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Sheet No.	5	Typical Sections
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Sheet No.	7	Traffic Control
Sheet No.	2	Miscellaneous Quantities
Sheet No.	2	Structure Plans

TOTAL SHEETS = 106



14

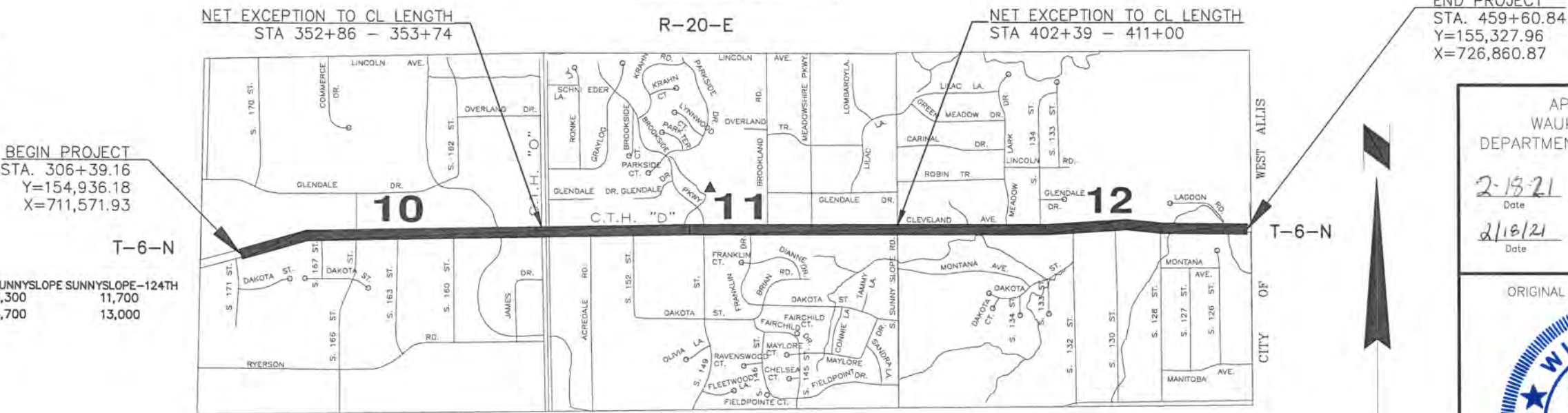
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
PLAN OF PROPOSED IMPROVEMENT

CTH D  
CALHOUN ROAD TO EAST COUNTY LINE

CTH D  
WAUKESHA  
COUNTY

STATE PROJECT NUMBER  
2773-05-71

STATE PROJECT	FEDERAL PROJECT	
	PROJECT	CONTRACT
2773-05-71	WISC 2021329	1



END PROJECT  
STA. 459+60.84  
Y=155,327.96  
X=726,860.87

DESIGN DESIGNATION				
A.A.D.T.	2021	=	15,200	13,300
A.A.D.T.	2041	=	17,500	14,700
D.H.V.		=		13,000
D.D.		=		
T.		=		
DESIGN SPEED		=		
ESALS		=		

CONVENTIONAL SYMBOLS

PLAN

CORPORATE LIMITS

PROPERTY LINE

LOT LINE

LIMITED HIGHWAY EASEMENT

EXISTING RIGHT OF WAY

PROPOSED OR NEW R/W LINE

SLOPE INTERCEPT

REFERENCE LINE

EXISTING CULVERT

PROPOSED CULVERT (Box or Pipe)

COMBUSTIBLE FLUIDS

MARSH AREA

WOODED OR SHRUB AREA

PROFILE

GRADE LINE

ORIGINAL GROUND

MARSH OR ROCK PROFILE (To be noted as such)

SPECIAL DITCH

GRADE ELEVATION

CULVERT (Profile View)

UTILITIES

ELECTRIC

FIBER OPTIC

GAS

SANITARY SEWER

STORM SEWER

TELEPHONE

WATER

UTILITY PEDESTAL

POWER POLE

TELEPHONE POLE

R-20-E

LAYOUT  
SCALE 0 1/4 MI

TOTAL NET LENGTH OF CENTERLINE = 2.72 MI. (URBAN)

HORIZONTAL POSITIONS SHOWN ON THIS PLAN ARE WISCONSIN COUNTY COORDINATES, WAUKESHA COUNTY, NAD83 (2011), IN U.S. SURVEY FEET. VALUES ARE GRID COORDINATES, GRID BEARINGS, AND GRID DISTANCES. GRID DISTANCES MAY BE USED AS GROUND DISTANCES.

ALL ELEVATIONS ON THIS PLAN ARE REFERENCED TO NAVD 88 (2012) USING THE WISCORS GEOD 12A IN US SURVEY FEET.

APPROVED FOR  
WAUKESHA COUNTY  
DEPARTMENT OF PUBLIC WORKS

2/18/21 Allison Bessler  
Date Director

2/18/21 Karen Braun  
Date Engineering Services Manager

ORIGINAL PLANS PREPARED BY

2/18/21  
Date Signature

STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
PREPARED BY	
Surveyor	WAUK. CO. DEPT. OF PUBLIC WORKS
Designer	WAUK. CO. DEPT. OF PUBLIC WORKS
Project Manager	KATHY KRAMER, P.E.
Regional Examiner	
Regional Supervisor	JEFFREY BOHEN, P.E.

APPROVED FOR THE DEPARTMENT  
2/18/21 Kathleen Kramer  
Date Digitally signed by Kathleen Kramer  
12:32:50.06'00'  
(Signature)

GENERAL NOTES

NO TREES OR SHRUBS ARE TO BE REMOVED UNLESS INDICATED FOR REMOVAL BY THE ENGINEER.

THE LOCATIONS OF EXISTING AND PROPOSED UTILITY INSTALLATIONS, AS SHOWN ON THE PLANS, ARE APPROXIMATE. THERE MAY BE OTHER UTILITIES AND UTILITY INSTALLATIONS WITHIN THE PROJECT LIMITS THAT ARE NOT SHOWN.

EXCAVATION BELOW SUBGRADE (EBS) SHALL NOT BE USED TO BALANCE YARDAGE. EBS IS NOT SHOWN ON THE CROSS SECTIONS, BUT WILL BE MEASURED AND PAID FOR AS EXCAVATION COMMON. THE PRECISE LOCATION OF THE EBS WILL BE DETERMINED BY THE ENGINEER.

PAVEMENTS ARE TO BE SAWCUT, AS INDICATED ON THE PLANS, TO PROVIDE A BUTT JOINT AT THE PROJECT LIMITS AND AT ALL ASPHALTIC DRIVEWAYS. SAWCUT AREAS ARE TO BE SQUEEGEED INTO NEAREST GRAVEL SHOULDER OR CURB AND GUTTER AREA AND REMOVED FROM THE SITE BEFORE MOVING TO NEXT SAW CUT AREA.

WHEN THE QUANTITY OF THE ITEMS OF BREAKER RUN, SELECT CRUSHED MATERIAL, BASE AGGREGATE OR HMA PAVEMENT IS MEASURED FOR PAYMENT BY THE TON, THE DEPTH OR THICKNESS OF THE LAYER SHOWN ON THE PLANS IS APPROXIMATE. THE ACTUAL THICKNESS WILL DEPEND ON THE DISTRIBUTION OF THE MATERIAL AS DIRECTED BY THE ENGINEER.

THE CRUSHED AGGREGATE FOR SHOULDERS ADJACENT TO THE HMA PAVEMENT SHALL NOT BE PLACED UNTIL AFTER THE SURFACE LAYER OF THE HMA PAVEMENT HAS BEEN LAID.

ALL DISTURBED AREAS WITHIN THE RIGHT OF WAY SHALL BE COVERED WITH SALVAGED TOPSOIL OR TOPSOIL AND HYDROSEEDING.

SEED QUANTITIES ARE BASED ON MIXTURE NO. 30.

THE CONTRACTOR SHALL NOTIFY DIGGER’S HOTLINE AND AFFECTED UTILITIES PRIOR TO THE START OF WORK TO DETERMINE THE LATEST STATUS OF UTILITY RELOCATIONS. ANY LOCAL MUNICIPAL UTILITY WHICH IS NOT A MEMBER OF A ONE–CALL SYSTEM MUST BE CONTACTED SEPARATELY.

