0

RUMBLE STRIP QUANTITY SC-0900(051) - HWY 38 (CMC 0909)			
STA START	STA END	SIDE (LT/RT)	LENGTH (MILE)
2+00	105+00	LT	1.95
5+00	105+00	RT	1.89
111+00	169+00	LT&RT	2.20
185+00	206+00	LT&RT	0.80
211+00	305+00	LT&RT	3.56
311+00	444+00	LT&RT	5.04
454+00	482+00	LT&RT	1.06
507+00	513+00	LT&RT	0.23
516+00	524+00	LT&RT	0.30
535+00	547+00	LT&RT	0.45
555+00	615+00	LT&RT	2.27
631+00	760+00	LT&RT	4.89
768+00	792+00	LT&RT	0.91
810+00	851+00	LT&RT	1.55
857+00	897+50	LT&RT	1.53
TOTAL MILES			28.64

RUMBLE STRIP QUANTITY SC-0900(051) - HWY 4 (CMC 0918)			
STA START	STA END	SIDE (LT/RT)	LENGTH (MILE)
322+00	440+00	LT&RT	4.47
451+00	526+75	LT&RT	2.87
TOTAL MILES			7.34

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC–0900(051)
BASIS OF ESTIMATE

PAVEMENT MARKING QUANTITIES - SC-0900(051) - HWY 4 (CMC 0918)								
START STA	END STA	LANE	4" YELLOW TEMPORARY (4 LIFTS)		4" PERMANENT MARKING			
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)
319+70	335+00	LT/RT		3,060		3,060	3,060	6,120
335+00	515+05		4,501		4,501		36,010	40,511
335+00	343+15	LT		815		815		815
361+90	385+70	RT		2,380		2,380		2,380
385+70	395+55	LT		985		985		985
501+80	514+95	RT		1,315		1,315		1,315
515+05	526+95	LT/RT		2,380		2,380	2,380	4,760
526+95	527+75		20		20		160	180
PER LIFT TOTAL =			4,521	10,935	N/A	N/A	N/A	N/A
3 LIFT TOTALS =			13,564	32,805	4,521	10,935	41,610	57,066

PAVEMENT MARKING QUANTITIES - SC-0900(051) - HWY 38 (CMC 0909)								
START STA	END STA	LANE	4" YELLOW TEMPORARY (3 LIFTS)		4" PERMANENT MARKING			
			SKIP (L.F.)	NPZ (L.F.)	4" SKIP (L.F.)	4" NPZ (L.F.)	4" WHITE (L.F.)	TOTAL 4" (L.F.)
0+00	352+30		8,808		8,808		70,460	79,268
0+65	10+60	LT		995		995		995
11+95	26+40	RT		1,445		1,445		1,445
32+00	43+80	LT		1,180		1,180		1,180
217+50	225+00	RT		750		750		750
279+70	288+55	RT		885		885		885
300+40	308+45	RT		805		805		805
310+50	318+25	LT		775		775		775
342+25	352+30	RT		1,005		1,005		1,005
352+30	459+80	LT/RT		21,500		21,500	21,500	43,000
459+80	483+60		595		595		4,760	5,355
459+80	465+30	LT		550		550		550
478+70	483+60	RT		490		490		490
483+60	486+40	LT/RT		560		560	560	1,120
486+00	510+00	LT/RT		4,800		4,800	4,800	9,600
510+00	897+50		9,688		9,688		77,500	87,188
652+80	661+80	LT		900		900		900
702+30	712+00	RT		970		970		970
712+00	720+20	LT		820		820		820
857+00	866+50	RT		950		950		950
866+50	873+80	LT		730		730		730
PER LIFT TOTAL =			19,091	40,110	N/A	N/A	N/A	N/A
2 LIFT TOTALS =			38,182	80,220	19,091	40,110	179,580	238,781

PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	8	23

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC–0900(051)
BASIS OF ESTIMATE

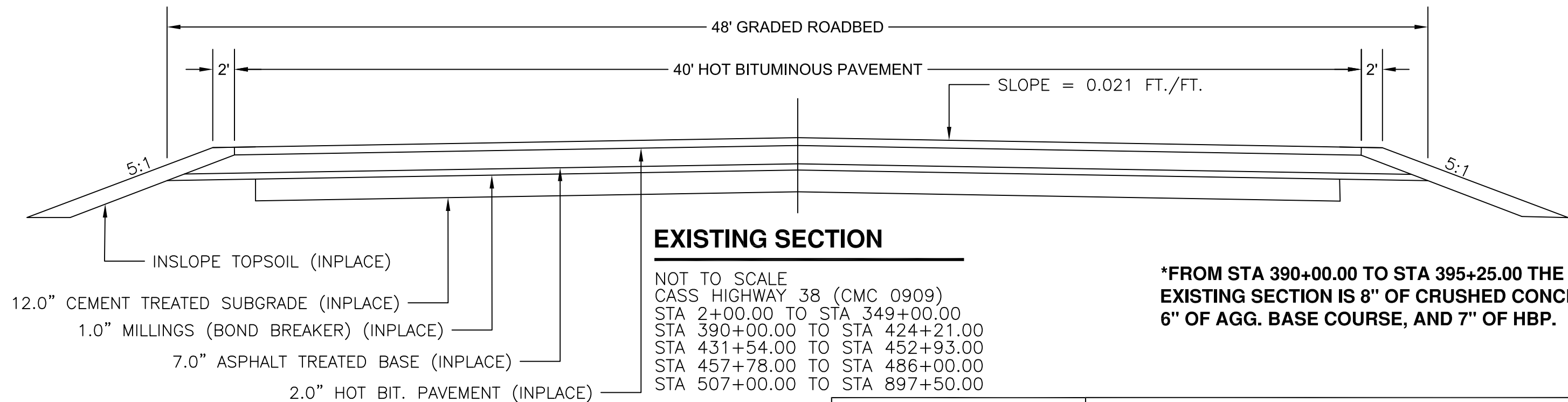
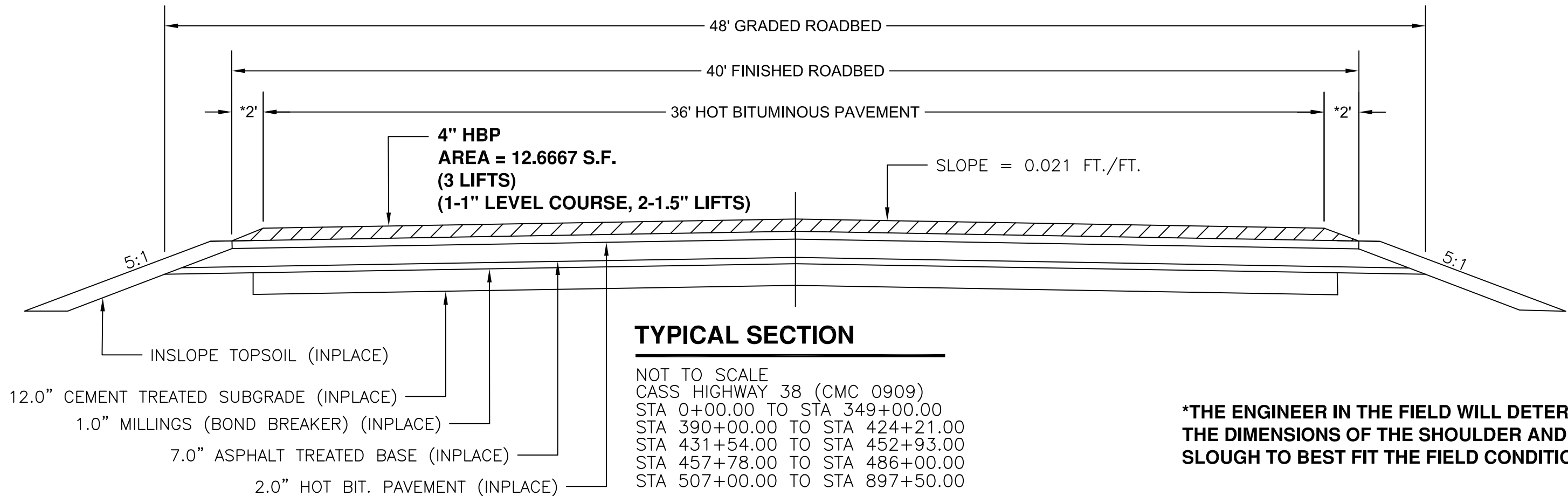
							STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS	
							PCN 21950	N.D.	SC-0900(051)	9	23

					ESTIMATED QUANTITIES SC-0009(051) HIGHWAY 4 (CMC 0918) - STATE HWY 38 TO HIGHWAY 3	ESTIMATED QUANTITIES SC-0009(051) HIGHWAY 38 (CMC 0909) - STATE HWY 46 TO INTERSTATE 94	TOTAL
ITEM	SPEC NO.	CODE	DESCRIPTION	UNIT	APPROX. QUANTITY	APPROX. QUANTITY	APPROX. QUANTITY
1	103	0100	CONTRACT BOND	L SUM	0.19	0.81	1.00
2	107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1	0	1
3	216	0100	WATER	MGAL	300	500	800
4	302	0120	AGGREGATE BASE COURSE CL 5	TON	506	3,266	3,772
5	401	0050	TACK COAT	GAL	9,326	60,763	70,089
6	401	0070	FOG SEAL	GAL	3,710	21,737	25,447
7	411	0105	MILLING PAVEMENT SURFACE	SY	55,753	250	56,003
8	430	0142	RAP - SUPERPAVE FAA 42	TON	9,171	87,775	96,946
9	430	1000	CORED SAMPLE	EA	50	395	445
10	430	5815	PG 58S-34 ASPHALT CEMENT	TON	458.55	4,388.75	4,847.30
11	702	0100	MOBILIZATION	L SUM	0.19	0.81	1.00
12	704	0100	FLAGGING	MHR	110	1,053	1,163
13	704	1000	TRAFFIC CONTROL SIGNS	UNIT	704	3,002	3,706
14	704	1185	PILOT CAR	MHR	55	527	582
15	706	0550	BITUMINOUS LABORATORY	EA	0.19	0.81	1.00
16	706	0600	CONTRACTOR'S LABORATORY	EA	0.19	0.81	1.00
17	760	0005	RUMBLE STRIPS-ASPHALT SHOULDER	MILE	7.34	28.64	35.98
18	762	0122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	SF	265	0	265
19	762	0405	SHORT TERM 4 IN BROKEN LINE-PNT TAPE OR RSD MRK	LF	13,564	38,182	51,746
20	762	0410	SHORT TERM 4 IN LINE NPZ - PN TP OR RS MRK	LF	32,805	80,220	113,025
21	762	1104	PVMT MK PAINTED 4IN LINE	LF	57,066	238,781	295,847

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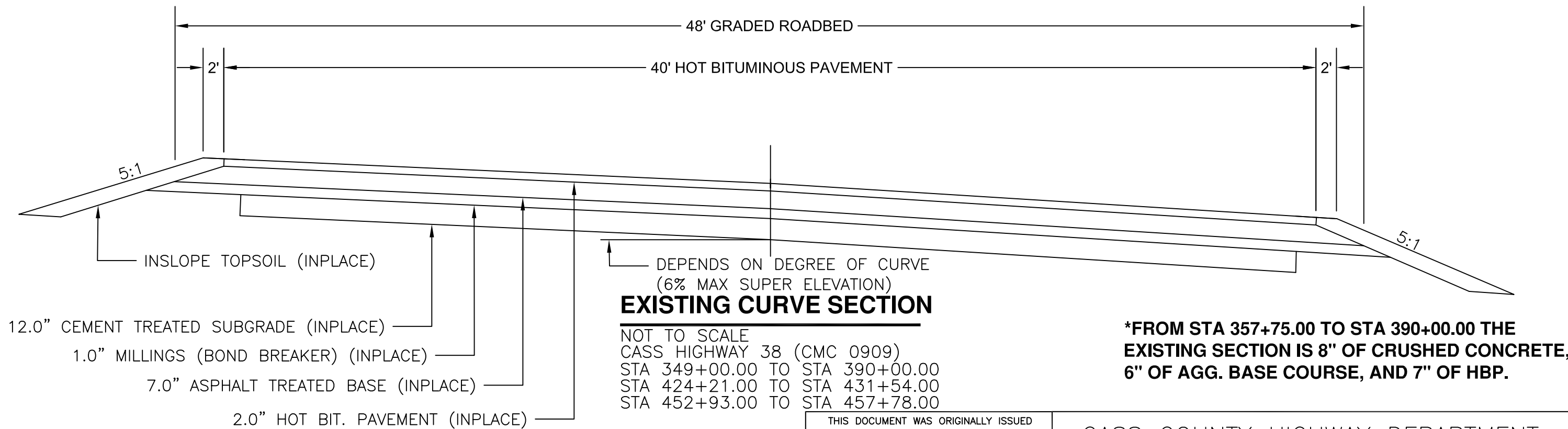
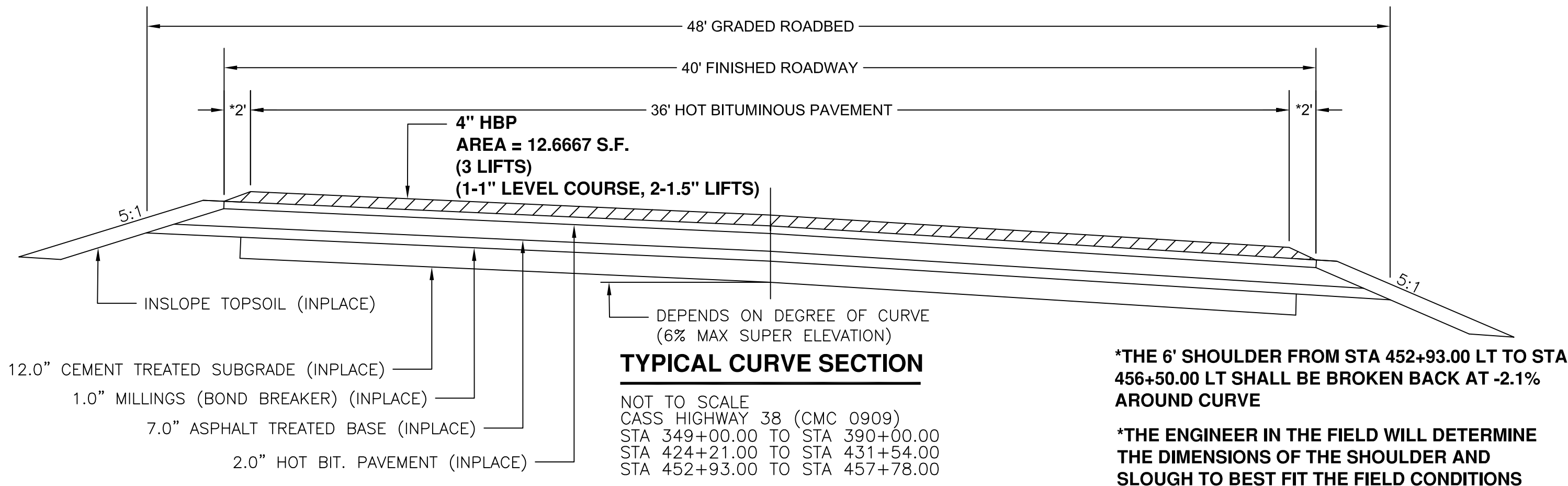
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC–0900(051)
ESTIMATED QUANTITIES

J:\Admin\Eng\Projects\C4 & C38 PAVE\C4 & C38 Paving Plan Set.dwg



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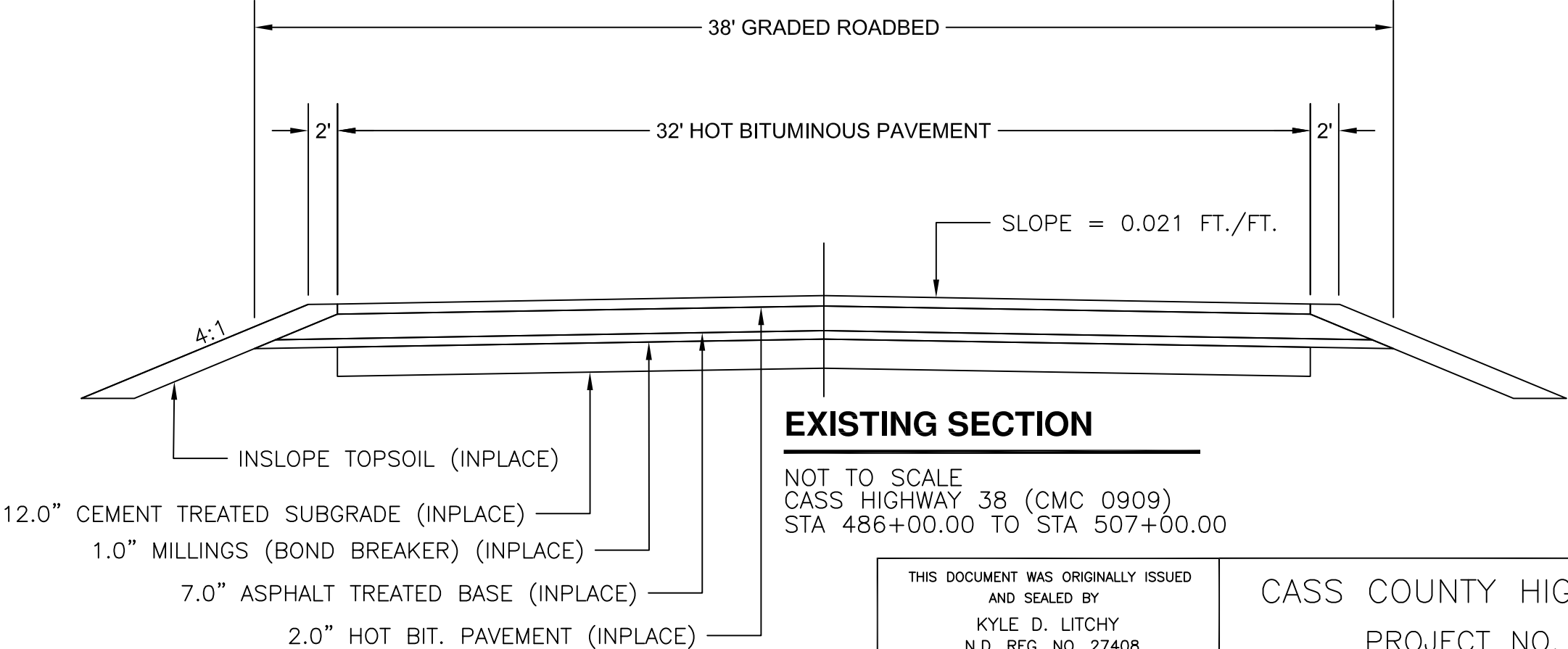
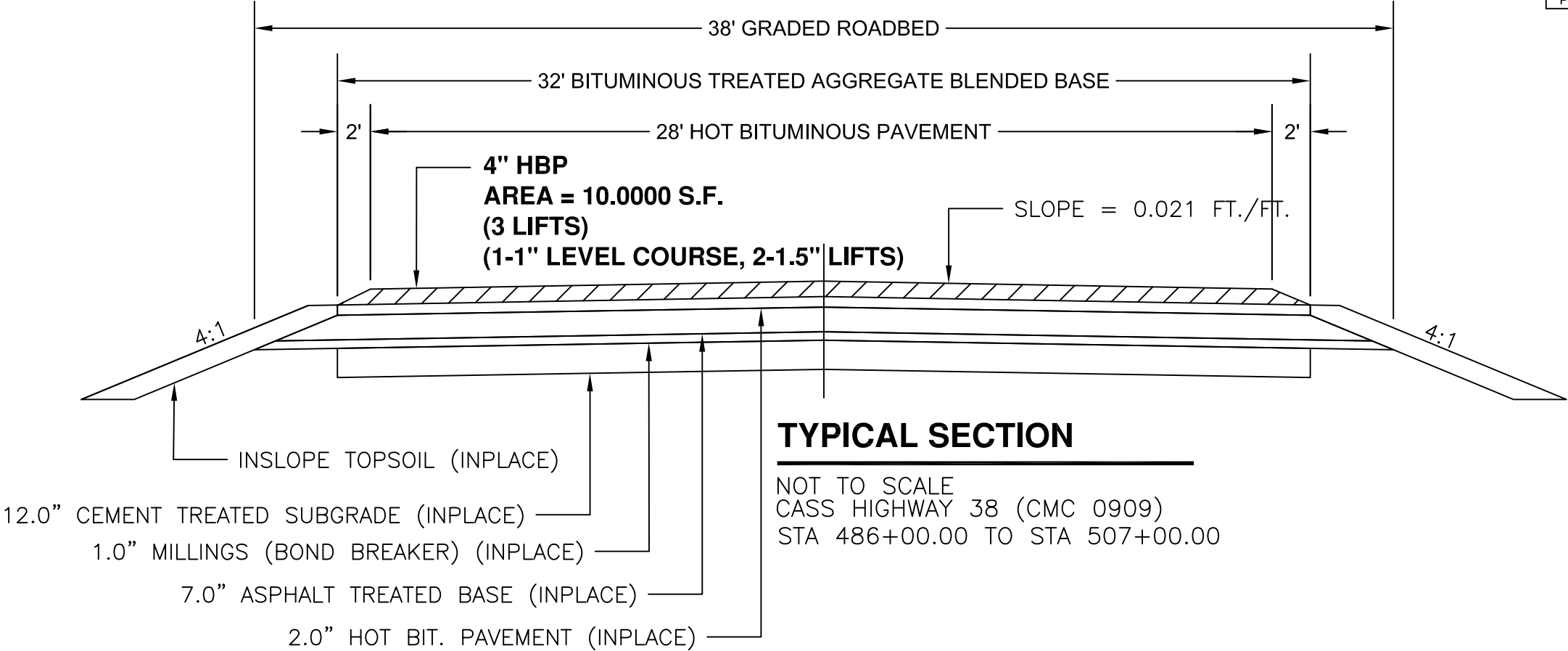
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
TYPICAL SECTIONS