RE–TOPSOIL OF GRADED AREAS, AS DESIGNATED BY THE ENGINEER, IMMEDIATELY AFTER GRADING IS COMPLETED WITHIN THOSE AREAS. SEED, FERTILIZE, AND MULCH/EROSION MAT TOP–SOILED AREAS, AS DESIGNATED BY THE ENGINEER, WITHIN FIVE (5) CALENDAR DAYS AFTER PLACEMENT OF TOPSOIL. IF GRADED AREAS OUTSIDE THE ROADBED (I.E. BETWEEN CURBS AND SIDEWALKS, OUTSIDE OF WALKS, ETC.) ARE LEFT EXPOSED FOR MORE THAN SEVEN (7) CALENDAR DAYS, SEED THOSE AREAS WITH TEMPORARY SEED AND MULCH.

STOCKPILE EXCESS MATERIAL OR SPOILS ON UPLAND AREAS AWAY FROM WETLANDS, FLOODPLAINS AND WATERWAYS. STOCKPILED SOIL SHALL BE PROTECTED AGAINST EROSION. IF STOCKPILED MATERIAL IS LEFT FOR MORE THAN SEVEN (7) CALENDAR DAYS, SEED THE STOCKPILE WITH TEMPORARY SEED AND MULCH.

EROSION CONTROL BMP’S ARE AT SUGGESTED LOCATIONS. THE ACTUAL LOCATIONS WILL BE DETERMINED BY THE CONTRACTORS ECIP AND BY THE ENGINEER. EROSION CONTROL BMP’S SHALL BE MAINTAINED UNTIL PERMANENT VEGETATION IS ESTABLISHED OR UNTIL THE ENGINEER DETERMINES THAT THE BMP IS NO LONGER REQUIRED.

INDEX OF SECTION 2 DRAWINGS

- GENERAL NOTES AND PROJECT CONTACTS
- PROJECT OVERVIEW
- TYPICAL EXISTING SECTIONS
- TYPICAL FINISHED SECTIONS
- CONSTRUCTION DETAILS
- PLAN DETAILS
- PERMANENT SIGNING
- PAVEMENT MARKING
- SIGNAGE PLANS
- TRAFFIC CONTROL
- MISCELLANEOUS QUANTITIES

STANDARD ABBREVIATIONS

A.D.T.	AVERAGE DAILY TRAFFIC	P.C.	POINT OF CURVATURE
AC.	ACRE(S)	P.I.	POINT OF INTERSECTION
ASPH.	ASPHALT	P.L.	PROPERTY LINE
BM	BENCH MARK	P.R.C.	POINT OF REVERSE CURVATURE
C & G	CURB & GUTTER	P.T.	POINT OF TANGENCY
CB	CATCH BASIN	PAV'T.	PAVEMENT
C.S.C.P.	CORRUGATED STEEL CULVERT PIPE	R	RADIUS
C.Y.	CUBIC YARDS	C.P.R.C.	CULVERT PIPE REINFORCED CONCRETE
CL	CENTERLINE	RHF	RIGHT HAND FORWARD
CO.	COUNTY	RT.	RIGHT
C.T.H.	COUNTY TRUNK HIGHWAY	R/W	RIGHT OF WAY
CWT.	HUNDREDWEIGHT	S	SOUTH
D	DEGREE OF CURVE	SAN	SANITARY
D.H.V.	DESIGN HOURLY VOLUME	S.B.	SOUTHBOUND
DISCH.	DISCHARGE	S.D.D.	STANDARD DETAIL DRAWING
E	EAST	S.F.	SQUARE FEET
EA.	EACH	S.S.P.R.C.	STORM SEWER PIPE REINFORCED CONCRETE
E.B.	EASTBOUND	STA.	STATION
ESALS	EQUIVALENT SINGLE AXLE LOADS	S.Y.	SQUARE YARDS
ESMT.	EASEMENT	T	TANGENT
F.E.	FIELD ENTRANCE	T	TELEPHONE
FT.	FOOT (FEET)	T.L.E.	TEMPORARY LIMITED EASEMENT
G	GAS	VAR.	VARIES
I.P.	IRON PIPE	V.P.C.	VERTICAL POINT OF CURVATURE
K	RATE OF VERTICAL CURVATURE	V.P.I.	VERTICAL POINT OF INTERSECTION
L	LENGTH	V.P.T.	VERTICAL POINT OF TANGENCY
LB.	POUND(S)	W	WATER MAIN
L.F.	LINEAR FEET	W	WEST
LHF	LEFT HAND FORWARD	W.B.	WESTBOUND
LS	LUMP SUM	WV	WATER VALVE
LT.	LEFT	YD.	YARDS
MH	MANHOLE		
N	NORTH		
N.B.	NORTHBOUND		
NO.	NUMBER		

UTILITIES CONTACTS

COMMUNICATIONS:

AT&T  
2005 PEWAUKEE ROAD  
WAUKESHA, WI 53188  
TOM CROWLEY  
PHONE: (262) 896-7427  
[tc1657@att.com](mailto:tc1657@att.com)

LEVEL 3 COMMUNICATIONS  
3235 INTERTECH DRIVE, SUITE 600  
BROOKFIELD, WI 53045-5140  
BRAHIM GADDOUR  
UTILITY COORDINATOR  
PHONE: (414) 908-1072  
[brahim.gaddour@vel3.com](mailto:brahim.gaddour@vel3.com)

CHARTER COMMUNICATIONS  
1320 N. DR. MARTIN LUTHER KING JR. DR.  
MILWAUKEE, WI 53212-3980  
STEVE CRAMER  
UTILITY COORDINATOR  
PHONE: (414) 277-4045

WE-ENERGIES:

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DELAFIELD, WI 53018  
ERIC KICKHAVER  
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[eric.kickhaver@we-energies.com](mailto:eric.kickhaver@we-energies.com)

GAS  
S13 W33800 HWY 18  
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JACOB SPENCER  
PHONE: (262) 968-7009  
[jacob.spencer@we-energies.com](mailto:jacob.spencer@we-energies.com)

NEW BERLIN:

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JIM HART  
UTILITY MANAGER  
PHONE: (262) 786-7086  
[nbutilities@newberlin.org](mailto:nbutilities@newberlin.org)

WDNR LIAISON

141 NW BARSTOW ROOM 180  
WAUKESHA, WI 53188  
MR. CRAIG WEBSTER  
ENVIRONMENTAL COORDINATOR - SOUTHEAST  
REGION  
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[craig.webster@wisconsin.gov](mailto:craig.webster@wisconsin.gov)

SEWRPC LIAISON

W239N1812 ROCKWOOD DR.  
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WAUKESHA, WI 53187-1607  
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WISDOT LIAISON

141 NW BARSTOW ST.  
WAUKESHA, WI 53188  
MS. KATHY KRAMER  
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[kathleenl.kramer@dot.wi.gov](mailto:kathleenl.kramer@dot.wi.gov)

OTHER CONTACTS

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ENGINEERING SERVICES MANAGER  
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[kyanny@waukeshacounty.gov](mailto:kyanny@waukeshacounty.gov)

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[nbeth@waukeshacounty.gov](mailto:nbeth@waukeshacounty.gov)

WAUKESHA COUNTY - HIGHWAY OPERATIONS  
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WAUKESHA WI 53188

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MOBILE: (262) 424-9129  
[dbentfield@waukeshacounty.gov](mailto:dbentfield@waukeshacounty.gov)

MR. DAN MOUDRY  
PATROL SUPERINTENDANT  
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[dmoudry@waukeshacounty.gov](mailto:dmoudry@waukeshacounty.gov)

CITY OF NEW BERLIN  
3805 S CASPER DRIVE  
NEW BERLIN, WI 53151

TAMMY SIMONSON - CITY ENGINEER  
WORK: (262) 754-1735  
[tsimonson@newberlin.org](mailto:tsimonson@newberlin.org)

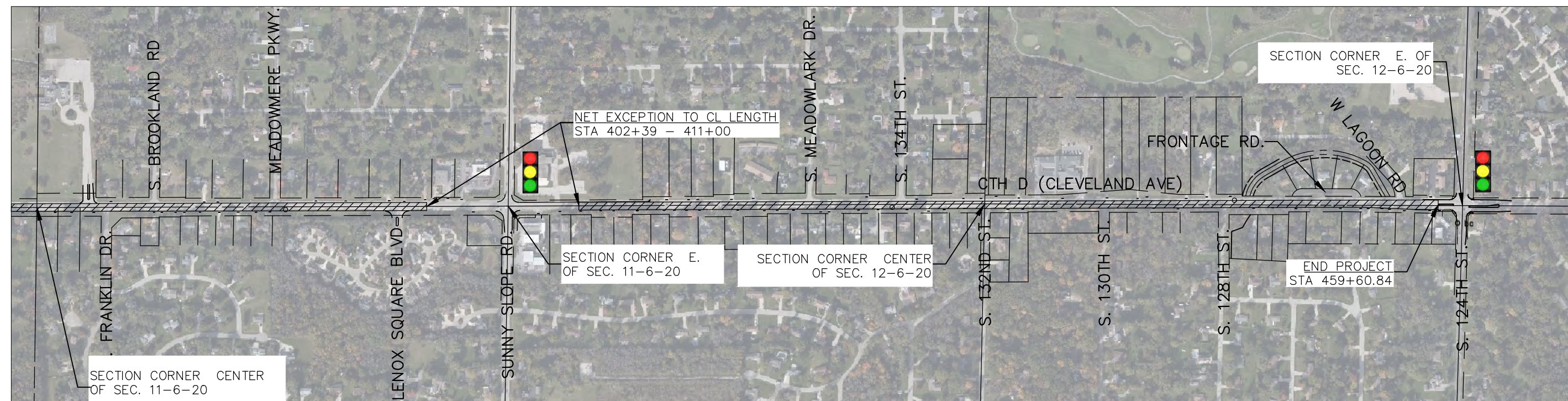
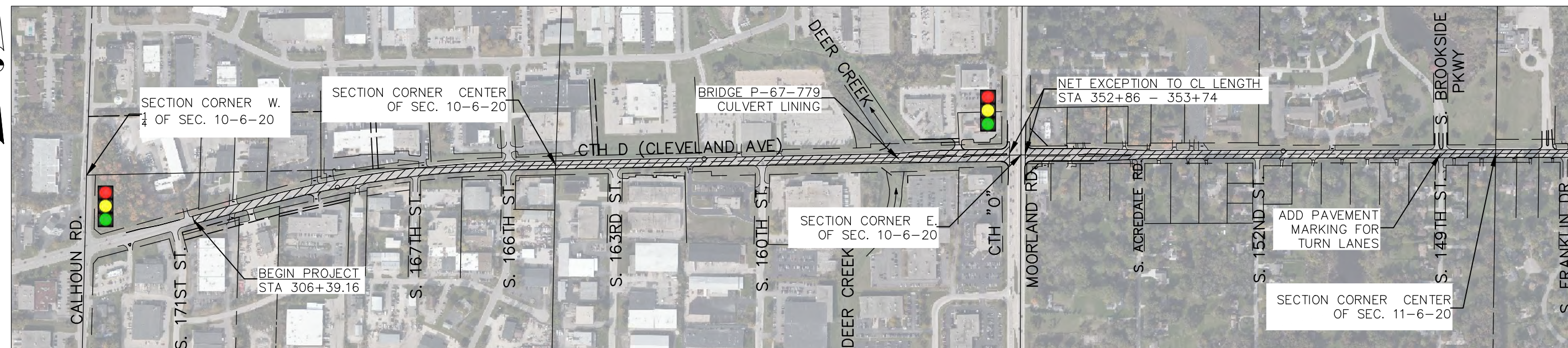
CITY OF WEST ALLIS - ENGINEERING  
7525 W GREENFIELD AVENUE, ROOM 212  
WEST ALLIS, WI 53214

PETER DANIELS - CITY ENGINEER  
WORK: (414) 302-8360  
[pdaniels@westalliswi.gov](mailto:pdaniels@westalliswi.gov)



Dial 811 or (800) 242-8511  
[www.DiggersHotline.com](http://www.DiggersHotline.com)



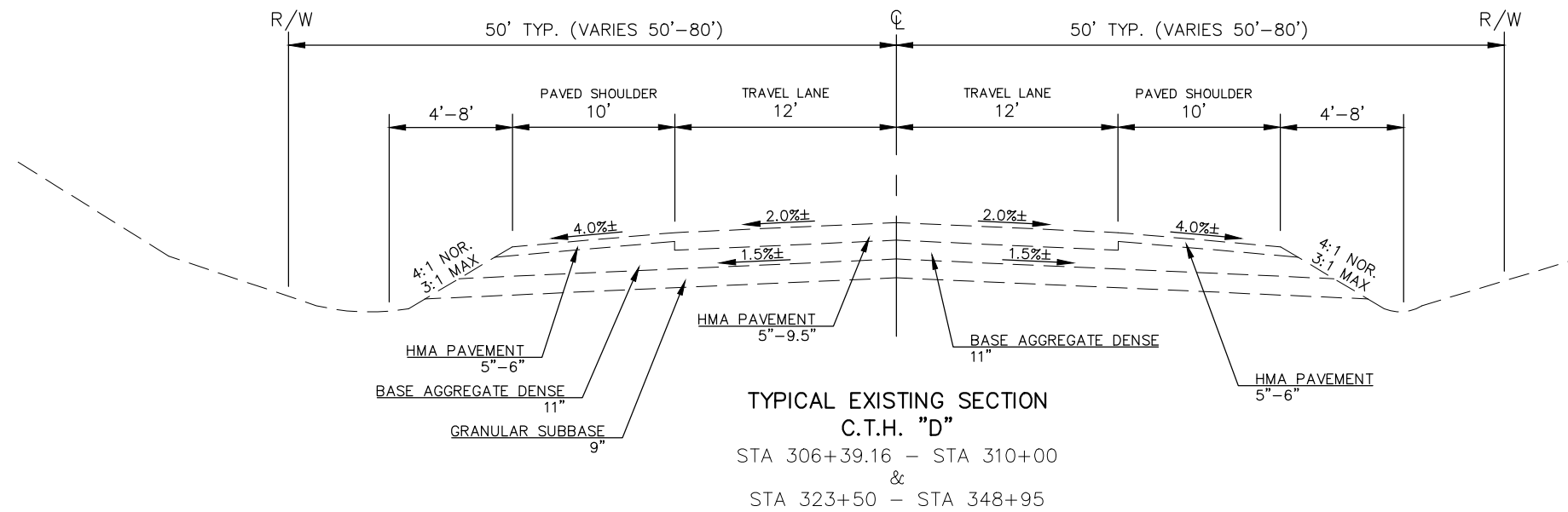
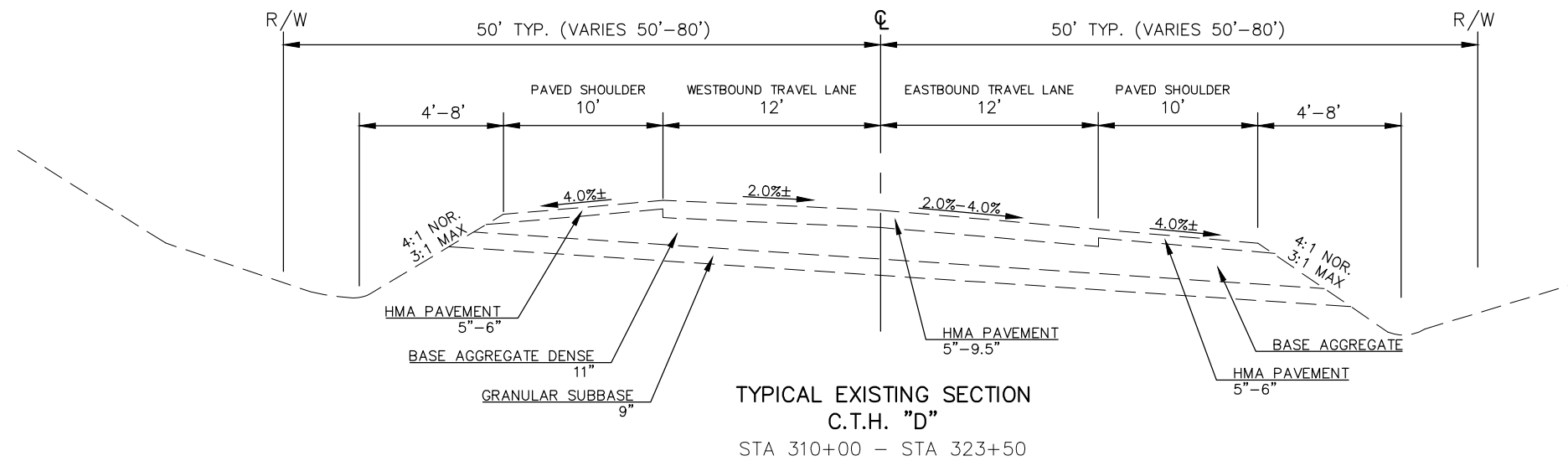