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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
TYPICAL SECTIONS

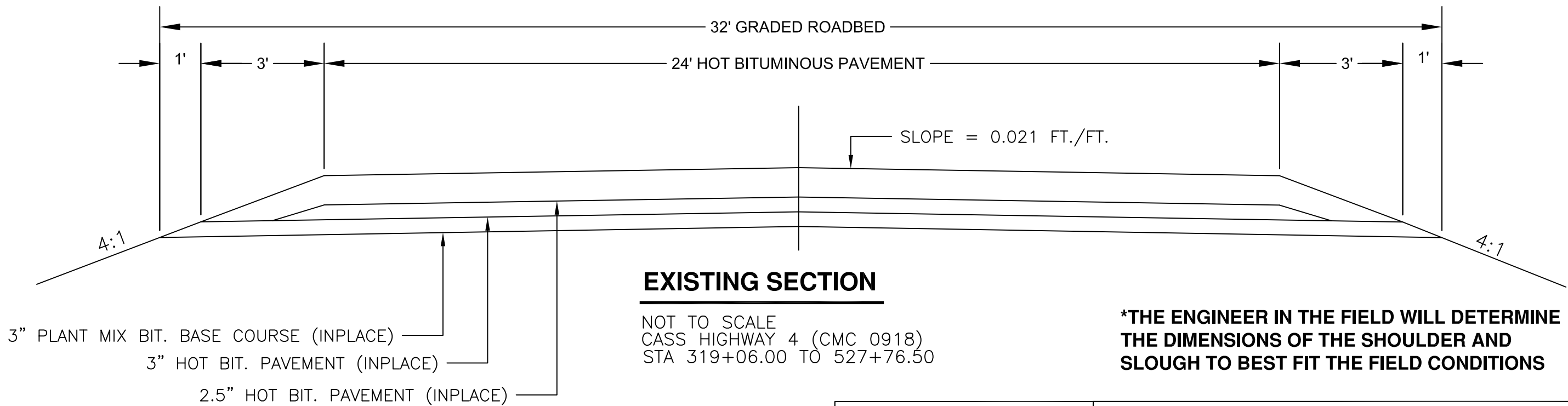
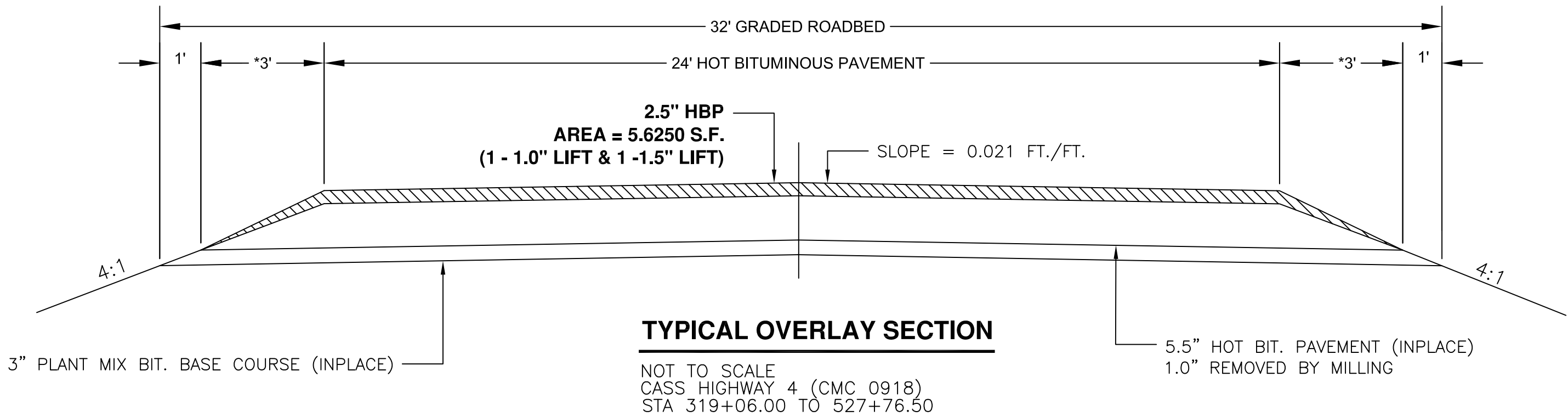
PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	12	23



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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
TYPICAL SECTIONS

PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	13	23

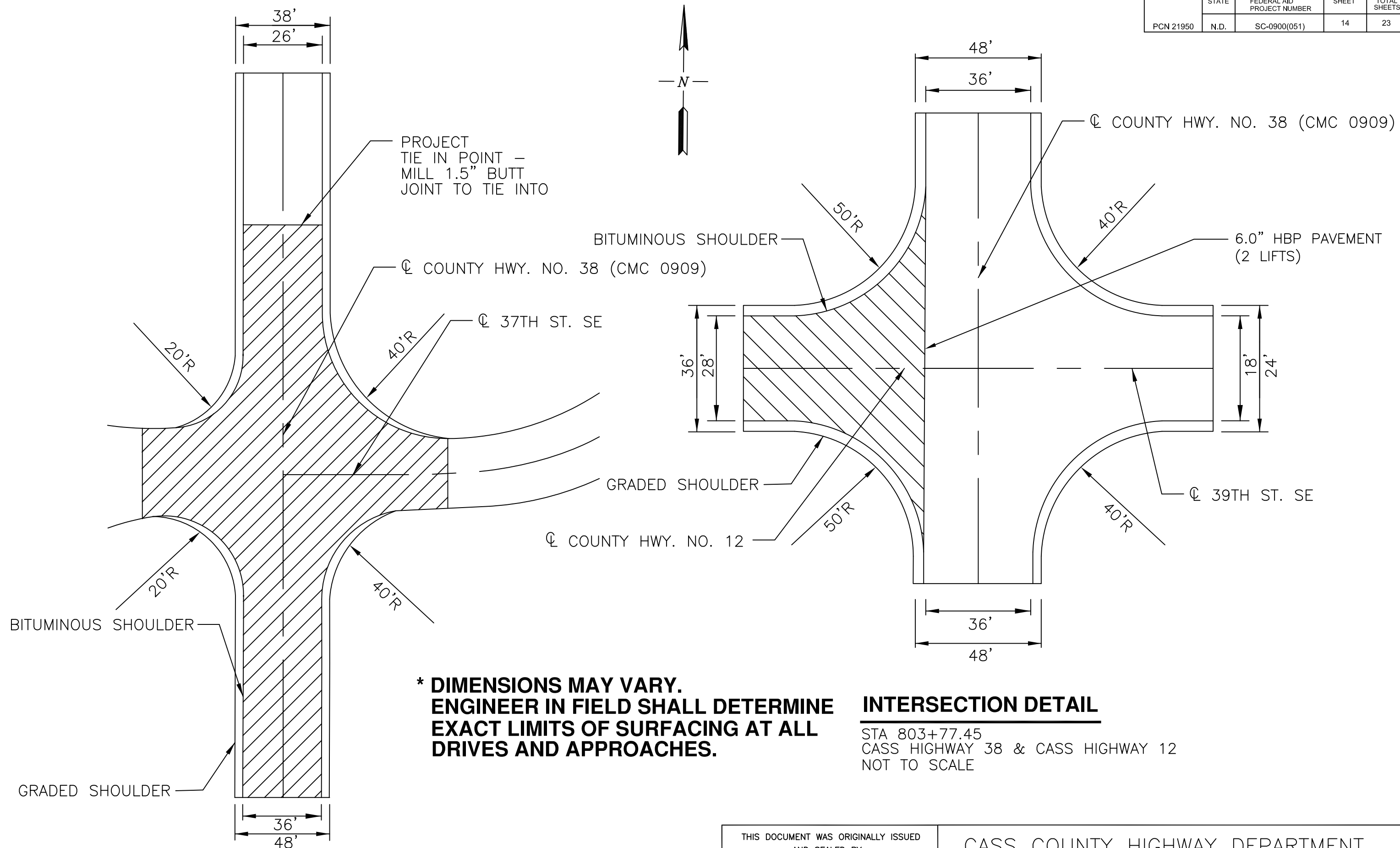


***THE ENGINEER IN THE FIELD WILL DETERMINE
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SLOUGH TO BEST FIT THE FIELD CONDITIONS**

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
TYPICAL SECTIONS

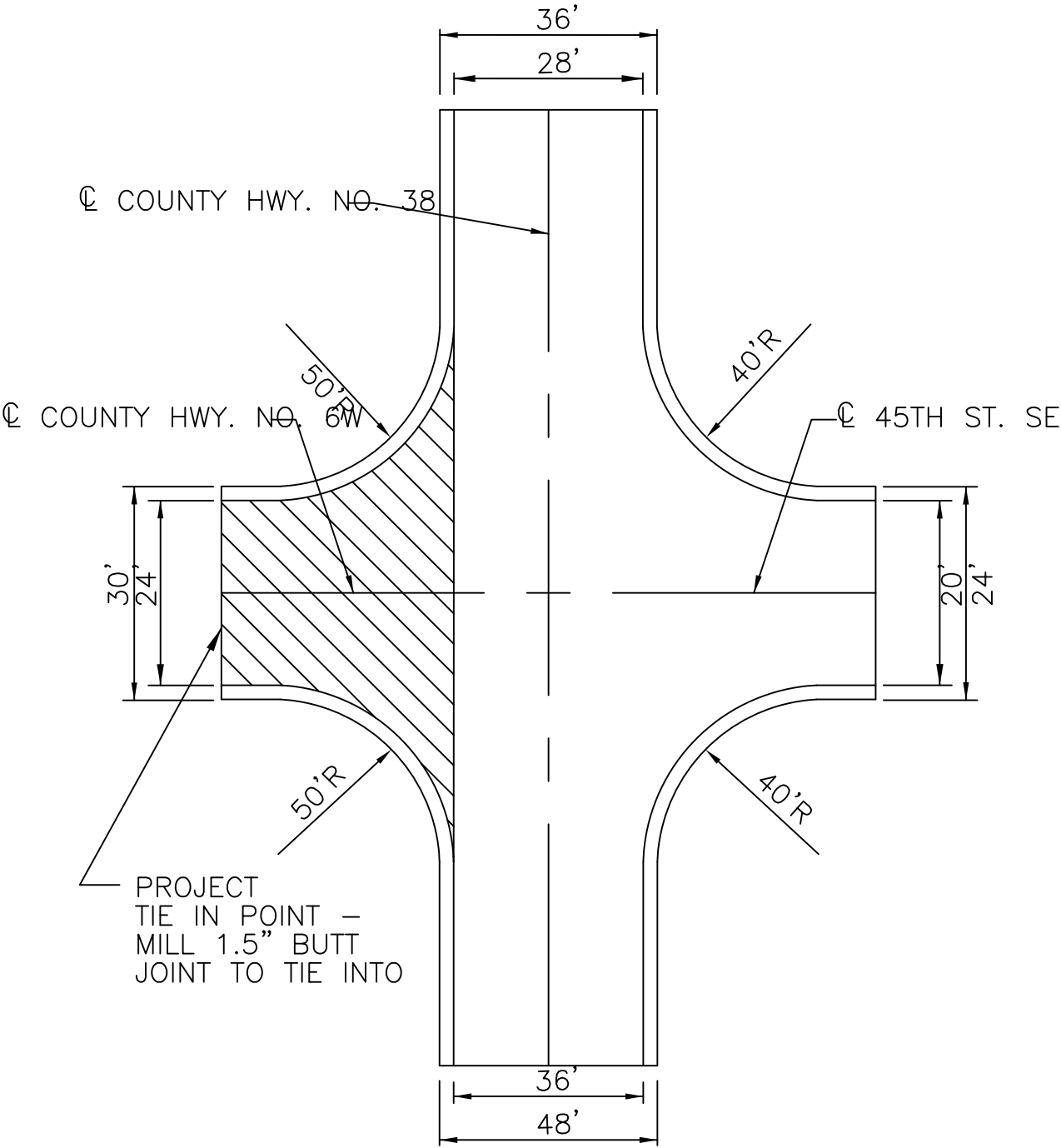
STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
PCN 21950	N.D.	SC-0900(051)	14
			23



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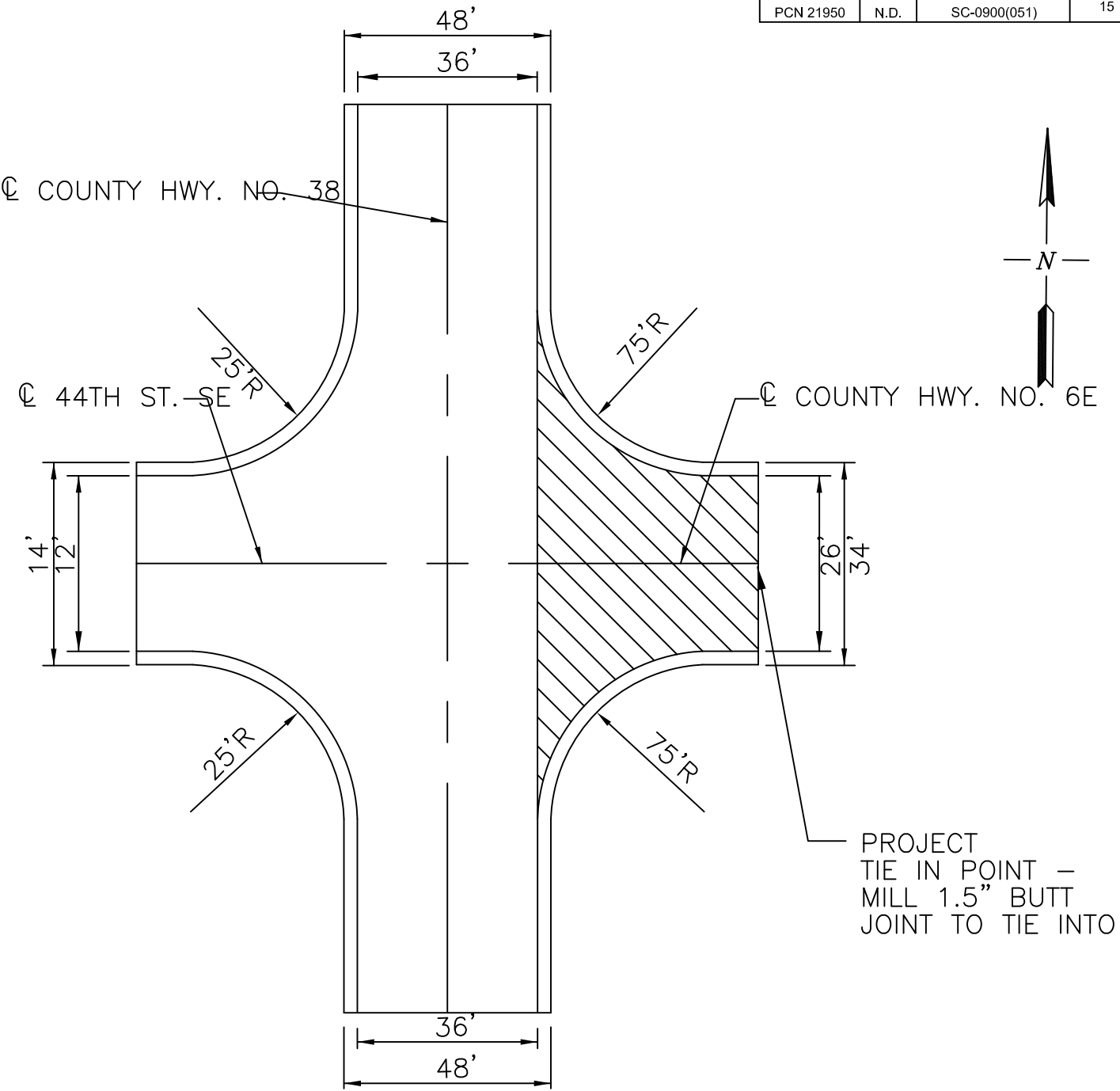
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
INTERSECTION DETAILS

PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	15	23



INTERSECTION DETAIL

CASS COUNTY HWY 6W & CASS COUNTY HWY 38 (CMC 0909)
STA. 486+76.42
NOT TO SCALE



INTERSECTION DETAIL

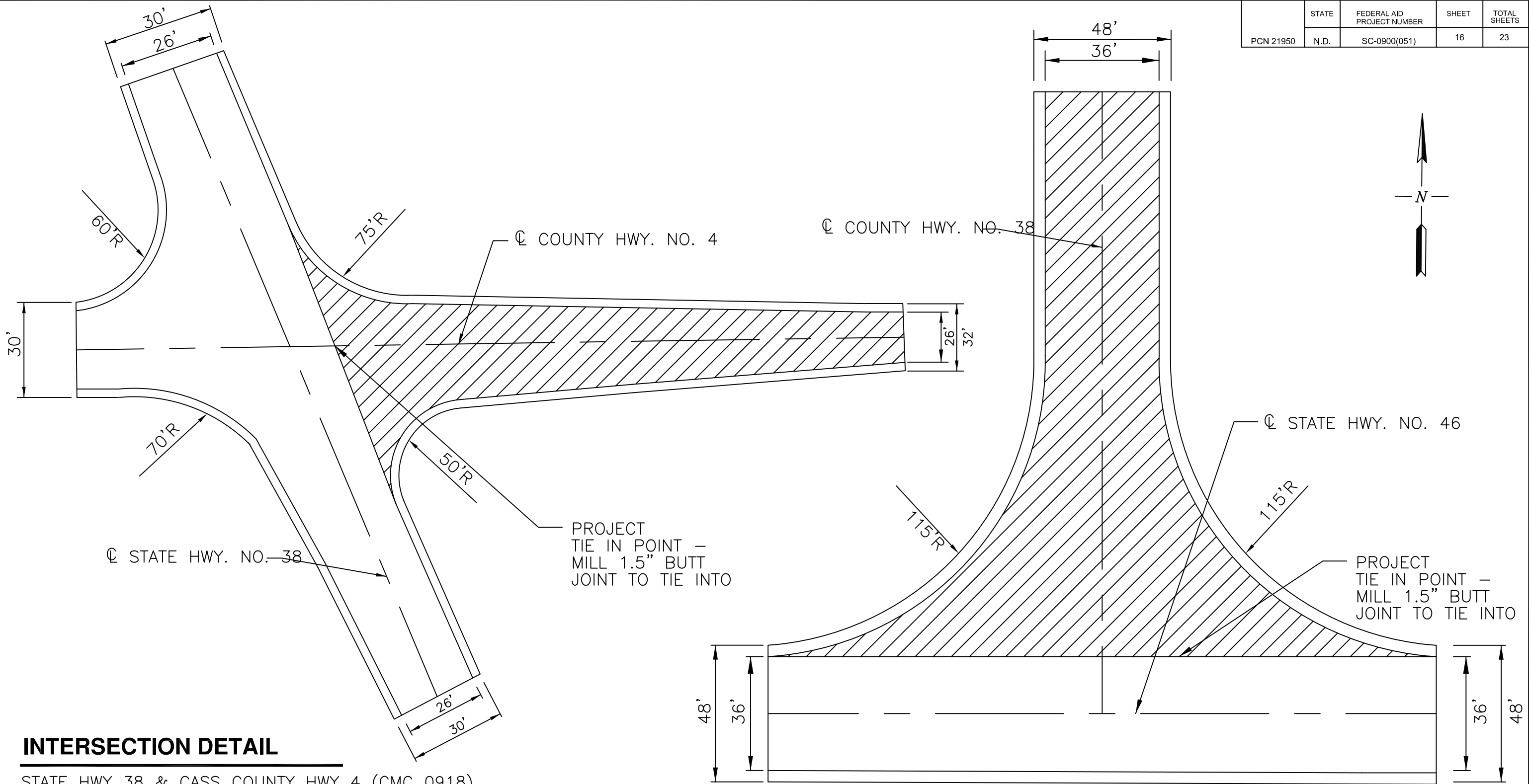
CASS COUNTY HWY 6E & CASS COUNTY HWY 38 (CMC 0909)
STA. 539+65.45
NOT TO SCALE

*** DIMENSIONS MAY VARY.
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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
INTERSECTION DETAILS