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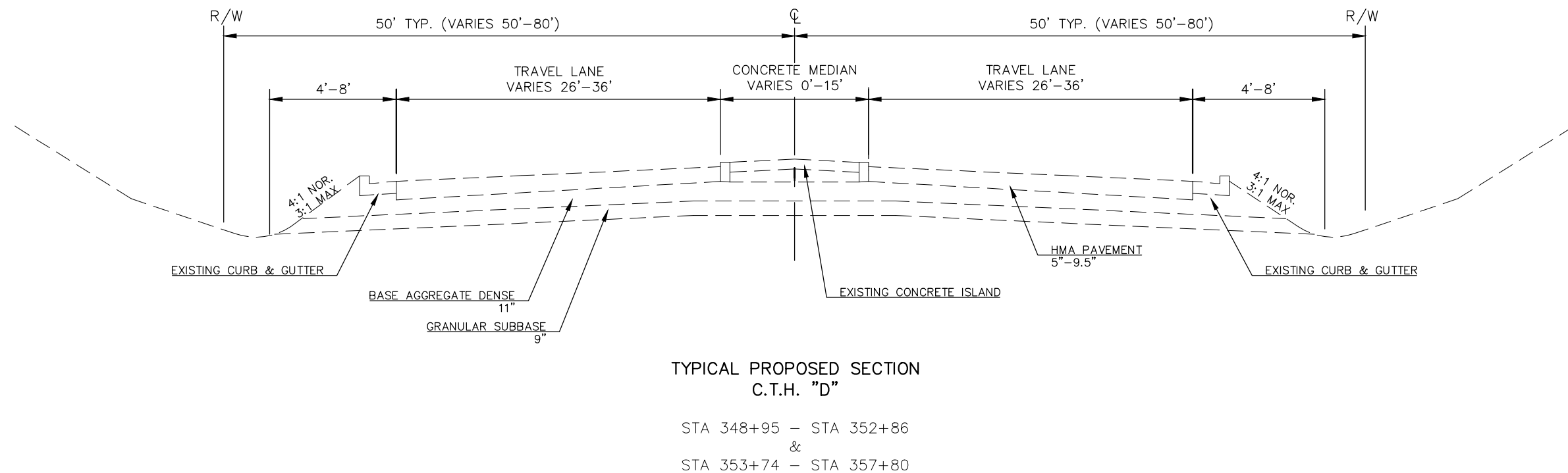
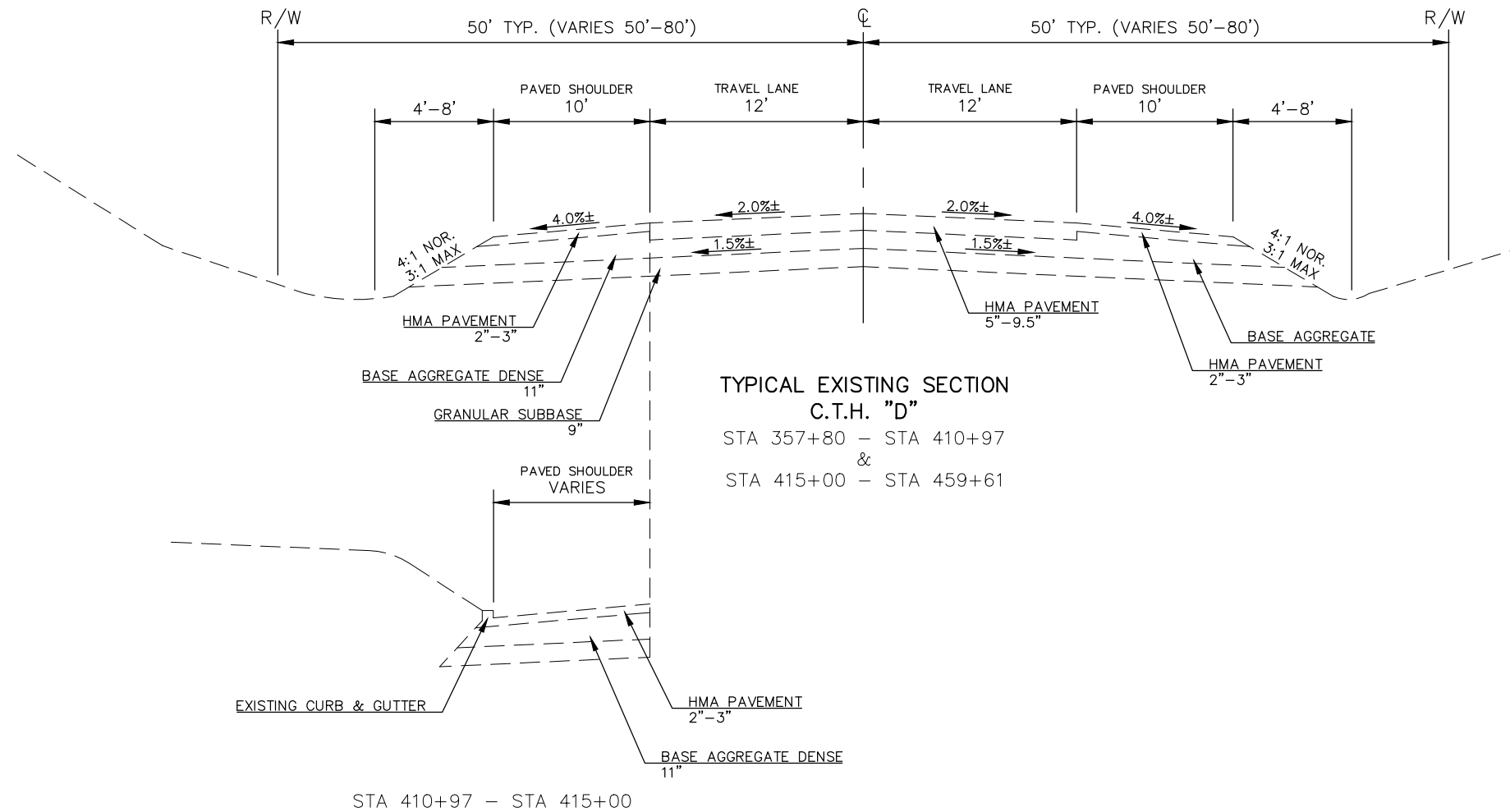


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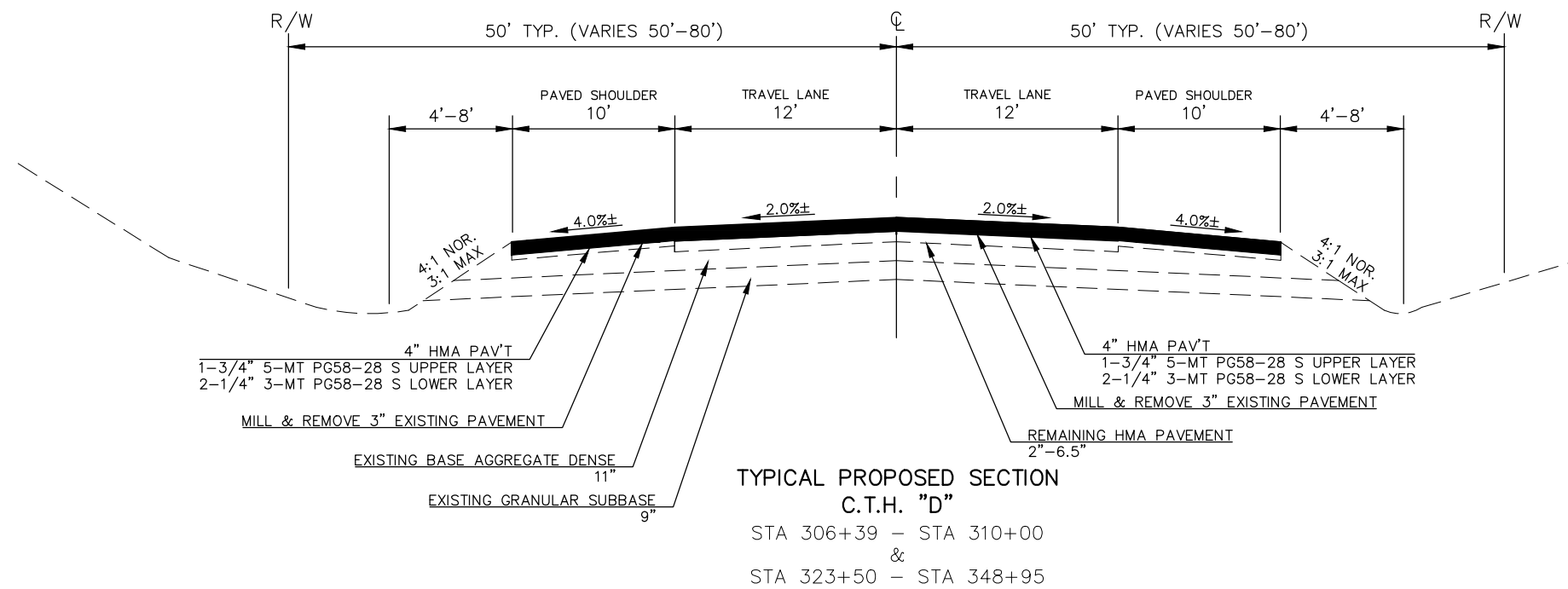
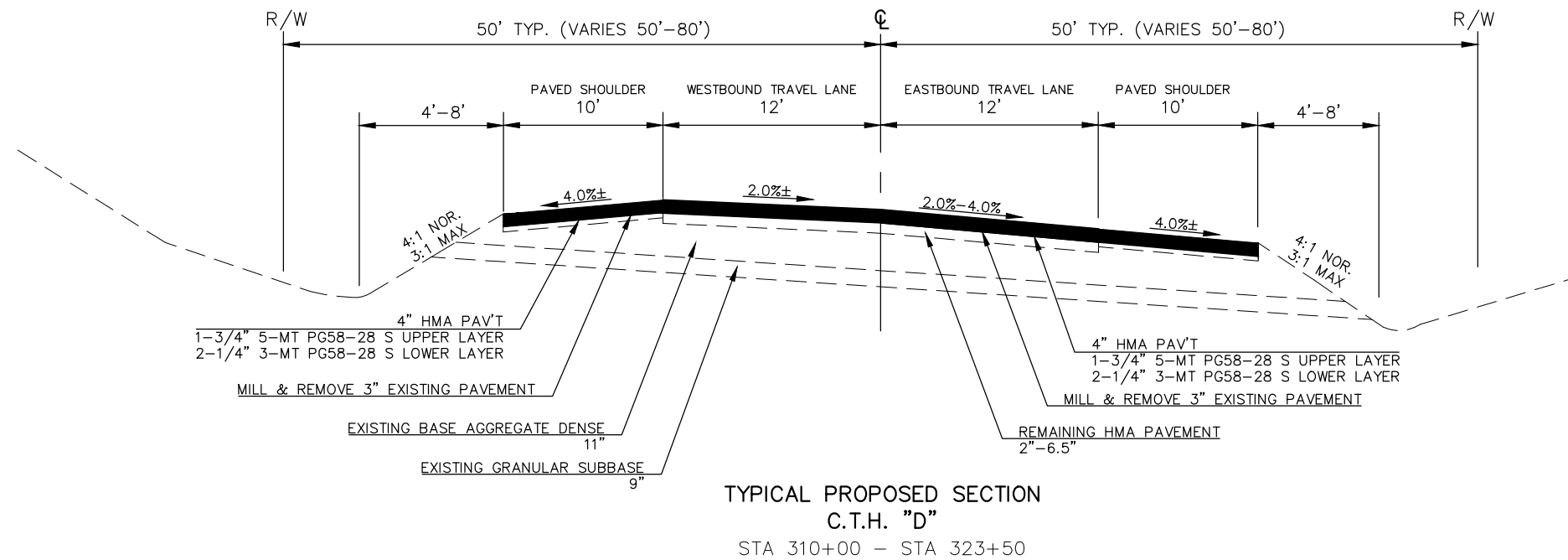




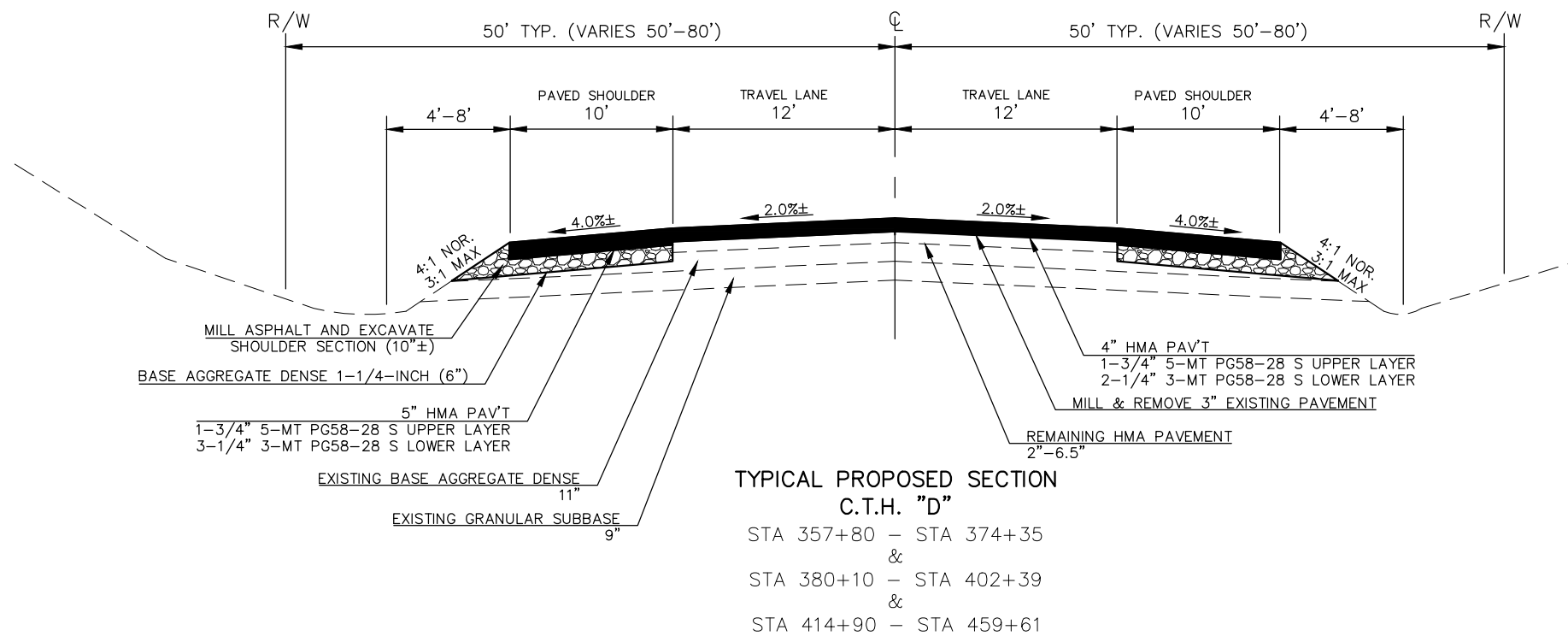
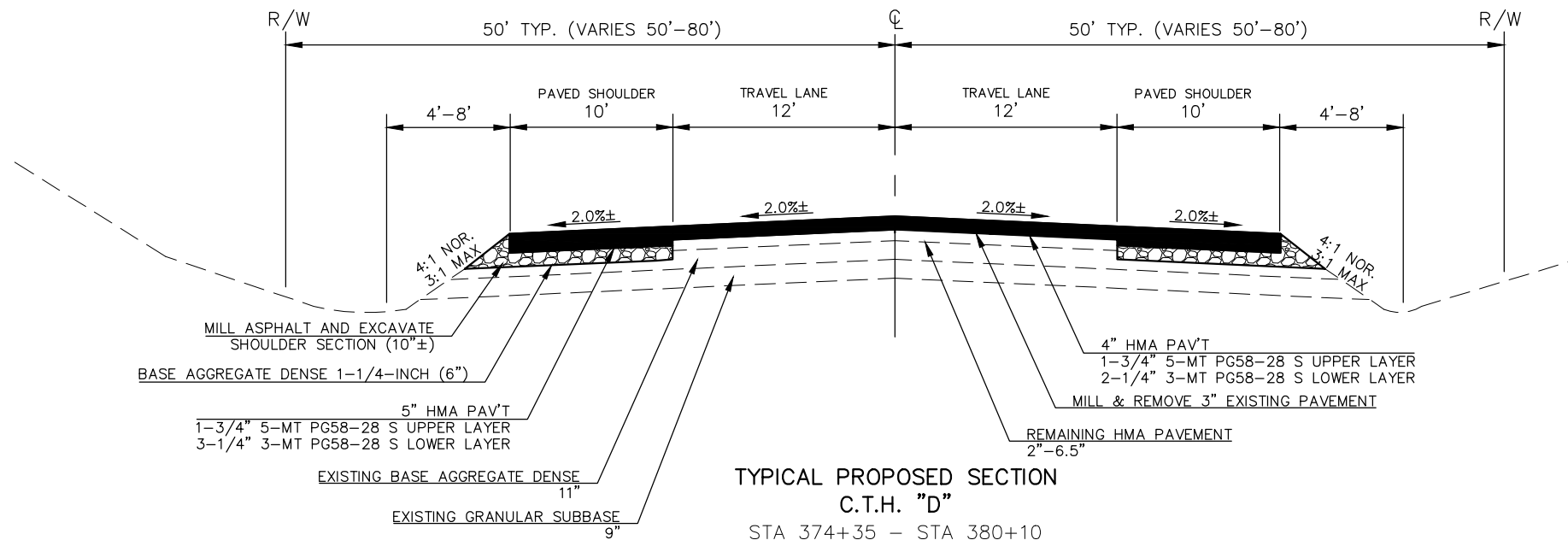