	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
PCN 21950	N.D.	SC-0900(051)	16	23



INTERSECTION DETAIL

STATE HWY 38 & CASS COUNTY HWY 4 (CMC 0918)
CH1902 – STA. 319+60.00
NOT TO SCALE

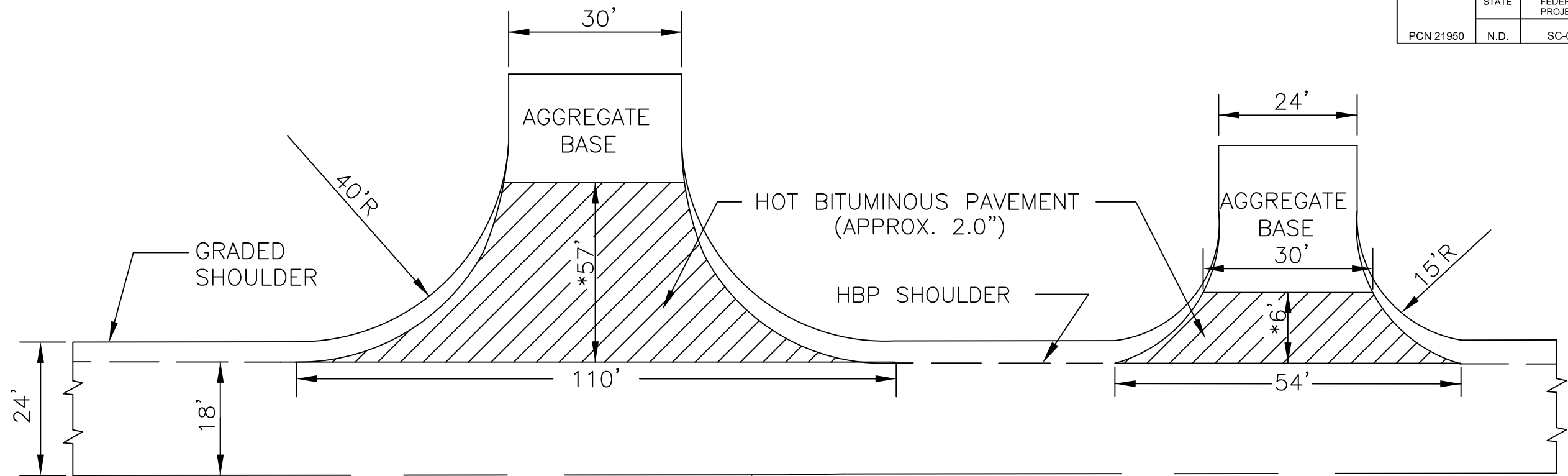
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INTERSECTION DETAIL

STA 0+00.00
CASS HIGHWAY 38 (CMC 0909) & STATE HIGHWAY 46
NOT TO SCALE

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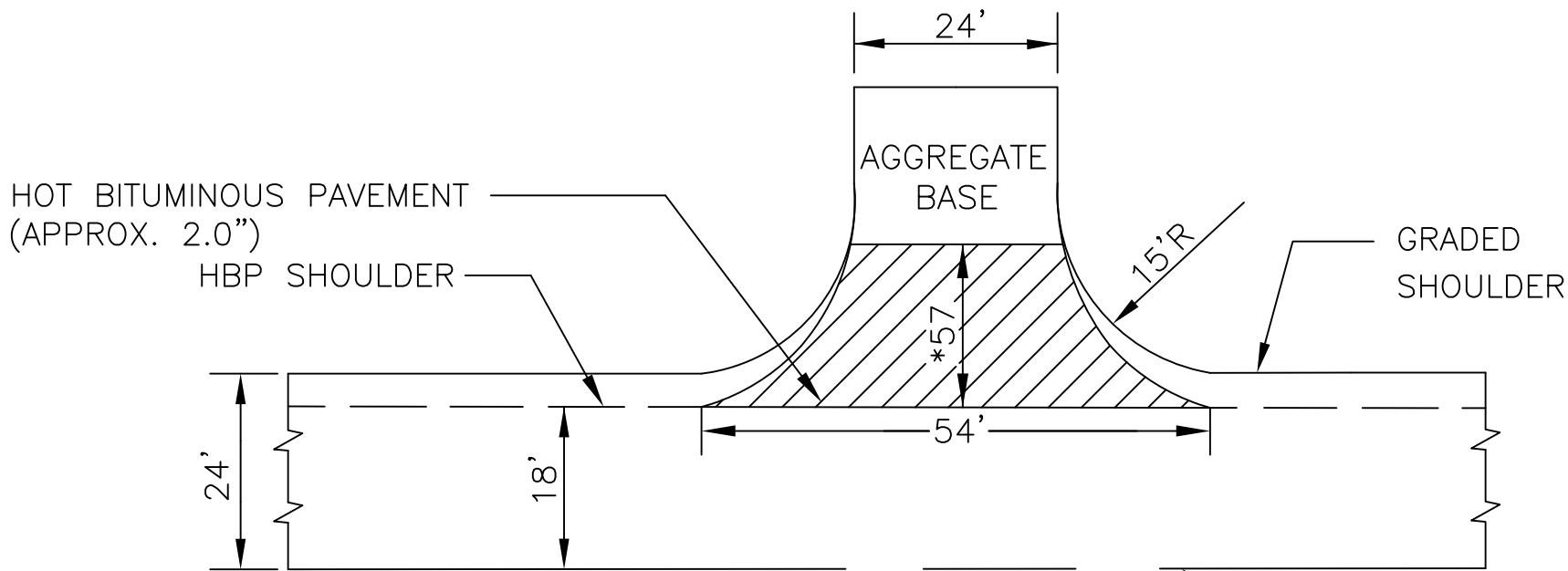
PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	17	23



SECTION LINE APPROACH
NOT TO SCALE

CL OF HIGHWAY
38 (CMC 0909)

FIELD APPROACH
NOT TO SCALE



PRIVATE DRIVE APPROACH
NOT TO SCALE

CL OF HIGHWAY
38 (CMC 0909)

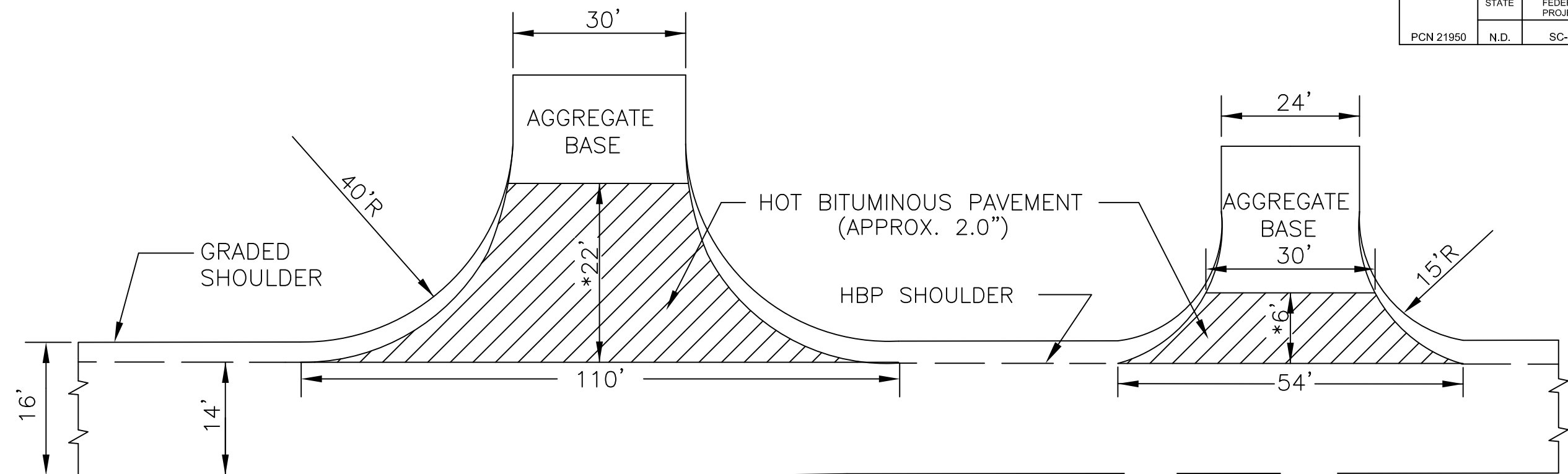
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**** EXCAVATION COSTS REQUIRED TO
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SHALL BE INCLUDED IN THE
RAP - SUPERPAVE FAA 42 BID ITEM.**

**PLACEMENT OF APPROACH PVMT:
PAVEMENT FOR APPROACHES SHALL
BE PLACED AHEAD OF THE MAINLINE
TOP LIFT PAVING OPERATION.
NO COLD JOINT WILL BE ALLOWED
BETWEEN THE MAINLINE AND APPROACHES.**

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
APPROACH DETAILS



SECTION LINE APPROACH

NOT TO SCALE

FIELD APPROACH

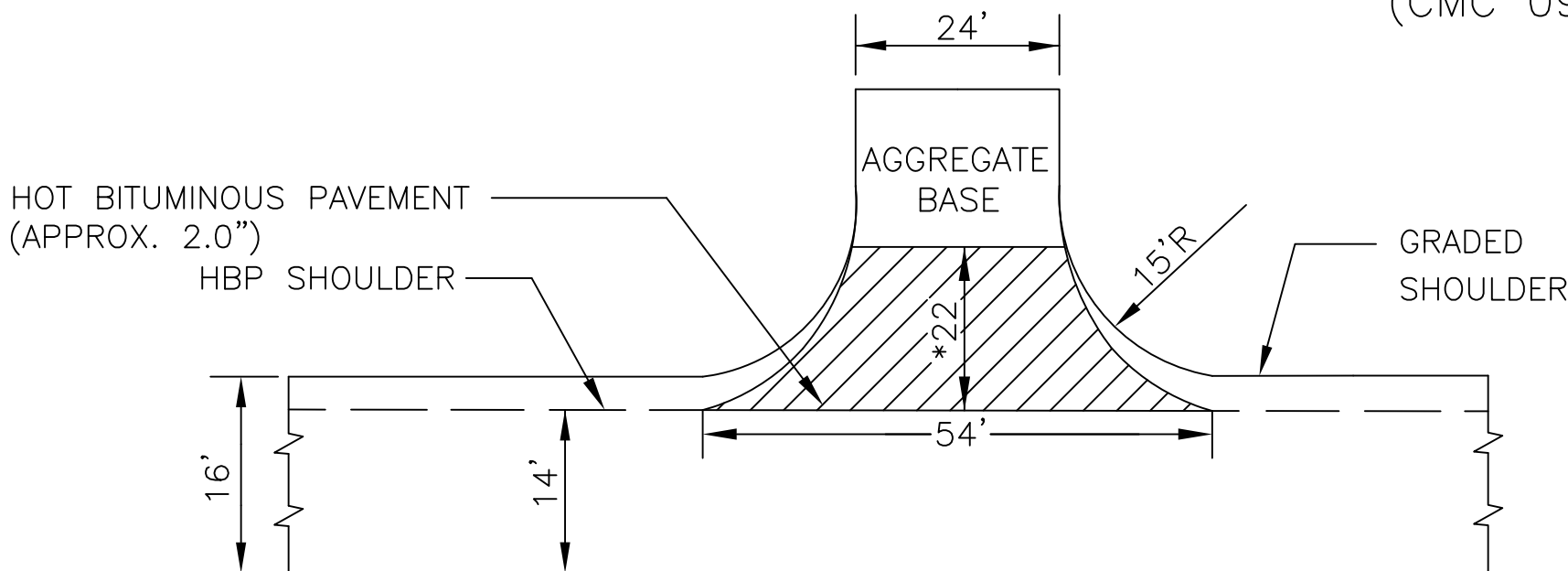
NOT TO SCALE

CL OF HIGHWAY
38 THROUGH ALICE
(CMC 0909)

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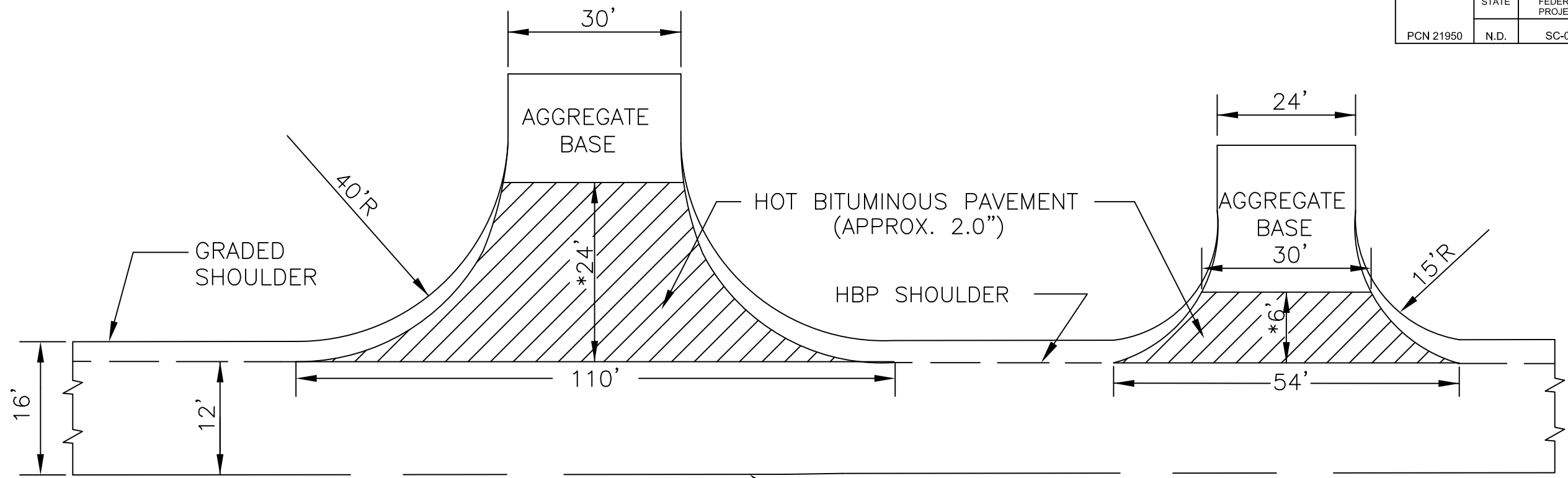
PRIVATE DRIVE APPROACH

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CL OF HIGHWAY
38 THROUGH ALICE
(CMC 0909)

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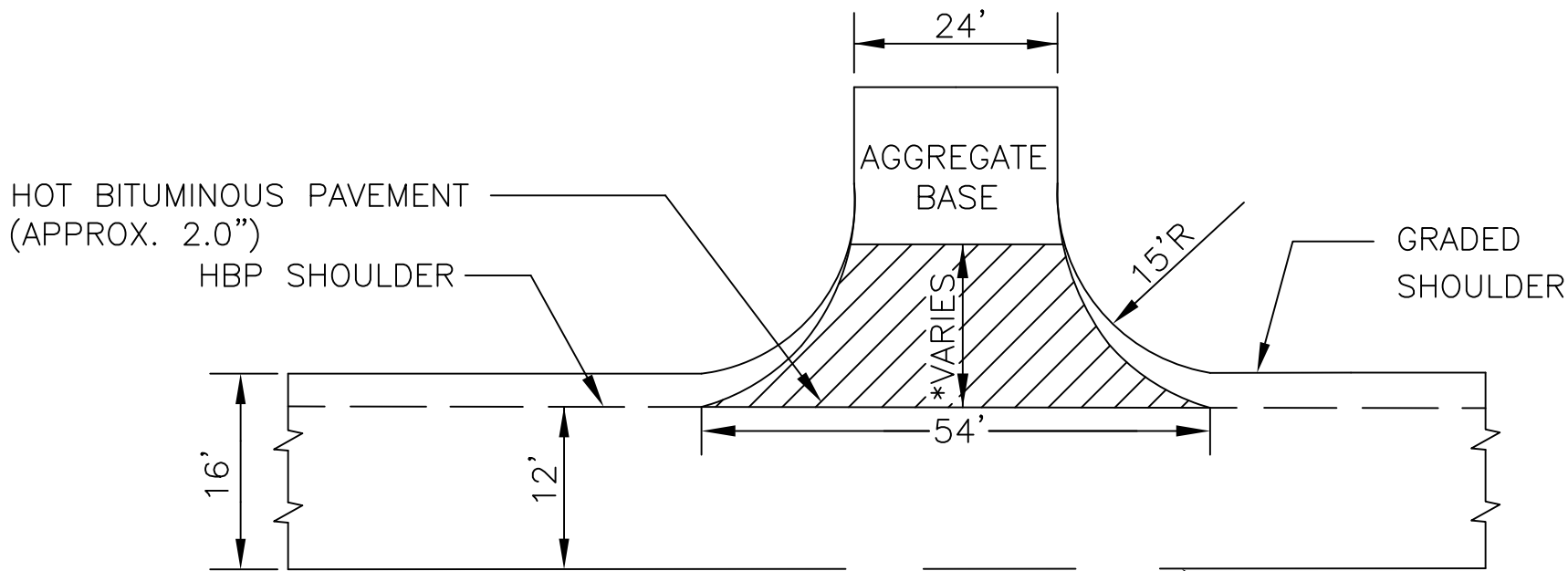
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
APPROACH DETAILS



SECTION LINE APPROACH
NOT TO SCALE

CL OF HIGHWAY
4 (CMC 0918)

FIELD APPROACH
NOT TO SCALE



PRIVATE DRIVE APPROACH
NOT TO SCALE

CL OF HIGHWAY
4 (CMC 0918)

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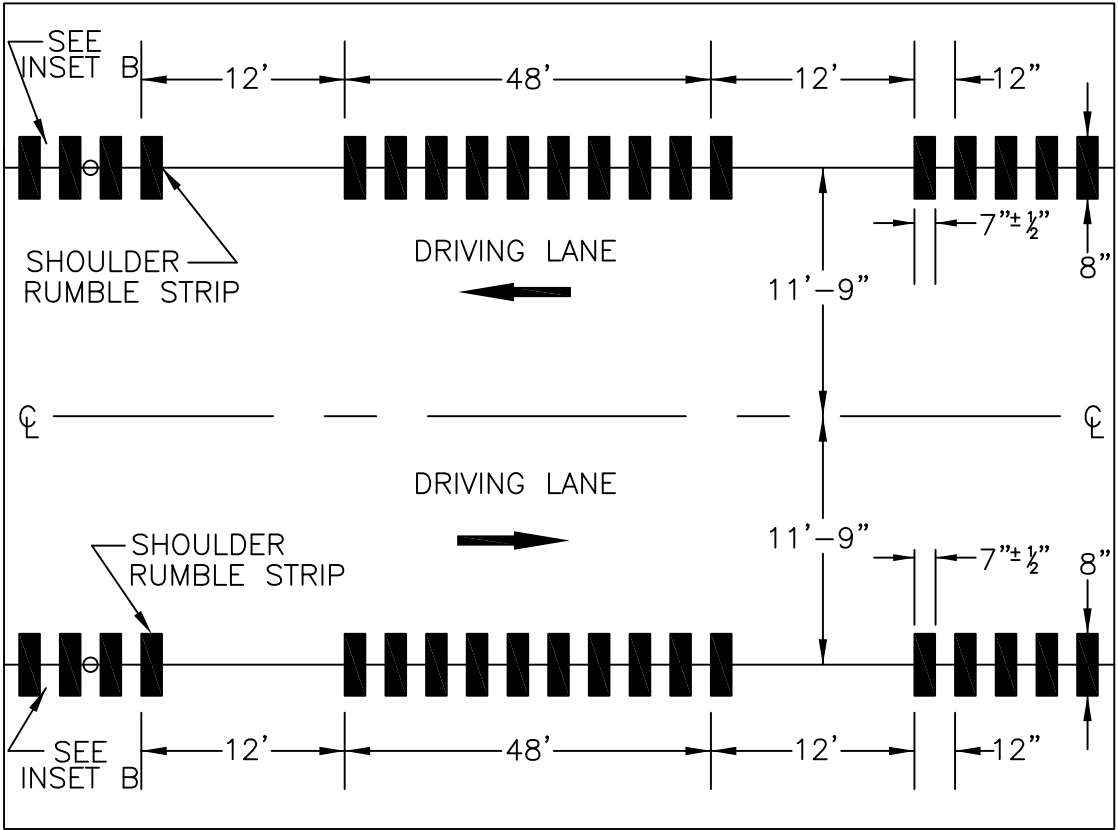
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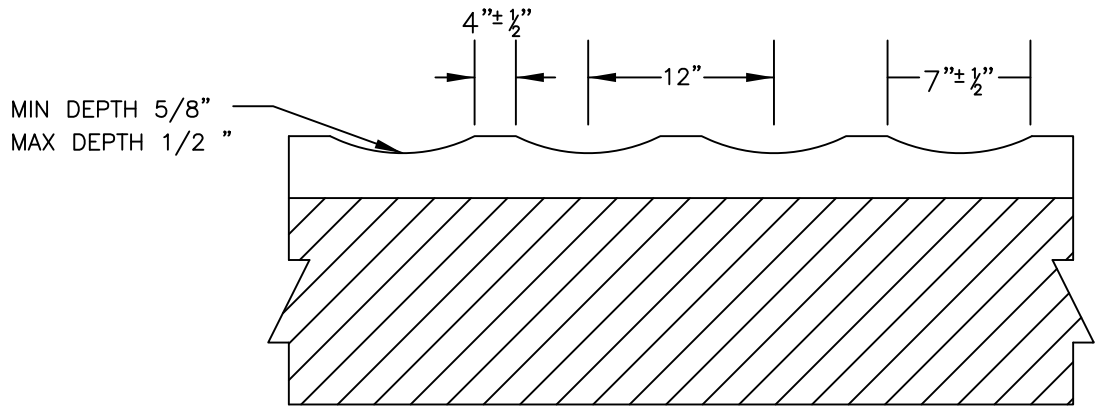
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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
APPROACH DETAILS

PCN 21950	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
	N.D.	SC-0900(051)	20	23



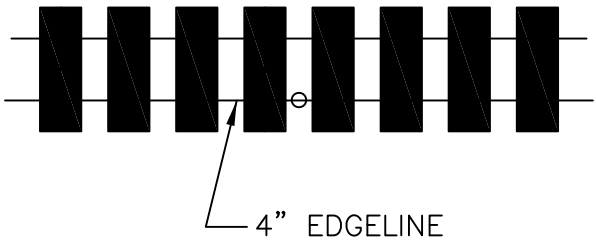
PLAN VIEW OF RUMBLE STRIPS



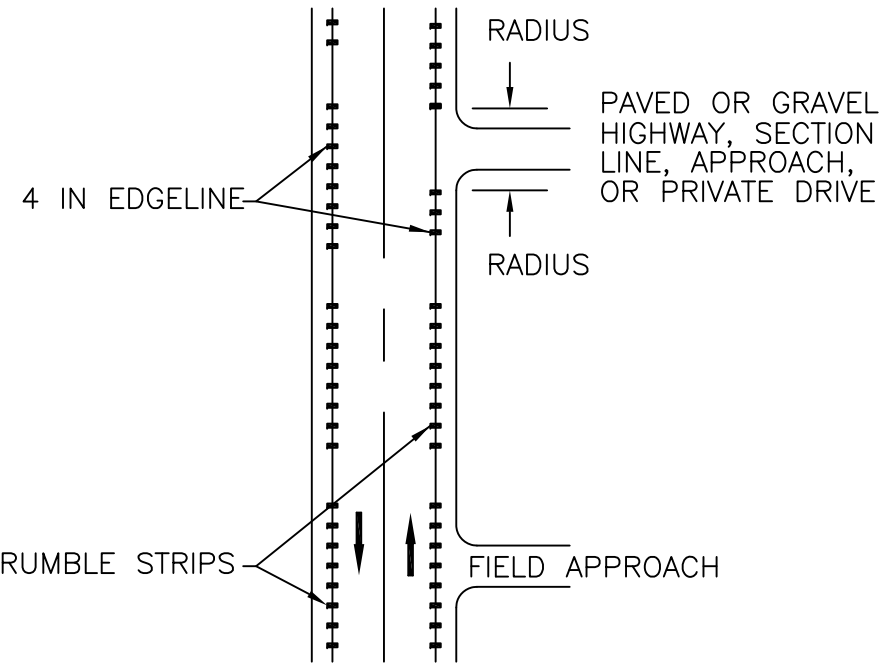
PROFILE VIEW OF RUMBLE STRIPS

RUMBLE STRIP DETAILS

NOT TO SCALE



INSET B - SHOULDER RUMBLE STRIP



ENTRANCE ROADWAYS

NOTES:

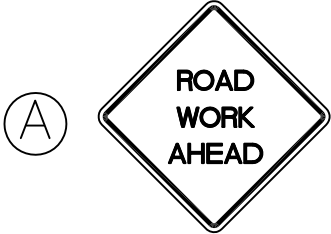
- 1) Rumble strips shall be milled into the bituminous paved shoulders. All milled materials shall be swept off of the driving lanes and paved shoulders using a mechanical sweeper. All costs for sweeping shall be included in the price bid for "RUMBLE STRIPS – ASPHALT SHOULDER."
- 2) Rumble strips milled into new or existing bituminous pavements shall be fog sealed across the full width of the milling with an application of SS-1h or CSS-1h emulsified asphalt at a rate of about 0.10 Gal/SY diluted 50/50 sprayed in both directions. All costs for fog sealing shall be included in the price bid for "FOG SEAL."
- 3) Discontinue rumble strips across bridge decks and approach slabs, adjacent to guardrail, and 1/2 mile on either side of:
 - highways with posted speeds 45 mph or less
 - all urban areas
 - areas with curb and gutter
- 4) Discontinue shoulder rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.
- 5) All costs associated with the use of a paint dribble line for rumble strip alignment shall be included in the "RUMBLE STRIPS – ASPHALT SHOULDER" bid item.
- 6) Skip in front of houses as seen on SHEET 7 "RUMBLE STRIP QUANTITY" – All locations will be marked by Cass County.

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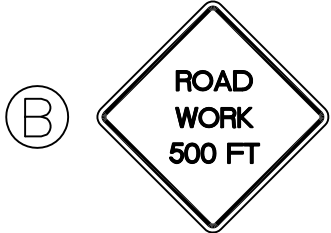
CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
RUMBLE STRIPS DETAIL

TRAFFIC CONTROL LEGEND

⇒ POST-MOUNTED SIGN
III TYPE III BARR.



W20-1-48



W20-1-48



G20-1a-60



G20-2a-48



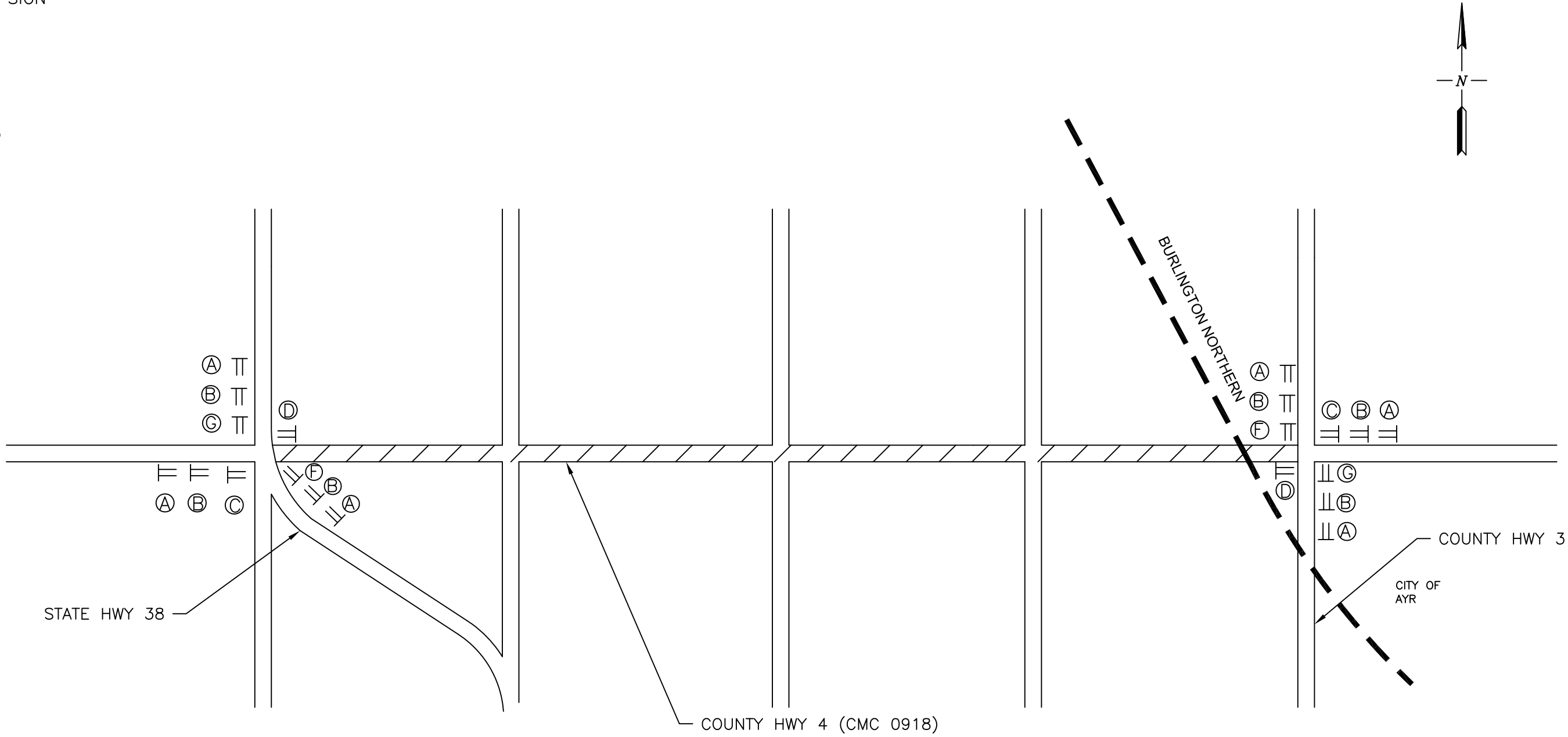
G20-50a-72



G20-52a-72



G20-52a-72



CONSTRUCTION SIGN LAYOUT - C-4 (CMC 0918)

NOT TO SCALE

*** NOTE: SEE SIGN LIST ON SHEET 23 FOR SIGN QUANTITIES.**

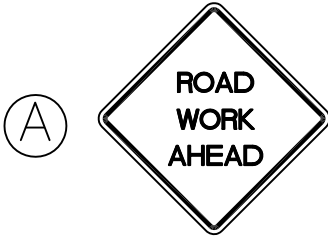
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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
CONSTRUCTION SIGNAGE

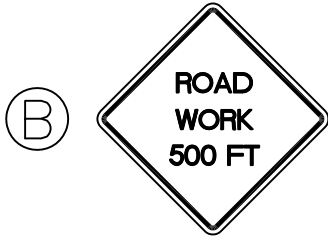
TRAFFIC CONTROL LEGEND

⇐ POST-MOUNTED SIGN

||| TYPE III BARR.



W20-1-48



W20-1-48



G20-1a-60



G20-2a-48



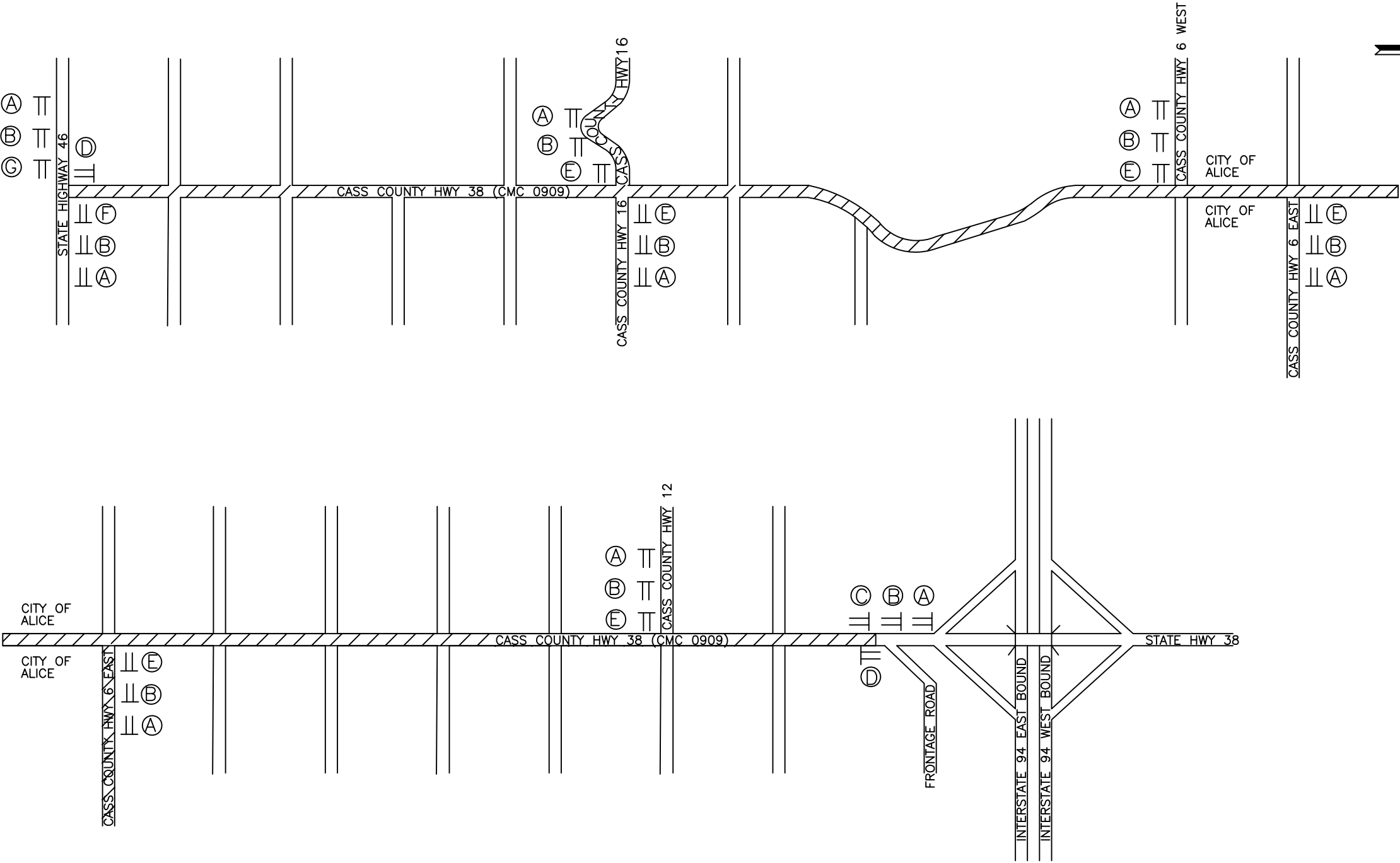
G20-50a-72



G20-52a-72



G20-52a-72



CONSTRUCTION SIGN LAYOUT - C-38 (CMC 0909)

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CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
CONSTRUCTION SIGNAGE

	STATE	FEDERAL AID PROJECT NUMBER	SHEET	TOTAL SHEETS
PCN 21950	N.D.	SC-0900(051)	23	23

PROJECT NO. SC-0900(051)

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQ'D	UNITS PER AMOUNT	UNITS SUB- TOTAL
G20-1a-60	60" X 24"	ROAD WORK NEXT ____ MILES	3	34	102
G20-2a-48	48" X 24"	END ROAD WORK	4	19	76
G20-4-36	36" X 18"	PILOT CAR FOLLOW ME	2	18	36
G20-50a-72	72" X 36"	ROAD WORK NEXT ____ MILES RT & LT ARROWS		37	
G20-52a-72	72" X 24"	ROAD WORK NEXT ____ MILES RT OR LT ARROWS	11	30	330
G20-54-48	48" X 36"	OVERHEAD BRIDGE PAINTING		30	
G20-8-48	48" X 36"	TEMPORARY SURFACE NEXT ____ MILES		30	
M1-4-24	24" X 24"	ROUTE MARKER (POST AND INSTALLATION ONLY)		10	
M3-2-24	24" X 12"	EAST (MOUNTED ON ROUTE MARKER POST)		7	
M3-3-24	24" X 12"	SOUTH (MOUNTED ON ROUTE MARKER POST)		7	
M3-4-24	24" X 12"	WEST (MOUNTED ON ROUTE MARKER POST)		7	
M4-10-48	48" X 18"	DETOUR ARROW RIGHT or LEFT		23	
M4-8-24	24" X 12"	DETOUR (MOUNTED ON THE ROUTE MARKER POST)		7	
M5-1-21	21" X 15"	ARROW AHD AND RT or LT (MTD ON ROUTE MKR POST)		7	
M6-1-21	21" X 15"	ARROW RT or LT (MOUNTED ON ROUTE MARKER POST)		7	
R1-1-48	48" X 48"	STOP		32	
R1-1-30	30" X 30"	STOP		32	
R1-1a-18	18" X 18"	STOP and SLOW PADDLE Back to Back	4	5	20
R1-2-48	48" X 48"	YIELD TO ONCOMING TRAFFIC		29	
R2-1-48	48" X 60"	SPEED LIMIT		39	
R2-1a-24	24" X 24"	MINIMUM FEE \$80		10	
R2-5a-48	48" X 60"	SPEED ZONE AHEAD		39	
R4-1-48	48" X 60"	DO NOT PASS		39	
R4-7-48	48" X 60"	KEEP RIGHT SYMBOL		39	
R4-8-48	48" X 60"	KEEP LEFT SYMBOL		39	
R10-6-48	48" X 72"	STOP HERE ON RED		16	
R11-2-48	48" X 30"	ROAD CLOSED		28	
R11-2a-48	48" X 30"	STREET CLOSED		28	
R11-3a-60	60" X 30"	ROAD CLOSED ____ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3b-60	60" X 30"	BRIDGE OUT ____ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-48	60" X 30"	STREET CLOSED		31	
R11-4a-60	60" X 30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-1-48	48" X 48"	RIGHT or LEFT SHARP CURVE ARROW		35	
W1-2-48	48" X 48"	RIGHT or LEFT CURVE ARROW		35	
W1-3-48	48" X 48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48" X 48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48" X 24"	LARGE ARROW		26	
W3-1a-48	48" X 48"	STOP AHEAD SYMBOL		35	
W3-2a-48	48" X 48"	YIELD AHEAD SYMBOL		35	
W5-1-48	48" X 48"	ROAD NARROWS		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQ'D	UNITS PER AMOUNT	UNITS SUB- TOTAL
W6-3-48	48" X 48"	TWO WAY TRAFFIC SYMBOL		35	
W8-11-48	48" X 48"	UNEVEN LANES	10	35	350
W8-1-48	48" X 48"	BUMP	10	35	350
W8-12-48	48" X 48"	NO CENTER STRIPE	10	35	350
W8-3a-48	48" X 48"	PAVEMENT ENDS SYMBOL		35	
W8-53-48	48" X 48"	TRUCKS ENTERING HIGHWAY	6	35	210
W8-54-48	48" X 48"	TRUCKS ENTERING AHEAD OR ____ FT.		35	
W8-55-48	48" X 48"	TRUCKS CROSSING AHEAD OR ____ FT.		35	
W8-9-48	48" X 48"	LOW SHOULDER		35	
W8-9a-48	48" X 48"	SHOULDER DROP OFF		35	
W13-1-24	24" X 24"	____ MPH ADVISORY SPEED PLATE		11	
W13-4-48	48" X 60"	RAMP ARROW		39	
W20-1-48	48" X 48"	ROADWORK AHEAD or ____ FT.	28	35	980
W20-2-48	48" X 48"	DETOUR ____ FT.		35	
W20-3-48	48" X 48"	ROAD OR STREET CLOSED AHEAD or ____ FT.		35	
W20-4-48	48" X 48"	ONE LANE ROAD AHEAD or ____ FT.		35	
W20-51-48	48" X 48"	EQUIPMENT WORKING	6	35	210
W20-52-54	54" X 12"	NEXT ____ MILES	6	12	72
W20-5-48	48" X 48"	RIGHT or LEFT LANE CLOSED AHEAD or ____ FT.		35	
W20-7a-48	48" X 48"	FLAGGING SYMBOL	6	35	210
W20-7b-48	48" X 48"	BE PREPARED TO STOP	6	35	210
W20-7k-24	24" X 18"	____ FEET	6	10	60
W20-8-48	48" X 48"	STREET CLOSED		35	
W21-2-48	48" X 48"	FRESH OIL		35	
W21-4-48	48" X 48"	ROAD WORK ____ FT.		35	
W21-50-48	48" X 48"	BRIDGE PAINTING AHEAD OR ____ FT.		35	
W21-51-48	48" X 48"	MATERIAL ON ROADWAY		35	
W21-5-48	48" X 48"	SHOULDER WORK		35	
W22-7-48	48" X 48"	SINGLE LANE AHEAD or ____ FT.		35	
W22-8-48	48" X 48"	FRESH OIL LOOSE ROCK	4	35	140