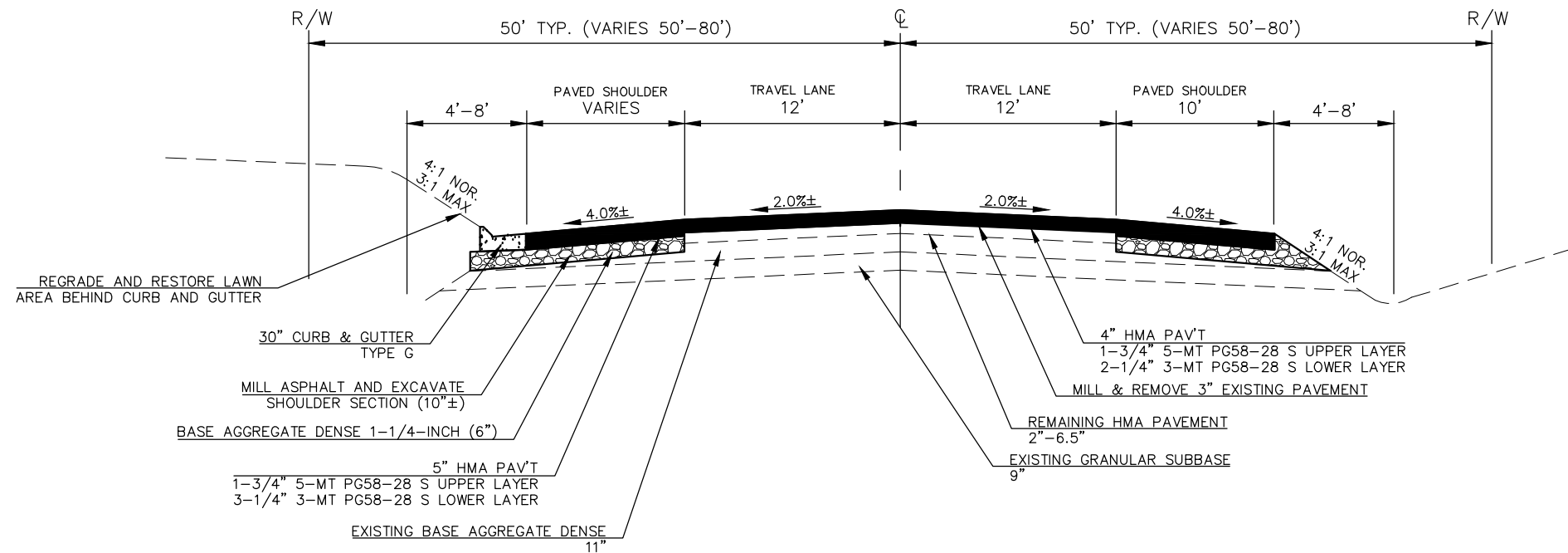






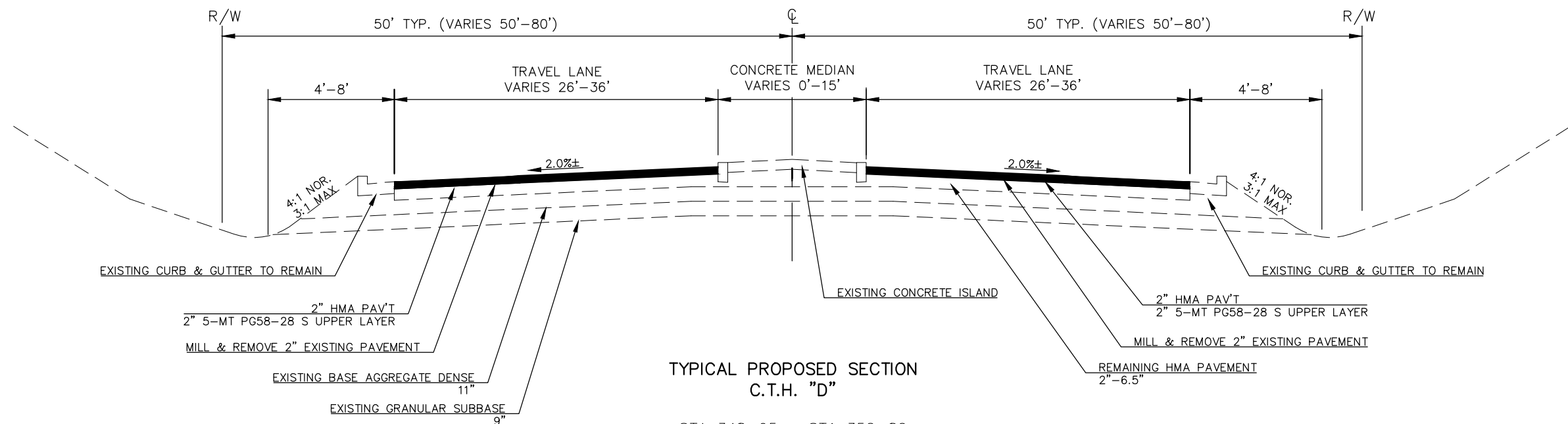






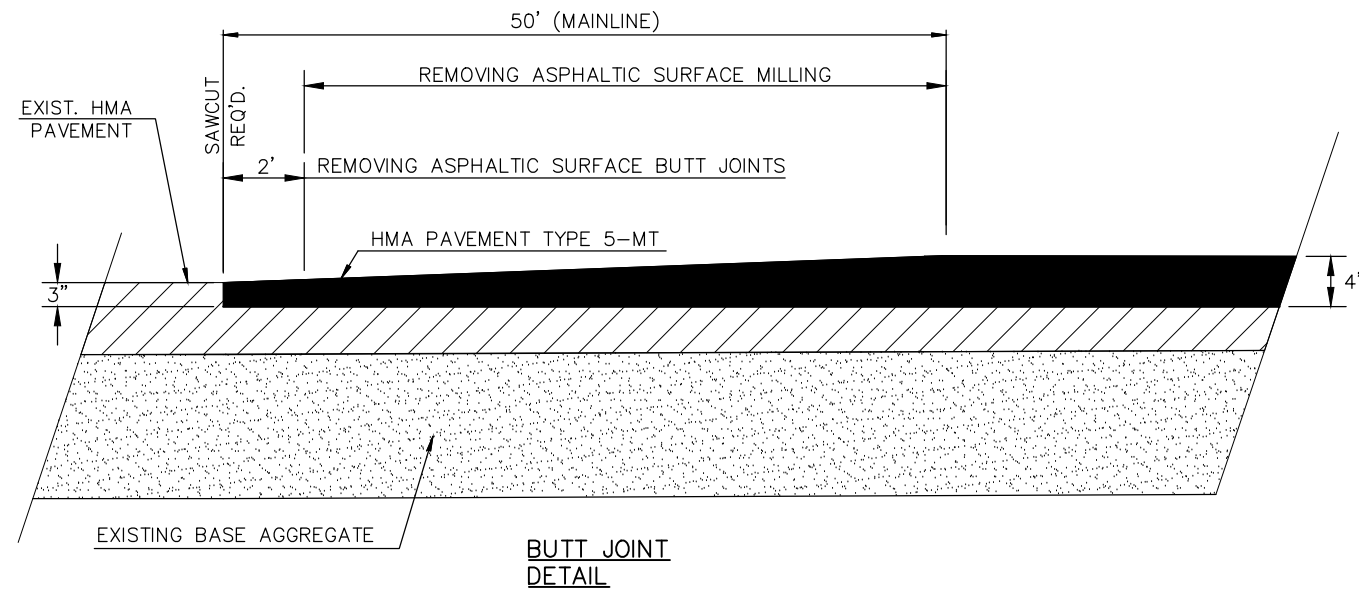
TYPICAL PROPOSED SECTION  
C.T.H. "D"