TOTAL UNITS 3,706

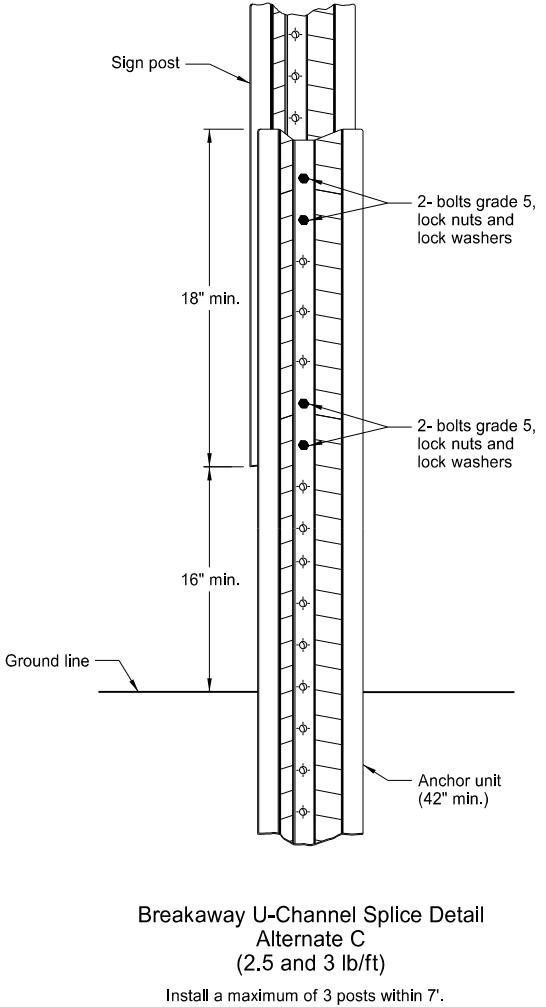
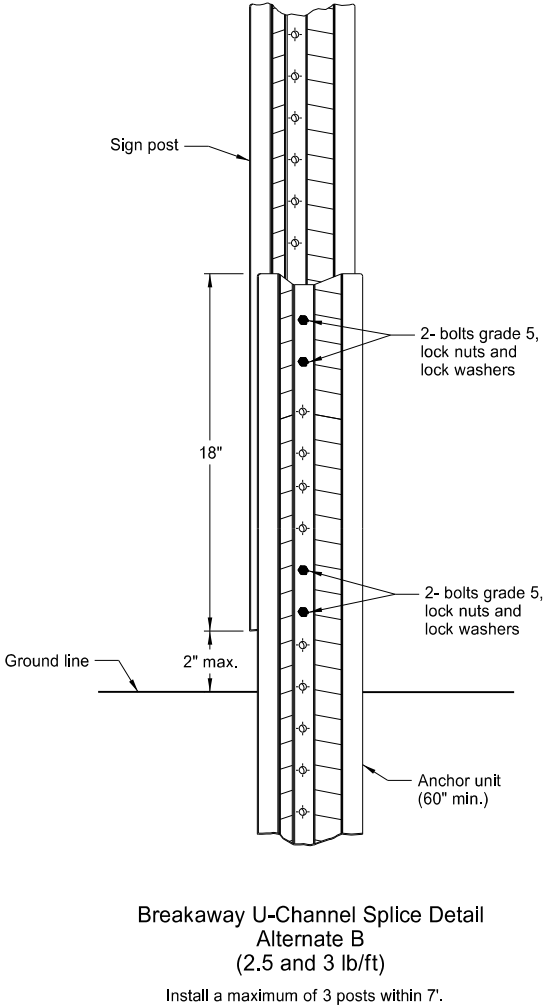
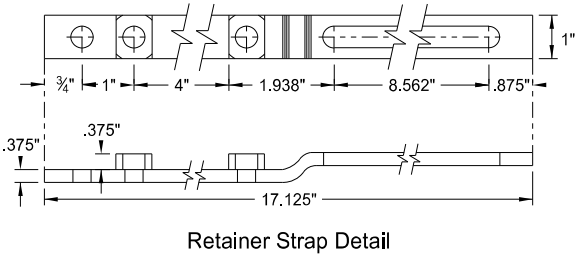
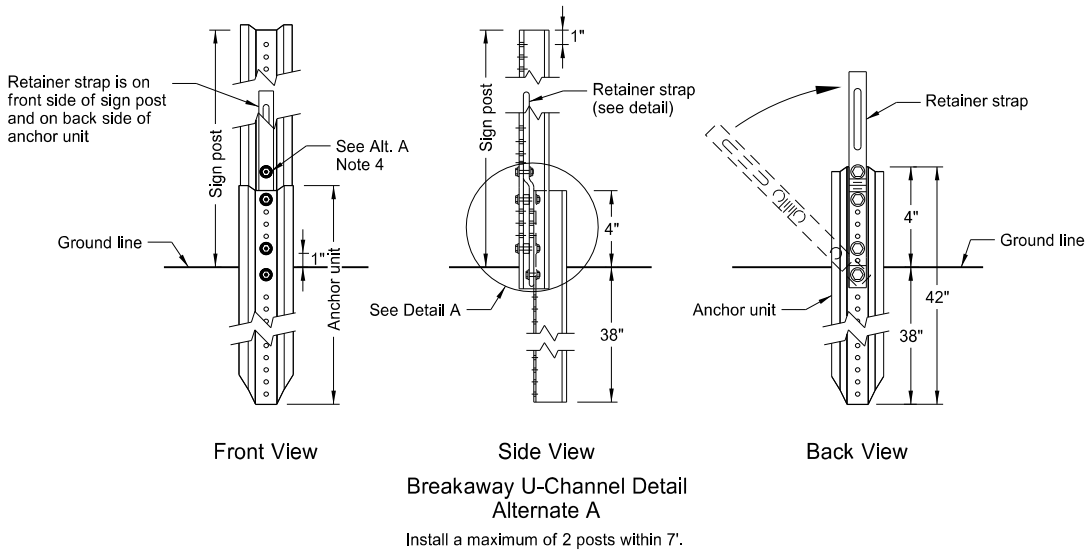
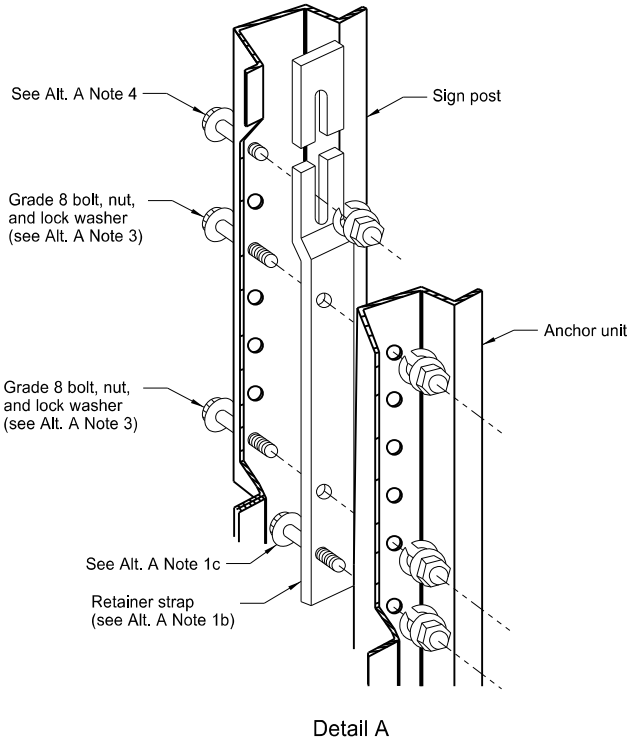
			SPEC&CODE	
			704-1000	
TYPE III	8' LONG	BARRICADES	EACH	704-1052
TYPE II	2' MIN.	BARRICADES	EACH	704-1051
TYPE I	6' TO 10'	BARRICADES	EACH	704-1050
	18" X 36" MIN.	DELINEATOR DRUMS	EACH	704-1060

THIS DOCUMENT WAS ORIGINALLY ISSUED
AND SEALED BY

KYLE D. LITCHY
N.D. REG. NO. 27408
ON 8/10/2018 AND THE ORIGINAL
DOCUMENT IS STORED AT THE CASS COUNTY
HIGHWAY DEPARTMENT, WEST FARGO, ND

CASS COUNTY HIGHWAY DEPARTMENT
PROJECT NO. SC-0900(051)
CONSTRUCTION DEVISE LISTING

U-Channel Post



Alternate A Steps of Installation:

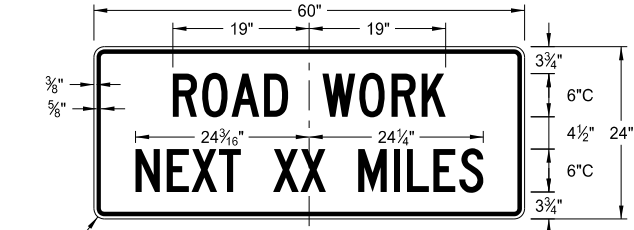
- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
- a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
- a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
b) Alternately tighten two connector bolts.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice

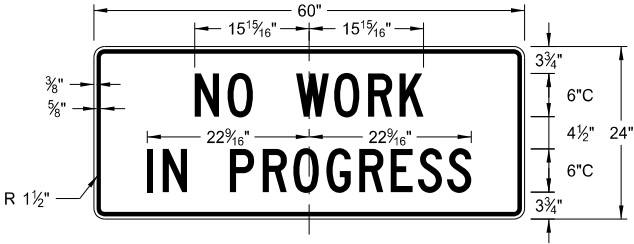
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Roger Weigel,
Registration Number
PE- 2930,
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North Dakota Department
of Transportation

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

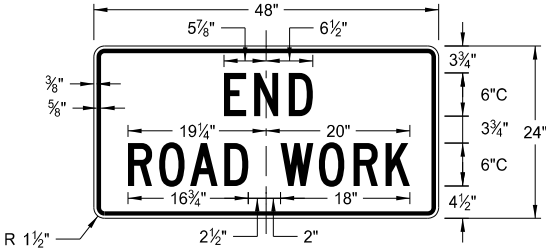
D-704-9



G20-1-60
Legend: black (non-refl)
Background: orange



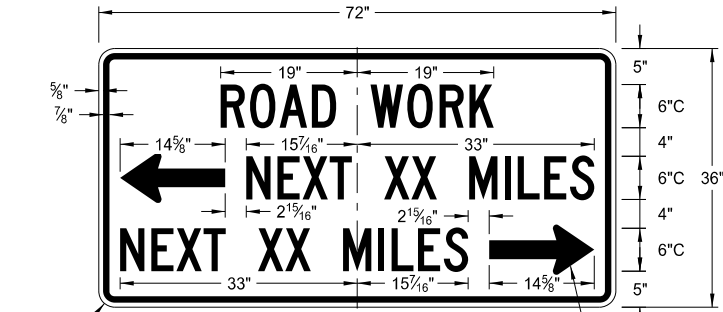
G20-1b-60
Legend: black (non-refl)
Background: orange



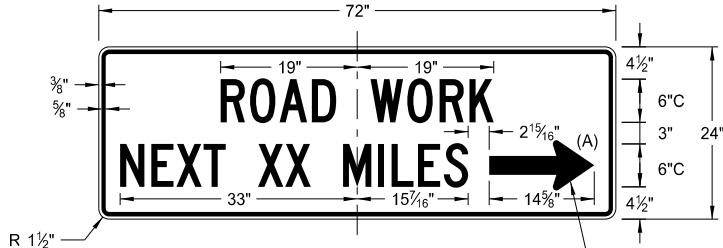
G20-2-48
Legend: black (non-refl)
Background: orange



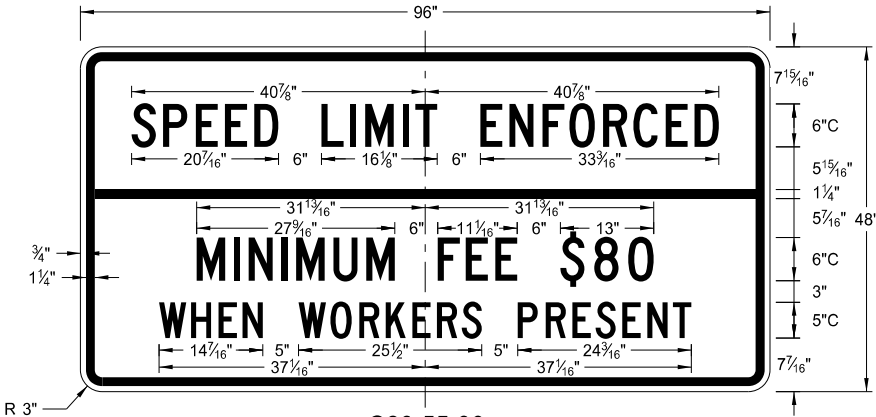
G20-4b-36
Legend: black (non-refl)
Background: orange



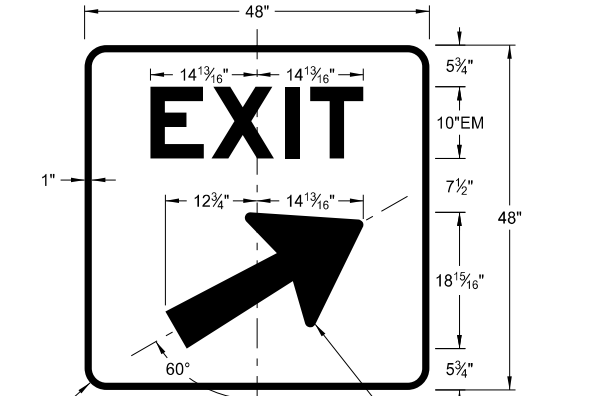
G20-50a-72
Legend: black (non-refl)
Background: orange



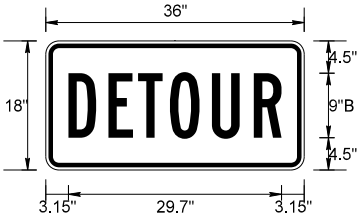
G20-52a-72
Legend: black (non-refl)
Background: orange



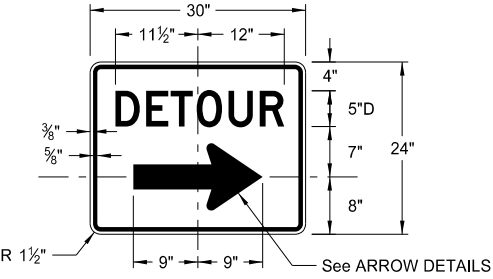
G20-55-96
Legend: black (non-refl)
Background: orange



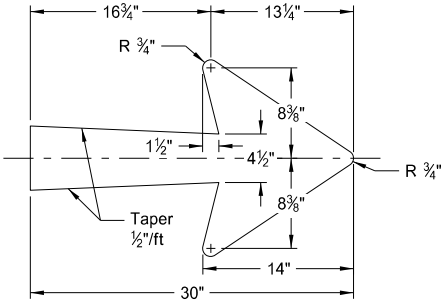
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



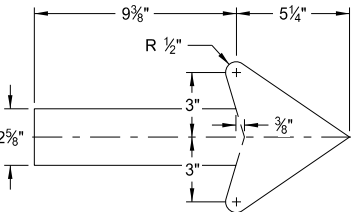
M4-8-36
Legend: black (non-refl)
Background: orange



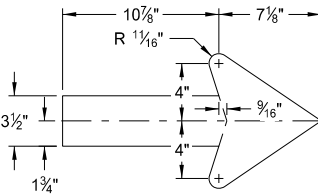
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



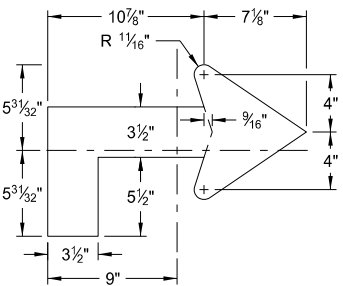
E5-1-48



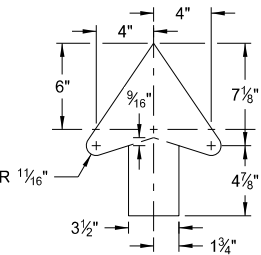
G20-50a-72
G20-52a-72



M4-9(L or R)-30
Right or Left



M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS

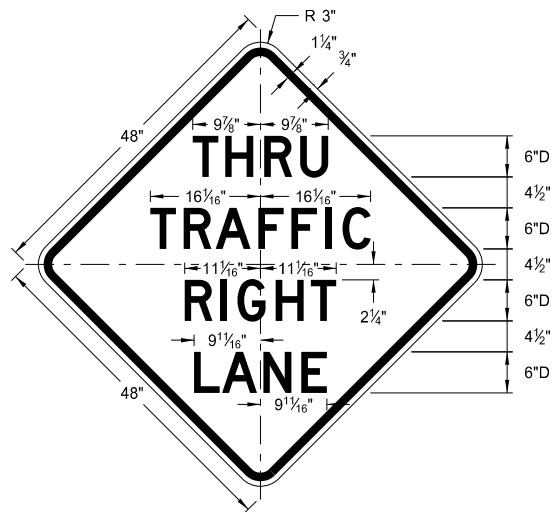
NOTES:
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color

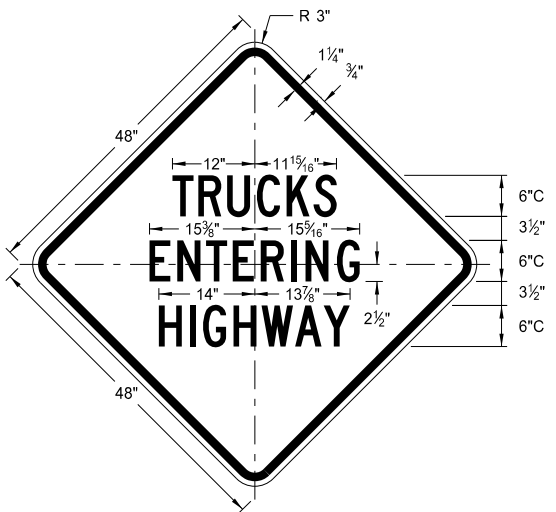
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

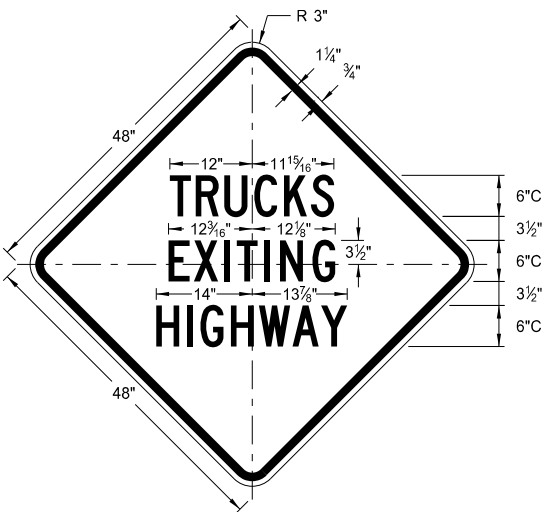
D-704-11



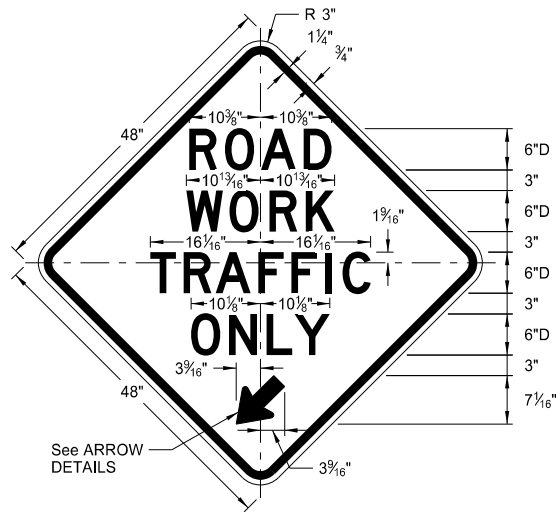
W5-8-48
Legend: black (non-refl)
Background: orange



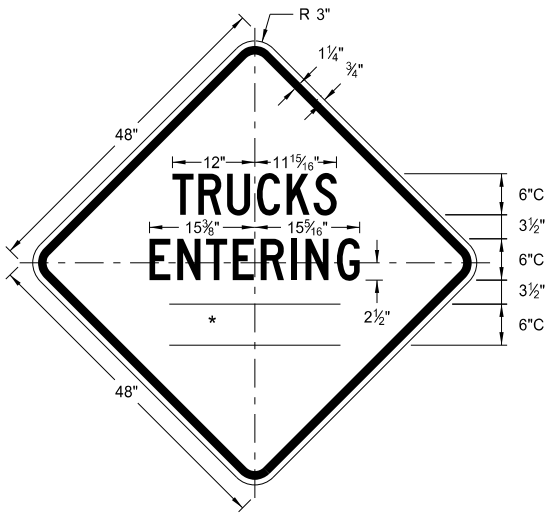
W8-53-48
Legend: black (non-refl)
Background: orange



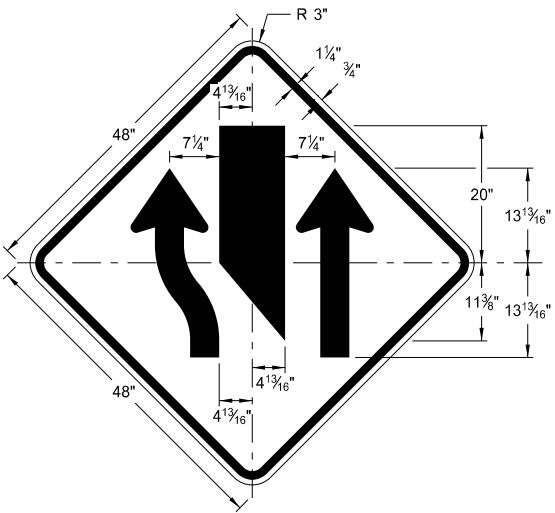
W8-56-48
Legend: black (non-refl)
Background: orange



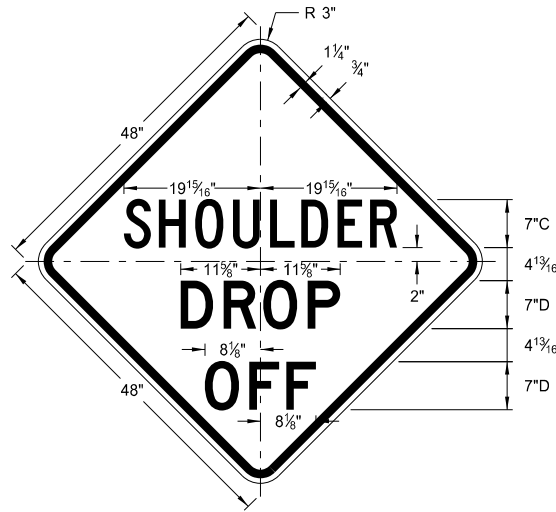
W5-9-48
Legend: black (non-refl)
Background: orange



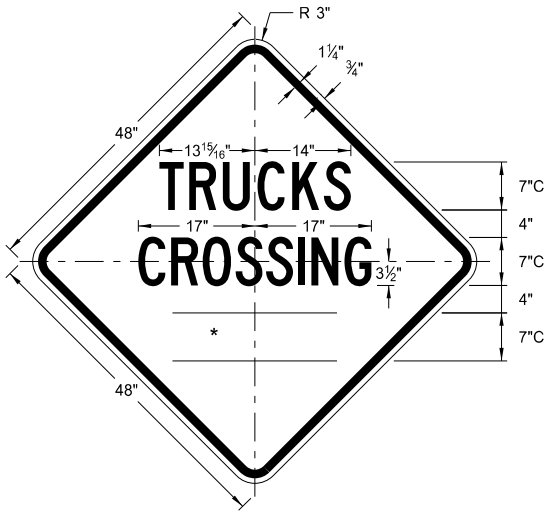
W8-54-48
Legend: black (non-refl)
Background: orange



W9-3a-48
Legend: black (non-refl)
Background: orange



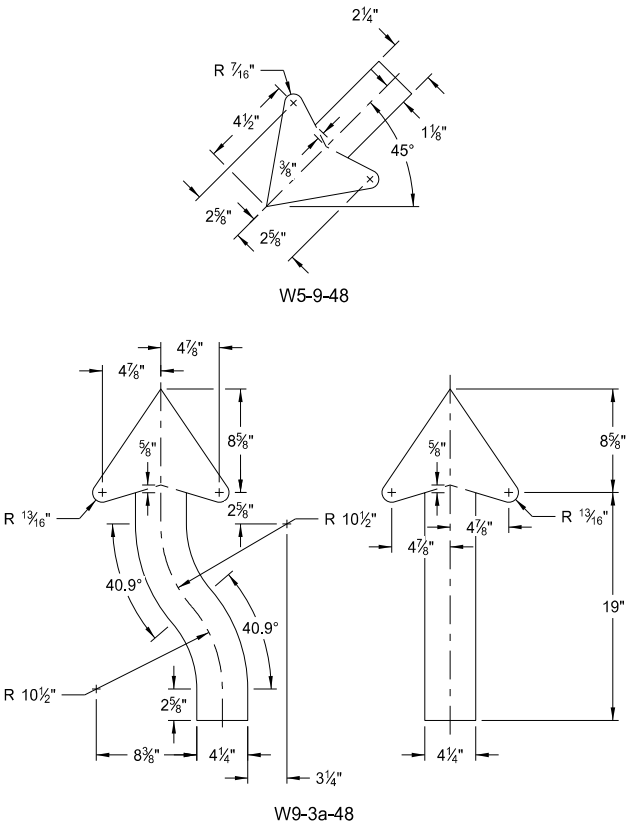
W8-9a-48
Legend: black (non-refl)
Background: orange



W8-55-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
1/2 MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



ARROW DETAILS

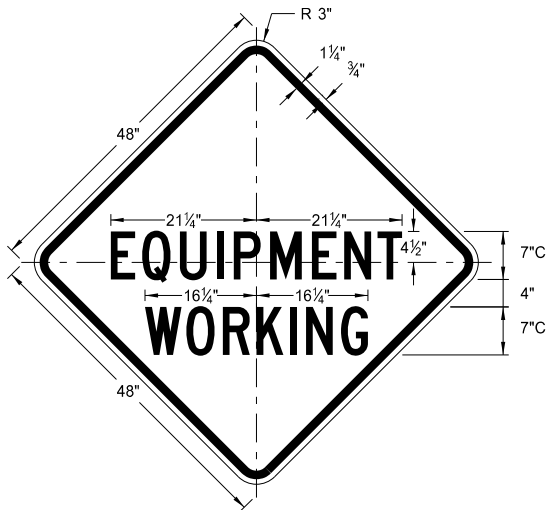
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details

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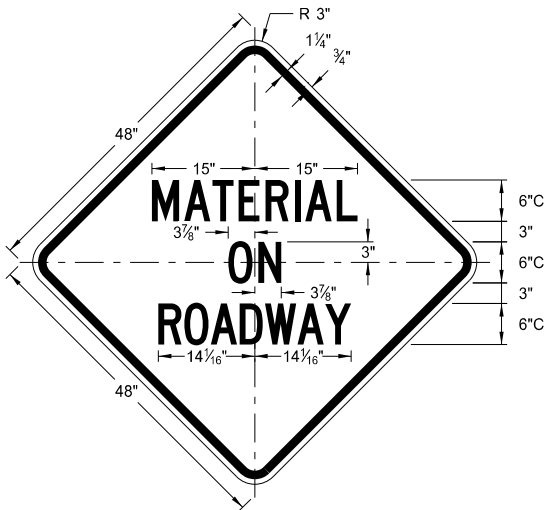
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

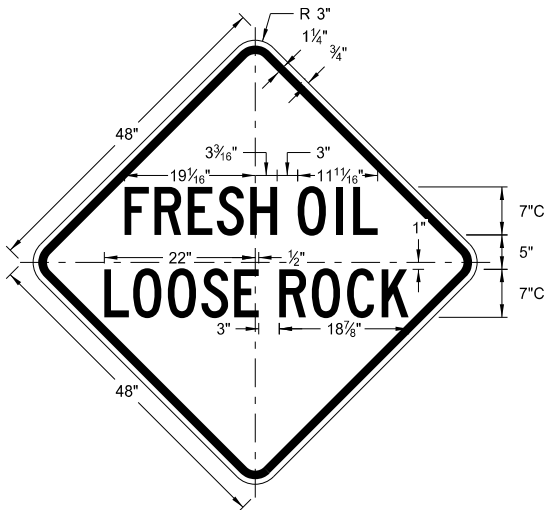
* DISTANCE MESSAGES



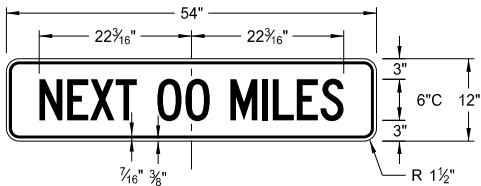
W20-51-48
Legend: black (non-refl)
Background: orange



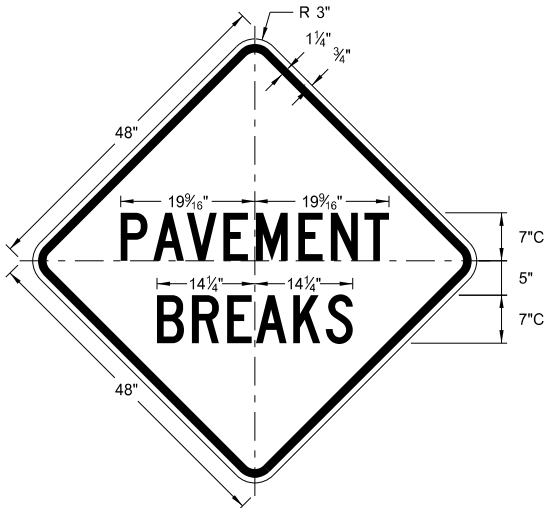
W21-51-48
Legend: black (non-refl)
Background: orange



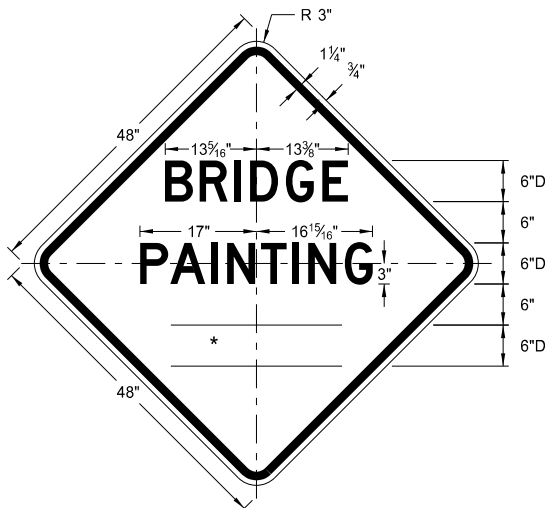
W22-8-48
Legend: black (non-refl)
Background: orange



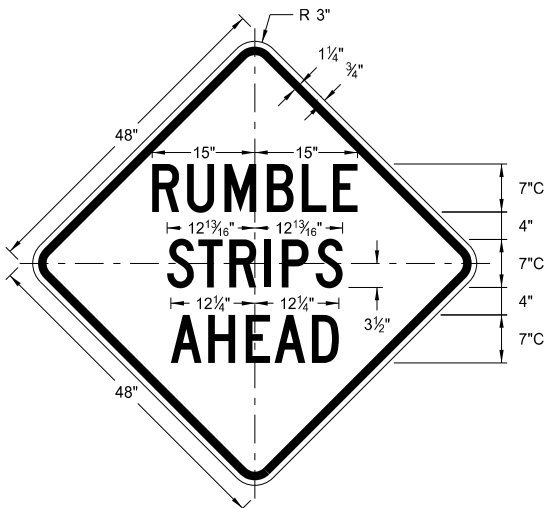
W20-52P-54
Legend: black (non-refl)
Background: orange



W21-52-48
Legend: black (non-refl)
Background: orange



W21-50-48
Legend: black (non-refl)
Background: orange



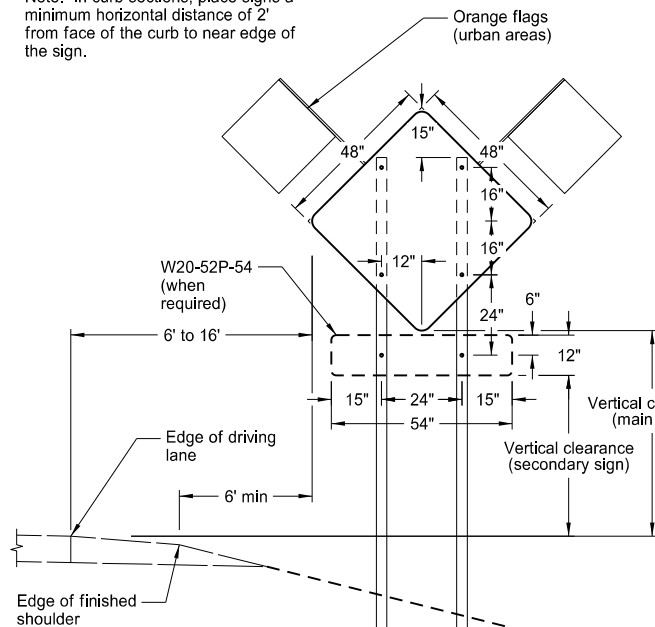
W21-53-48
Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE

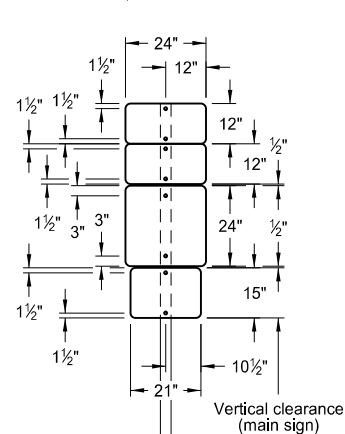
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Registration Number
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on 5/31/18 and the original
document is stored at the
North Dakota Department
of Transportation

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

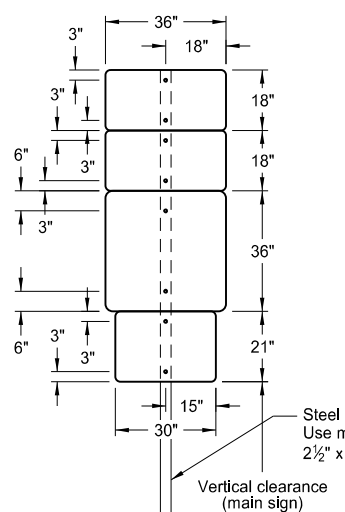
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



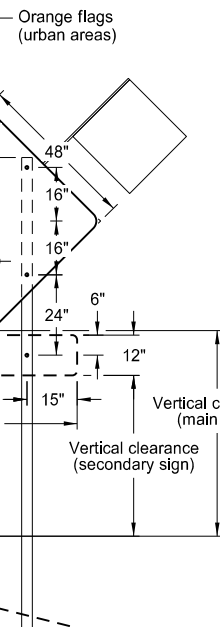
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



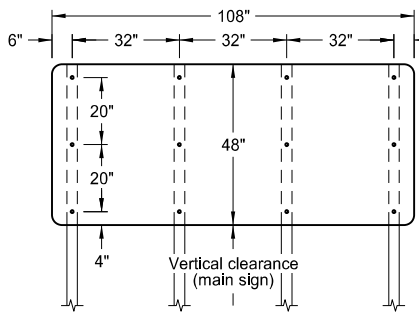
24" x 24"
ROUTE MARKER
ASSEMBLY



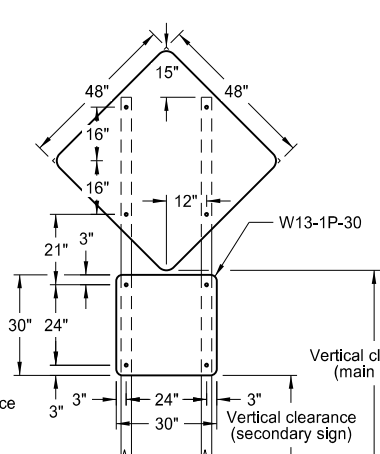
36" x 36"
ROUTE MARKER
ASSEMBLY



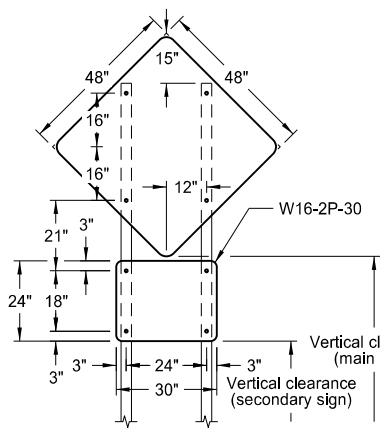
18" x 18"
DIAMOND SIGN



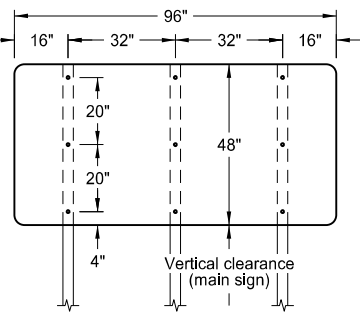
108" x 48" SIGN



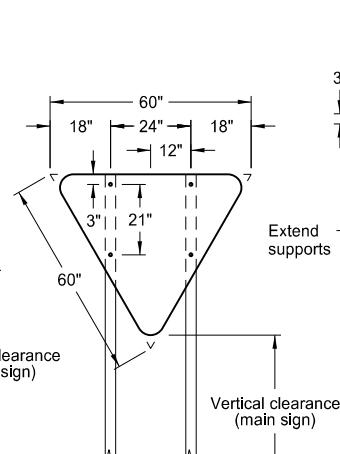
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



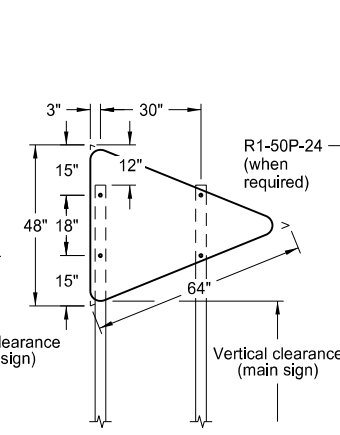
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



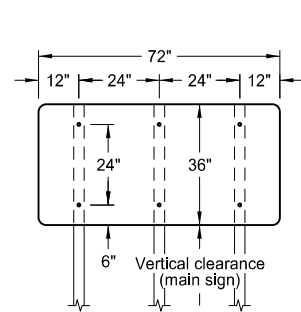
96" x 48" SIGN



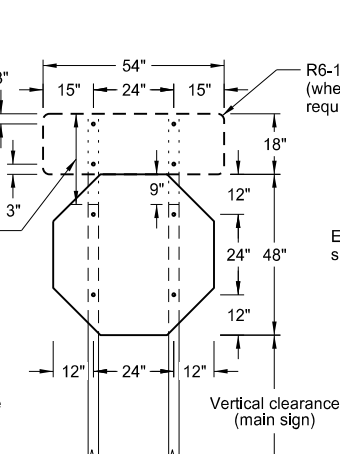
R1-2-60 - YIELD SIGN



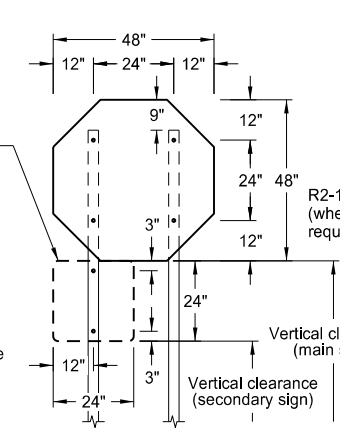
W14-3-64 - PENNANT SIGN



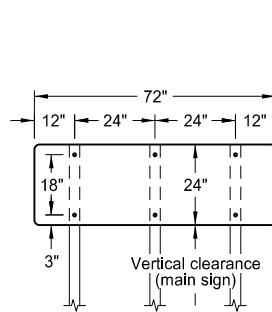
72" x 36" SIGN



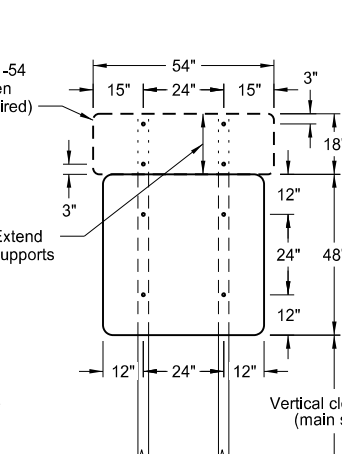
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



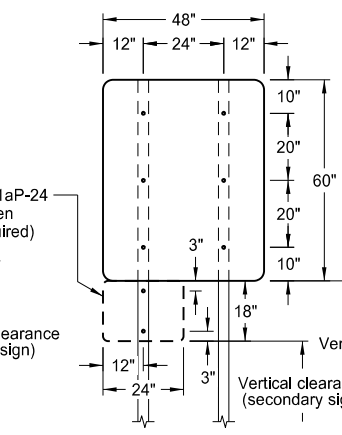
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



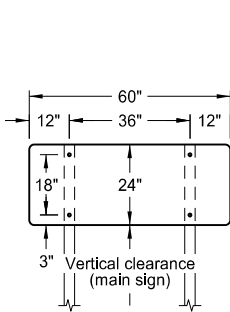
72" x 24" SIGN



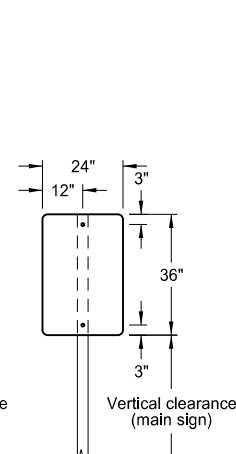
48" x 48" SIGN
(with R6-1-54 sign as required)



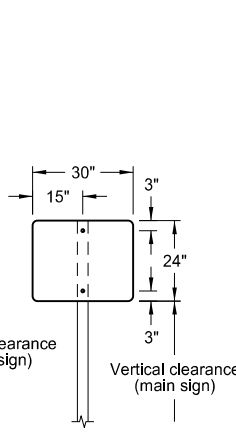
48" x 48" SIGN
(with R2-1aP-24 sign as required)



60" x 24" SIGN



24" x 36" SIGN



30" x 24" SIGN

NOTES:

1. Sign Supports: Galvanize or paint supports. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.

Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.