STA 411+00 - STA 414+90

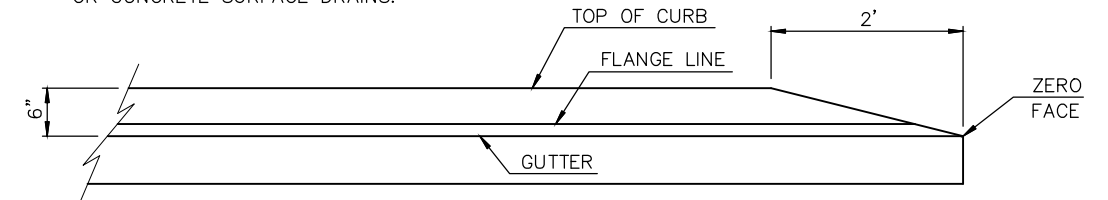


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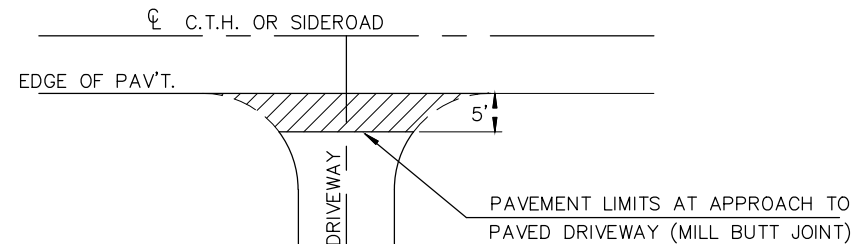
STA 348+95 - STA 352+86  
&  
STA 353+74 - STA 357+80



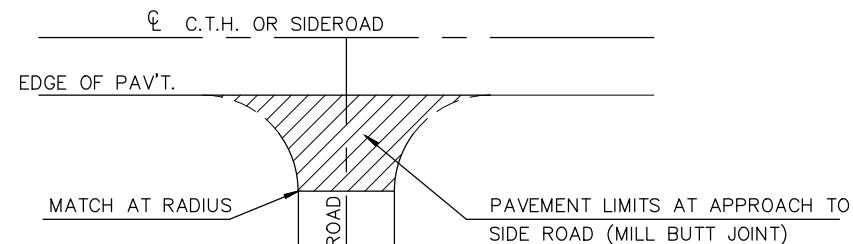
NOTE: TO BE USED AT ALL TERMINI OF CURB AND GUTTER WHERE NOT ABUTTING EXISTING CURB AND GUTTER OR CONCRETE SURFACE DRAINS.



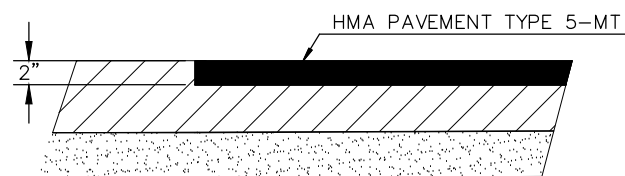
CURB AND GUTTER TERMINAL SECTION



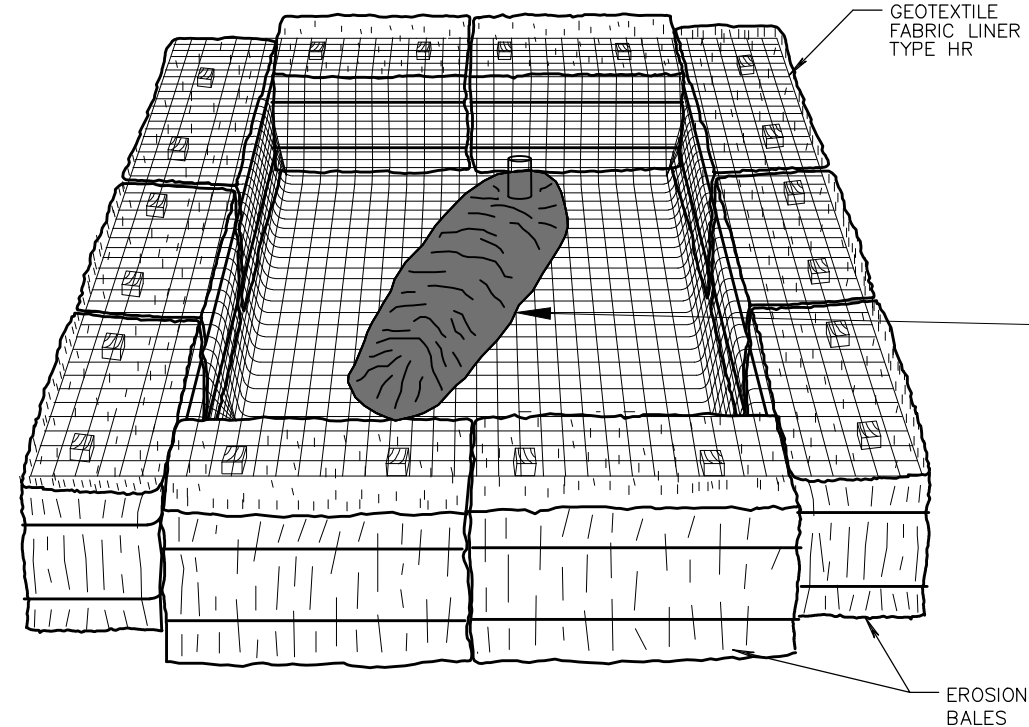
PLAN VIEW  
RURAL DRIVEWAY INTERSECTION  
DETAIL



PLAN VIEW  
RURAL DRIVEWAY INTERSECTION  
DETAIL



INTERSECTION DETAIL



TEMPORARY SETTLING BASIN

(SIZE TO BE DETERMINED IN FIELD AS INDICATED BELOW:)

STORAGE VOLUME ( C.F.) = 16 X GPM (PUMP RATE)

EXAMPLE:  
CONTRACTOR INDICATES PUMP CAPABLE OF 50 GPM  
HEIGHT OF BALES = 1.5 FT.

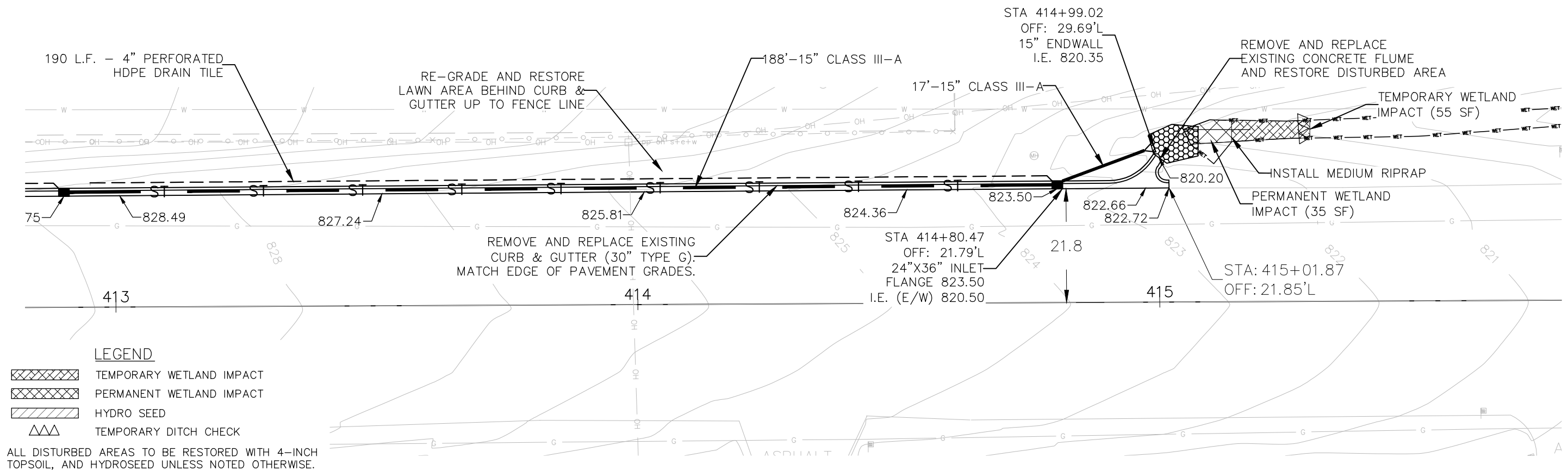
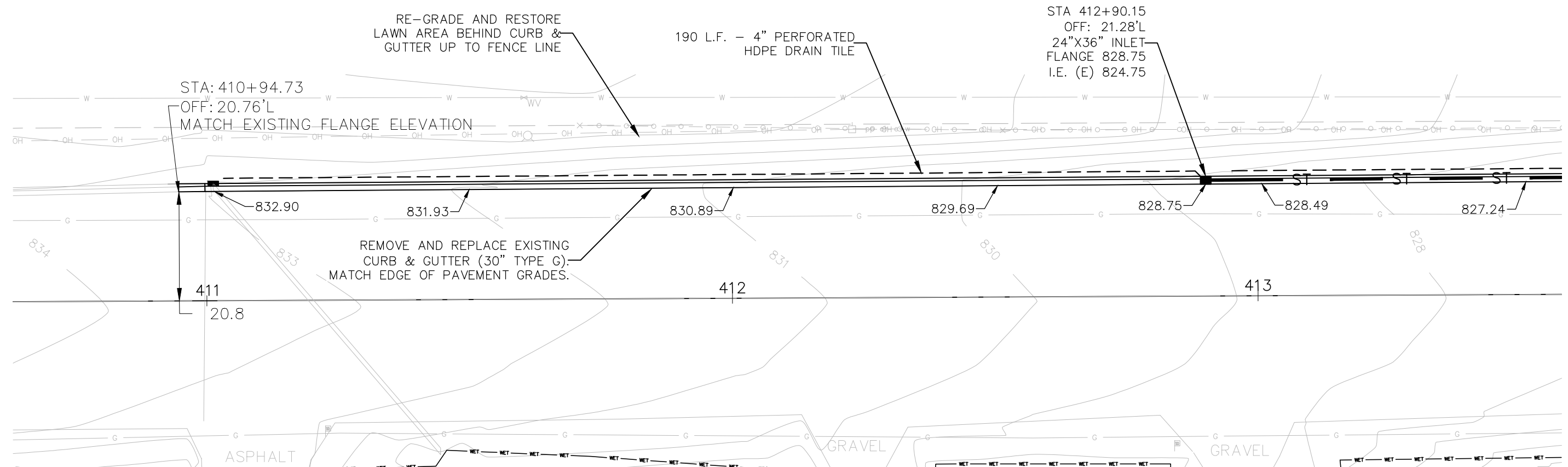
SOLUTION:  
SV ( C.F.) = 16 X 50  
SV = 800 C.F.