3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION). In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance stated above.

Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

6. Portable Signs: Provide portable signs that meet the vertical clearance stated above when it is necessary to place signs within the pavement surface.

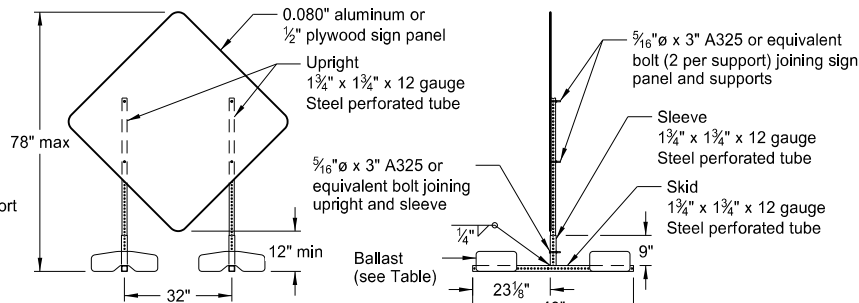
Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

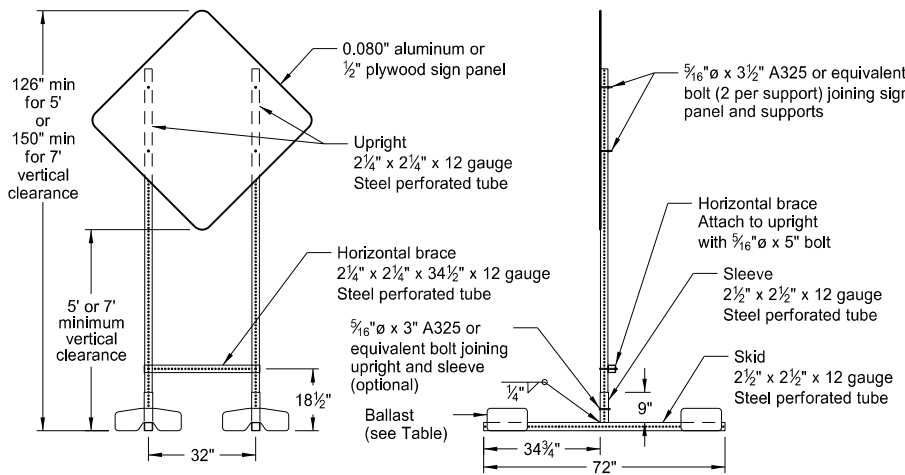
MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



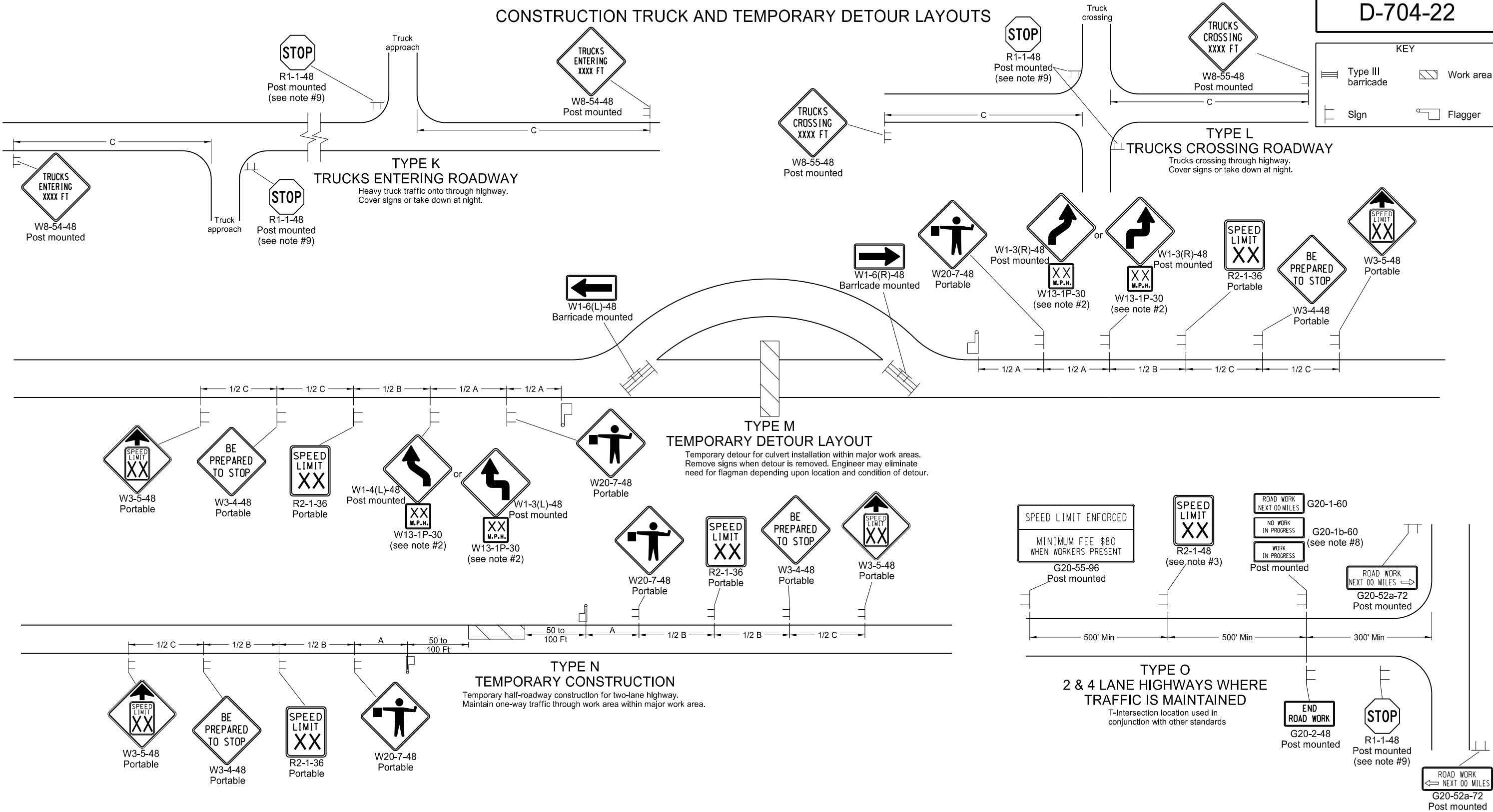
PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13 9-27-17	Revised Note 6, Updated to active voice

This document was originally issued and sealed by
Roger Weigel,
Registration Number
PE-2930,
on 9/27/2017 and the original document is stored at the
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of Transportation

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
- Where necessary, safe speed to be determined by the Engineer.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within a reduced speed zone.
- Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
- Install sign G20-1b-60 when work is suspended for winter.
- If existing stop sign is in place, a 48" stop sign is not required.
- Sign G20-55-96 is not required if layout is part of other traffic control or if work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

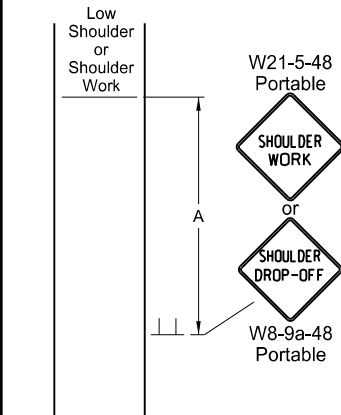
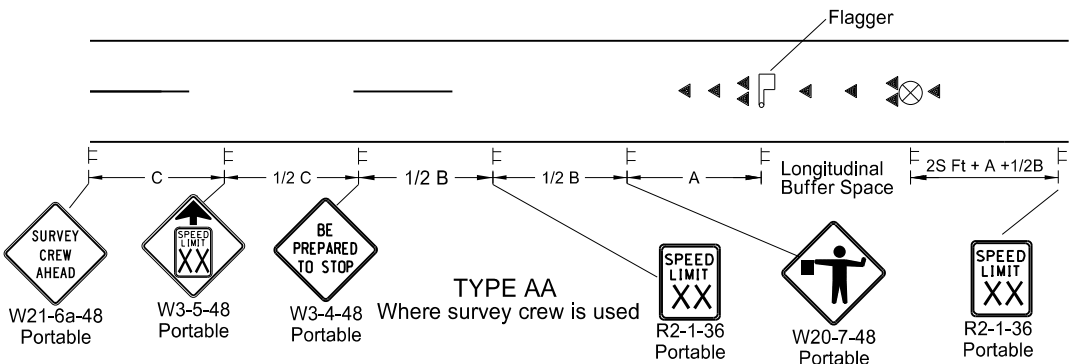
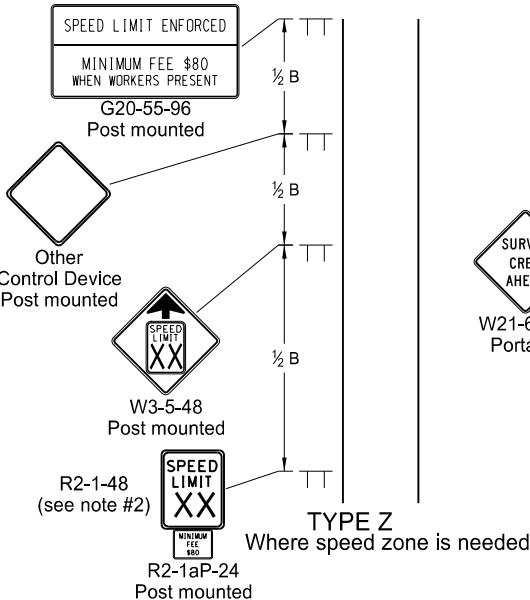
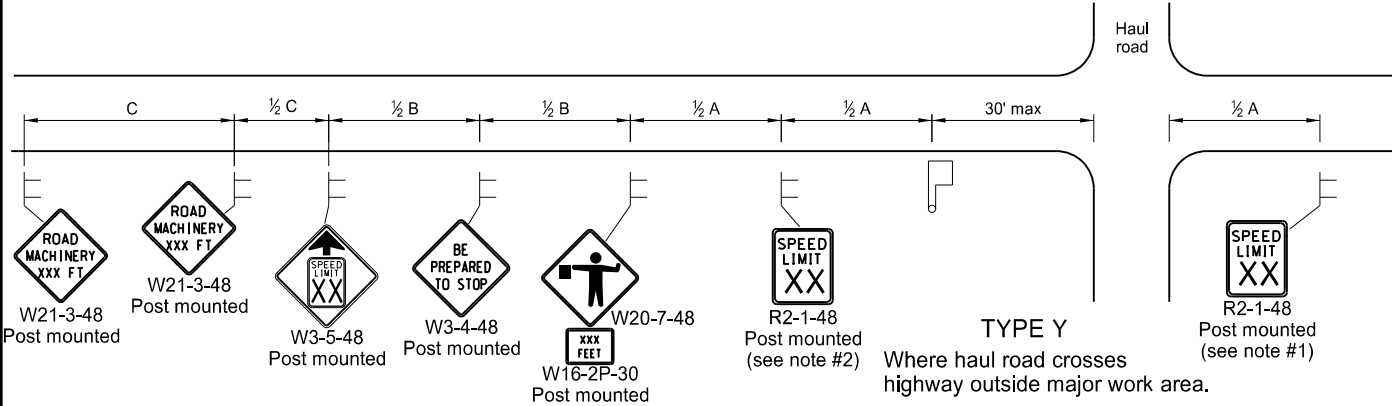
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Update notes & sign numbers

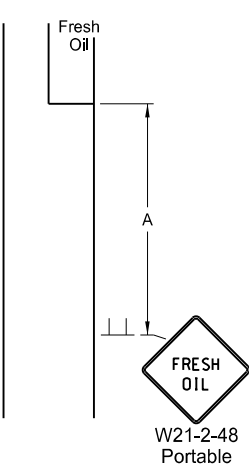
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MISCELLANEOUS SIGN LAYOUTS

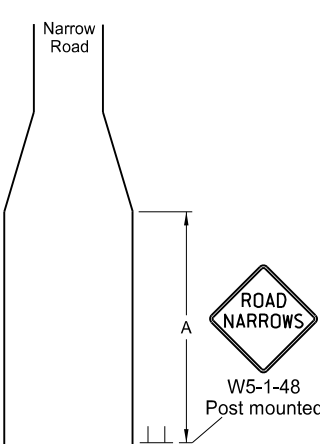
D-704-26



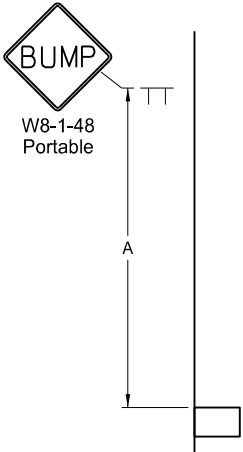
TYPE BB
Within major work area
where sign conditions exist



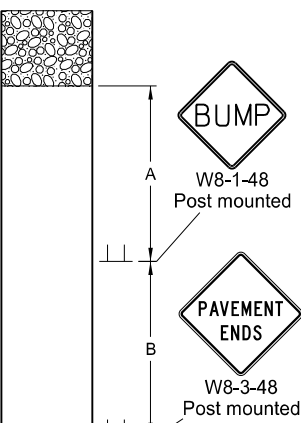
TYPE CC
Where sign conditions exist



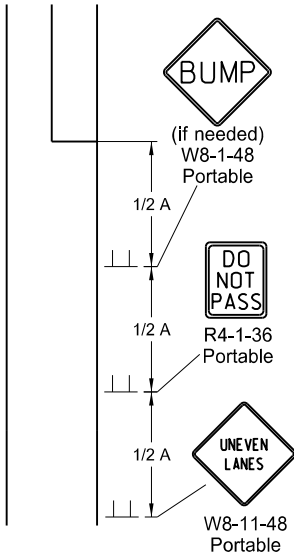
TYPE DD
Where sign conditions exist



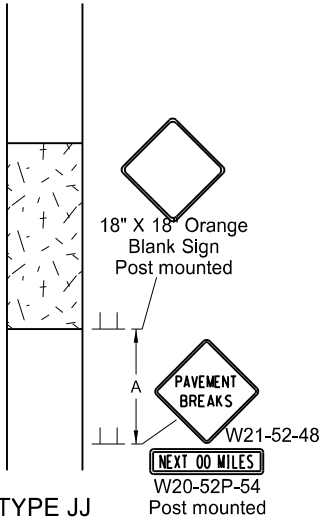
TYPE EE
Where sign conditions exist



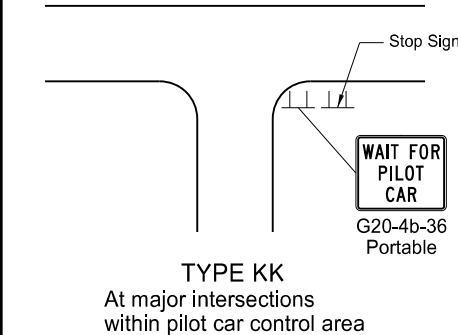
TYPE FF
Where sign conditions exist



TYPE GG
Where elevation difference
exists between lanes



TYPE JJ
For break in pavement.
Install signs when conditions exist
and remove when not applicable.



TYPE KK
At major intersections
within pilot car control area

- Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2B.
 3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 4. Cover existing speed limit signs within reduced speed zones.
 5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
 7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
 8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING				
Road Type	Distance Between Signs Min. (ft)			
	A	B	C	
Urban - Low Speed (30 mph or less)	150	150	150	
Urban - Low Speed (over 30 to 40 mph)	280	280	280	
Urban - High Speed (over 40 mph to 50 mph)	360	360	360	
Rural - High Speed (over 50 mph to 65 mph)	720	720	720	
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200	
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640	
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500	

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

KEY

Sign Flagger Cones

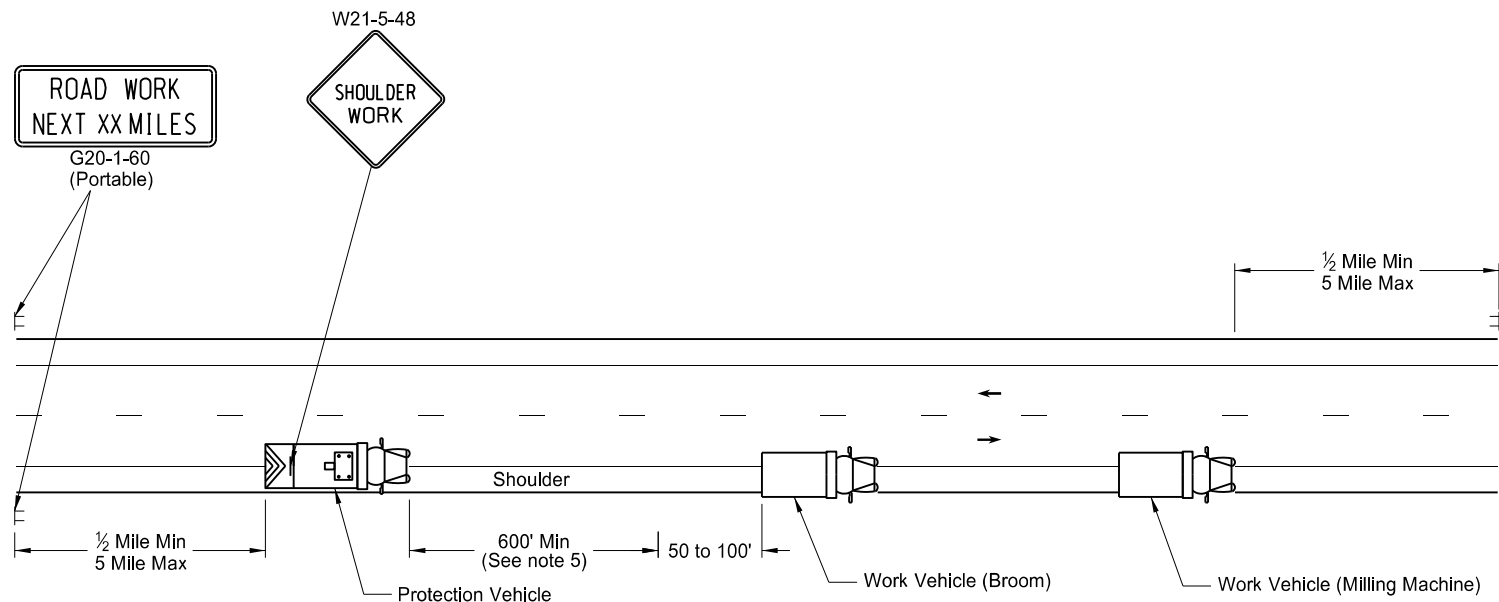
S = Numerical value of speed limit or 85th percentile.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers

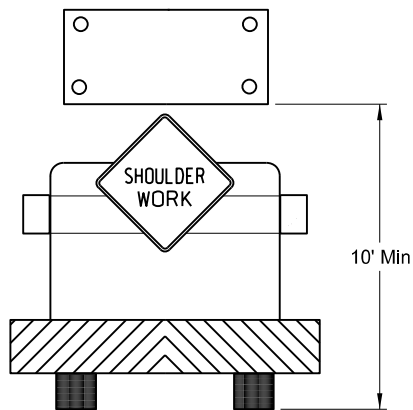
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MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



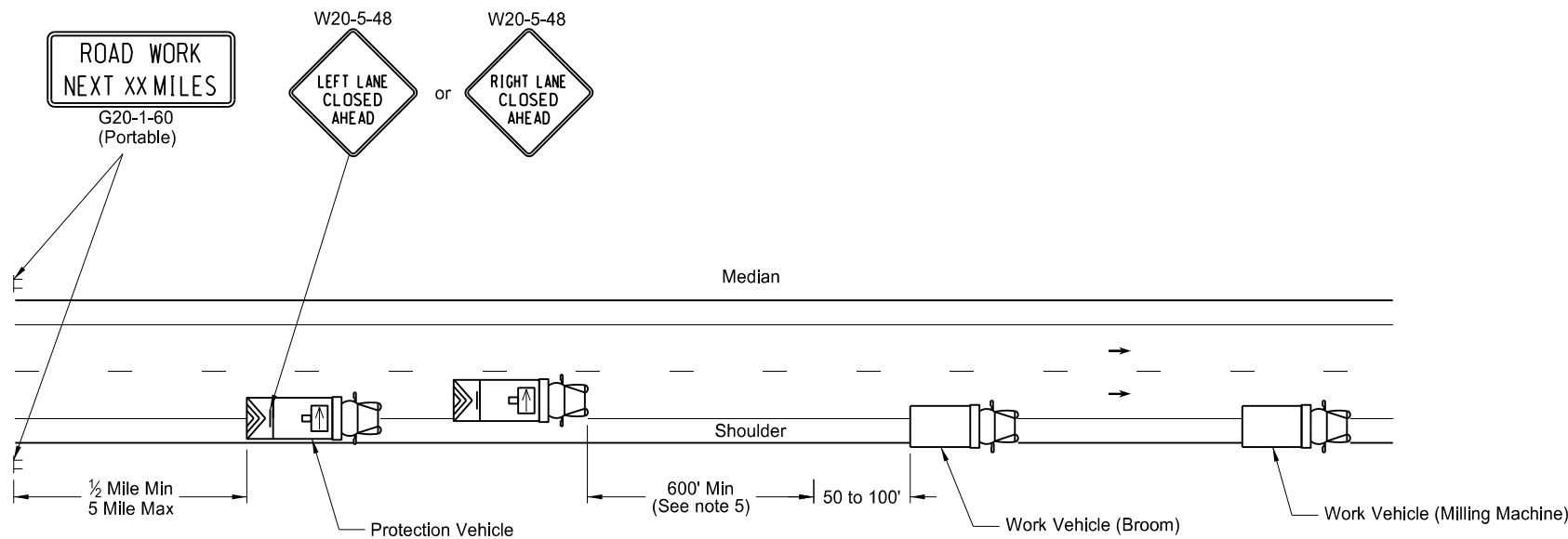
TWO LANE - TWO WAY ROADWAY



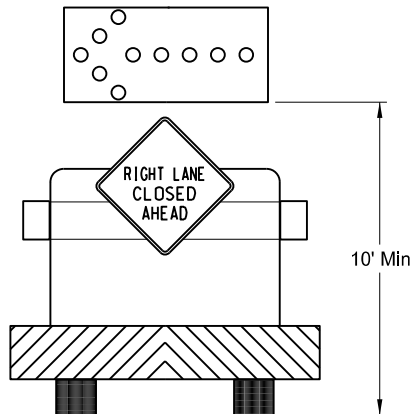
TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

- Notes:
1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
 2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
 3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
 4. Provide two - way electronic communication capability in each vehicle.
 5. Vary vehicle spacing between the protection vehicle and work vehicle depending on sight distance restrictions. Keep the spacing of the convoy vehicles such that motorists approaching the work convoy can see the protection vehicle in time to slow down and safely pass the work vehicles.
 6. Move advance Road Work Ahead signs as the work area moves through the construction zone.

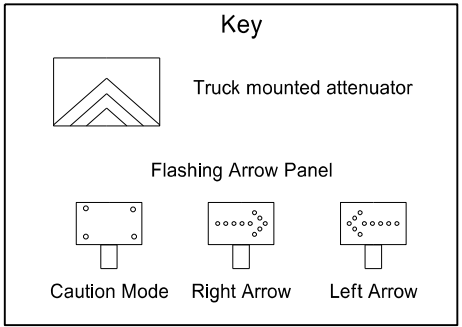


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

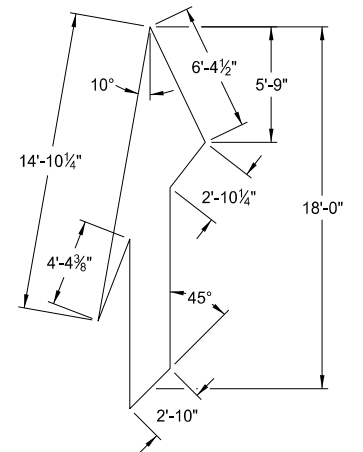
Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs

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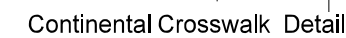
D-762-1




41 S. F.

46 S. F.

Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft



W10-1



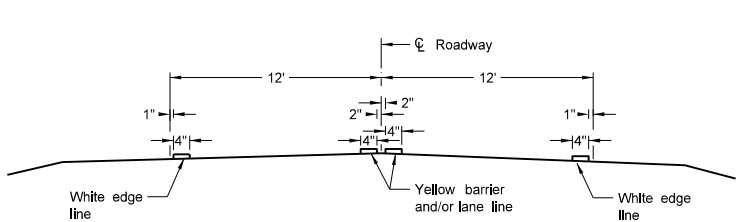
See Standard
Drawing D-754-8

See plans for correct message. Use white pavement markings unless noted otherwise.

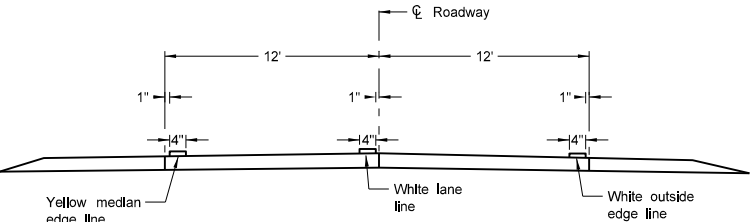
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PAVEMENT MARKING

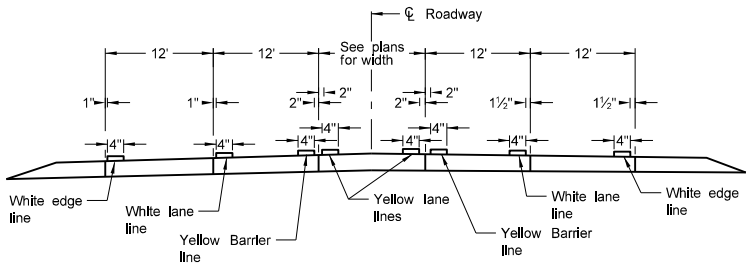
D-762-4



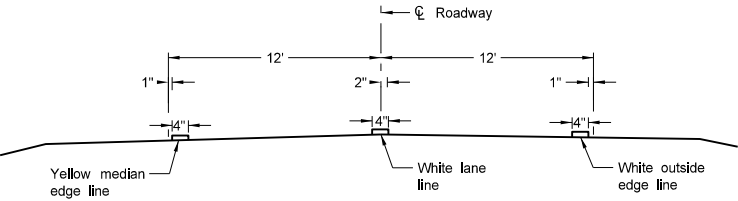
Two Lane Two Way
RURAL ROADWAY



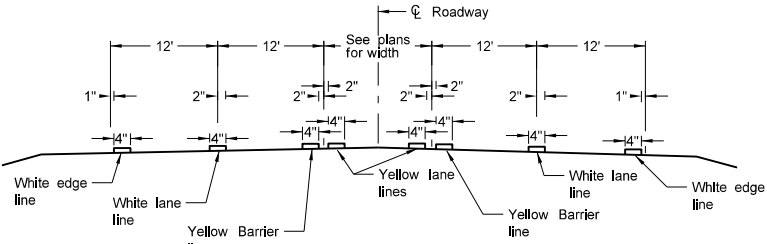
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



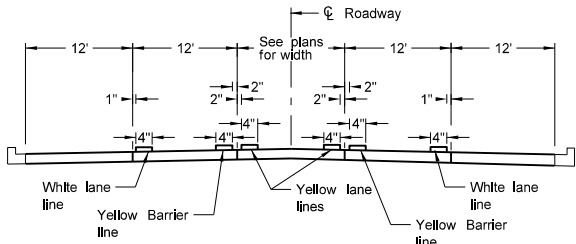
RURAL FIVE LANE ROADWAY
Concrete Section



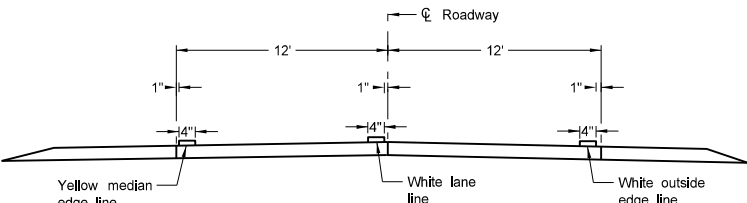
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



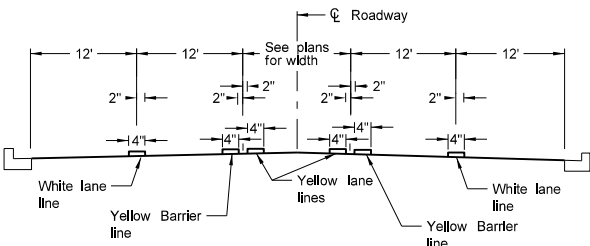
RURAL FIVE LANE ROADWAY
Asphalt Section



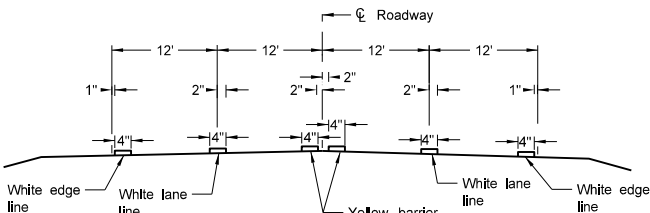
URBAN FIVE LANE SECTION
Concrete Section



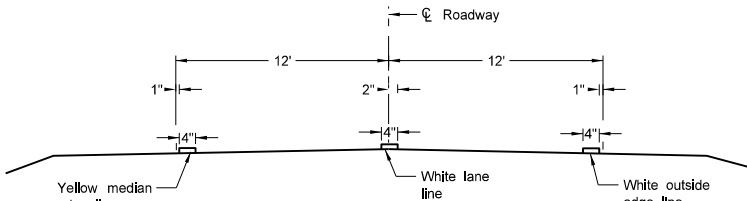
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



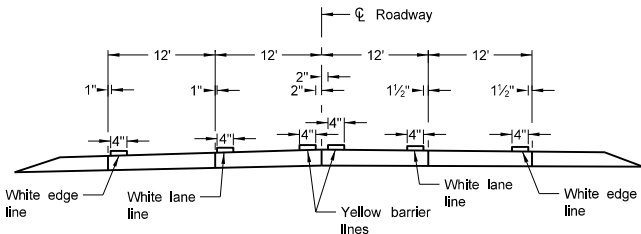
URBAN FIVE LANE SECTION
Asphalt Section



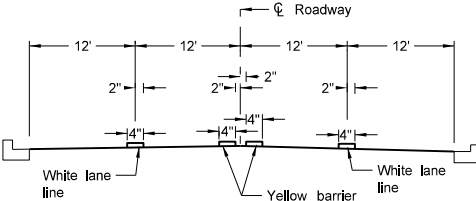
RURAL FOUR LANE ROADWAY
Asphalt Section



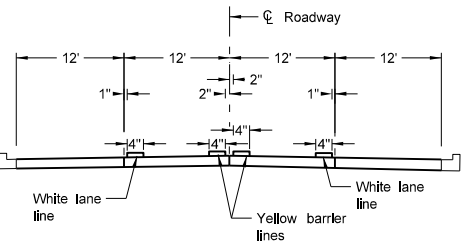
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



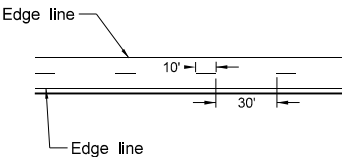
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



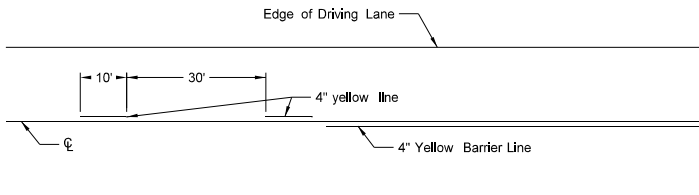
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

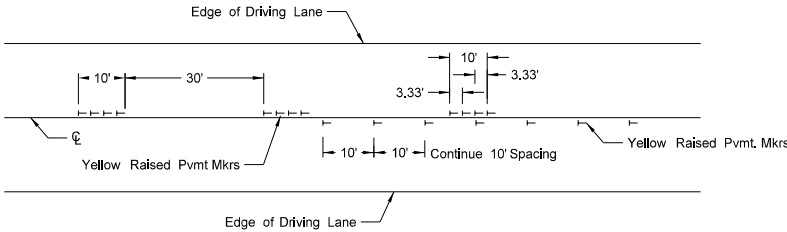
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.

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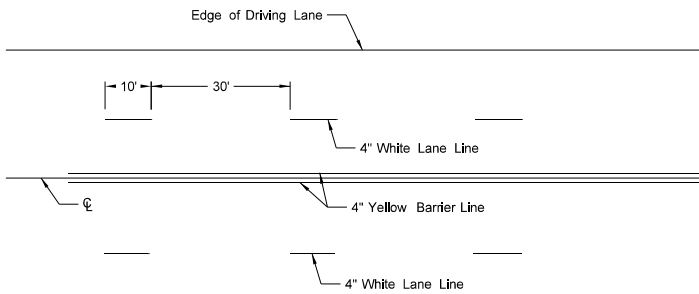


Painted or Tape Lines

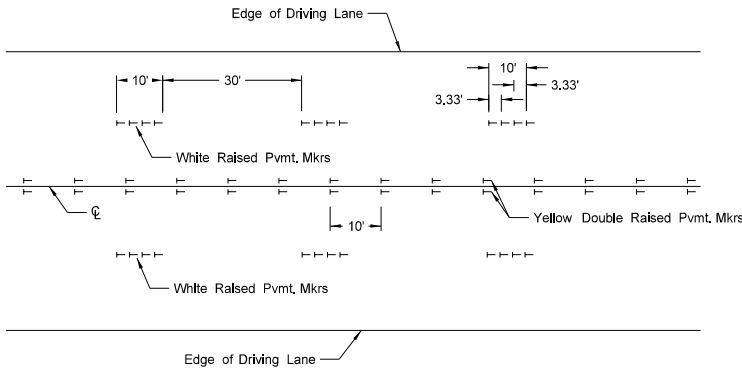


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

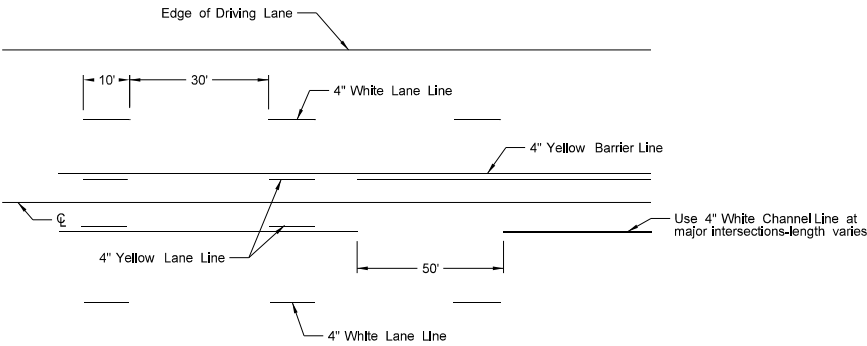


Painted or Tape Lines

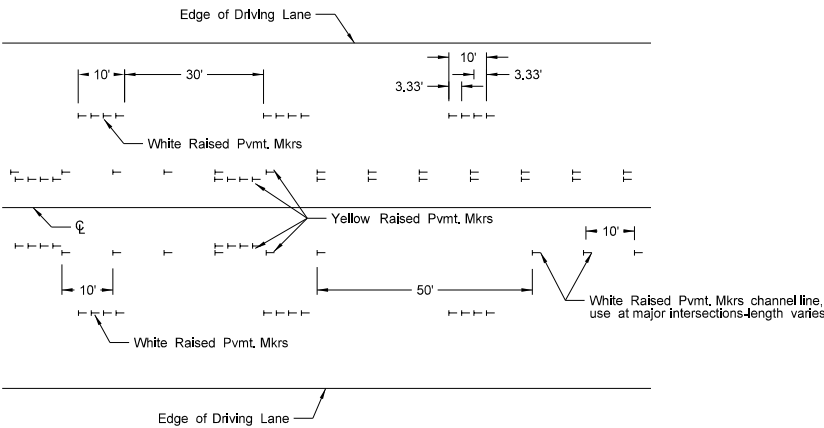


Raised Pavement Markers

FOUR LANE ROADWAY

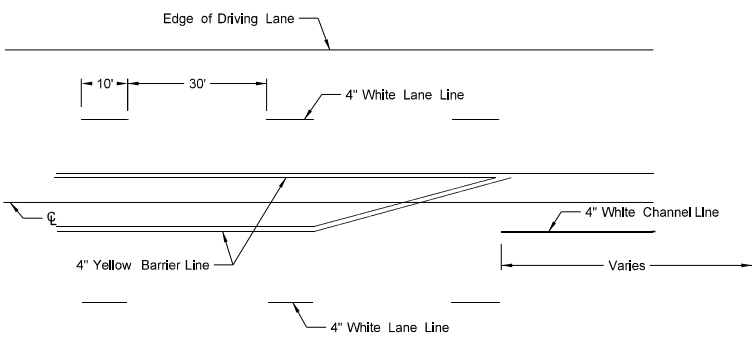


Painted or Tape Lines

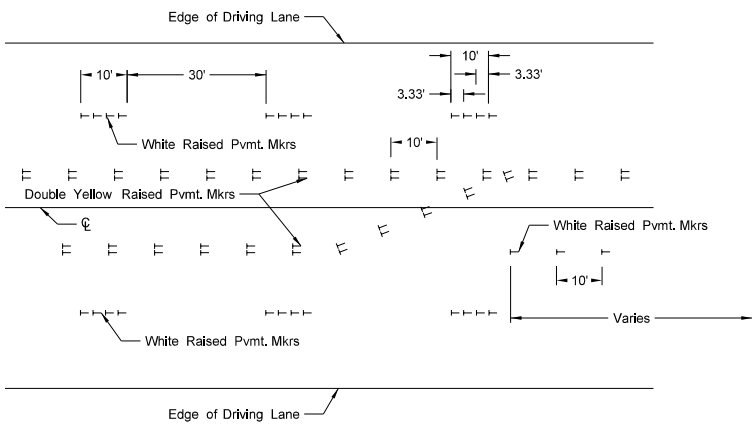


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

- NOTES:
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
 2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
 3. Remove raised markers and tape markings after permanent pavement marking is installed.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.

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