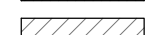
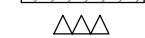
$\frac{800 \text{ C.F.}}{1.5 \text{ FT.}} = 533 \text{ S.F.}$

USE A 20 FT. X 27 FT. BASIN

CONTRACTOR TO PROVIDE A SEDIMENT BAG OR APPROVED EQUAL TO BE PLACED INSIDE OF BASIN. COST FOR ALL ITEMS ASSOCIATED WITH TEMPORARY SETTLING BASINS SHALL BE INCIDENTAL TO REMOVING OLD STRUCTURE ITEMS.

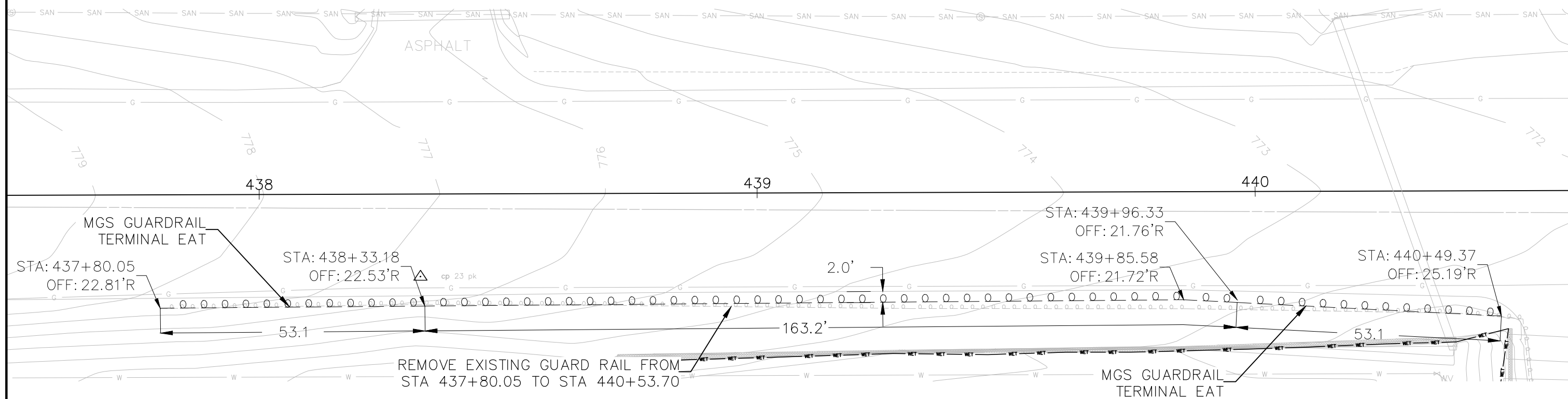
CONTRACTOR TO PROVIDE A SEDIMENT BAG OR APPROVED EQUAL TO BE PLACED INSIDE OF BASIN. THE COST OF ALL WORK AND MATERIALS TO CONSTRUCT THE SETTLING BASIN WILL BE PAID UNDER CONTRACT BID ITEMS EROSION BALES (EACH) AND GEOTEXTILE FABRIC TYPE HR (SY). SEDIMENT BAG AND DEWATERING IS INCIDENTAL TO THE BID ITEMS THE WORK IS ASSOCIATED WITH.

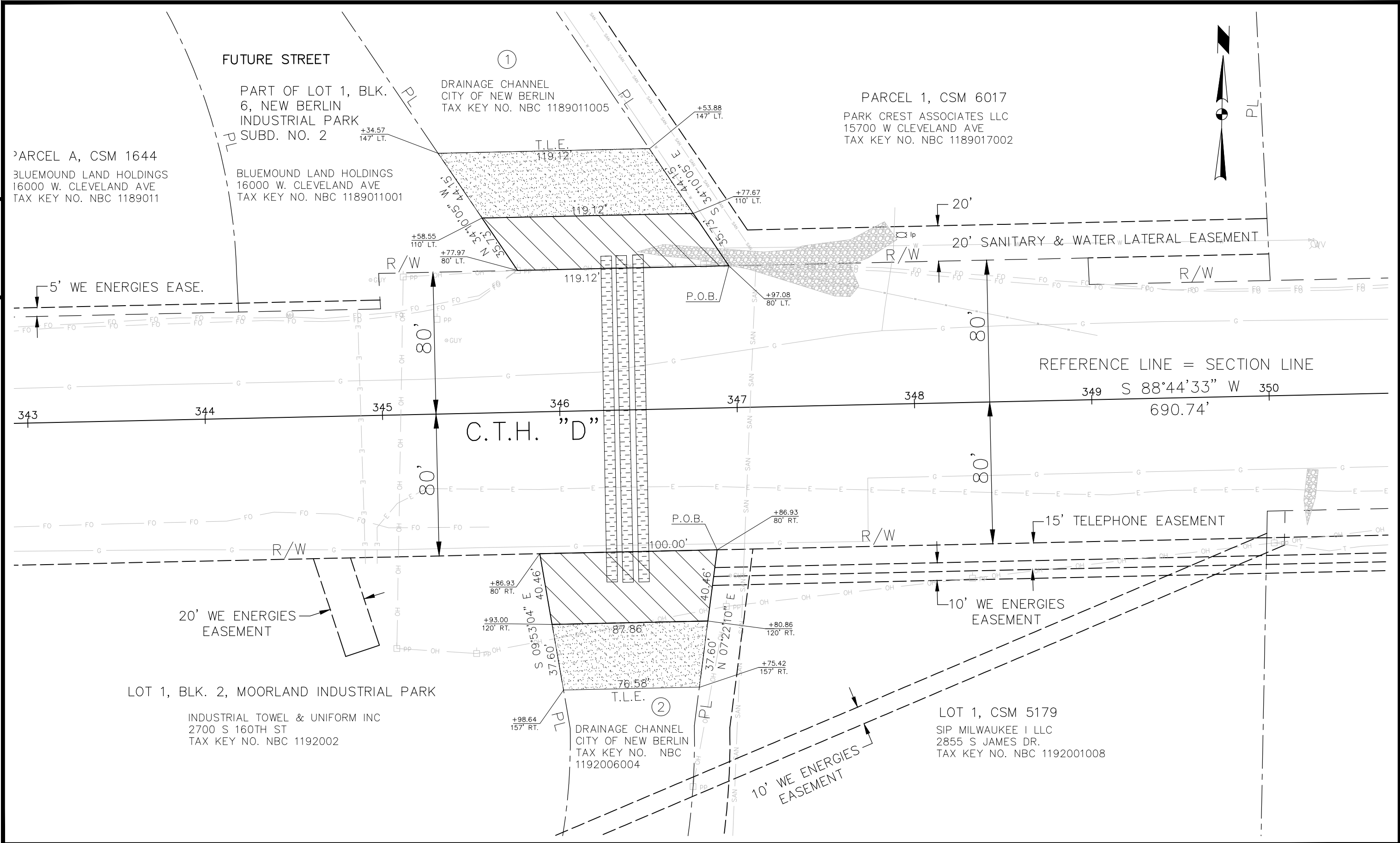
**LEGEND**

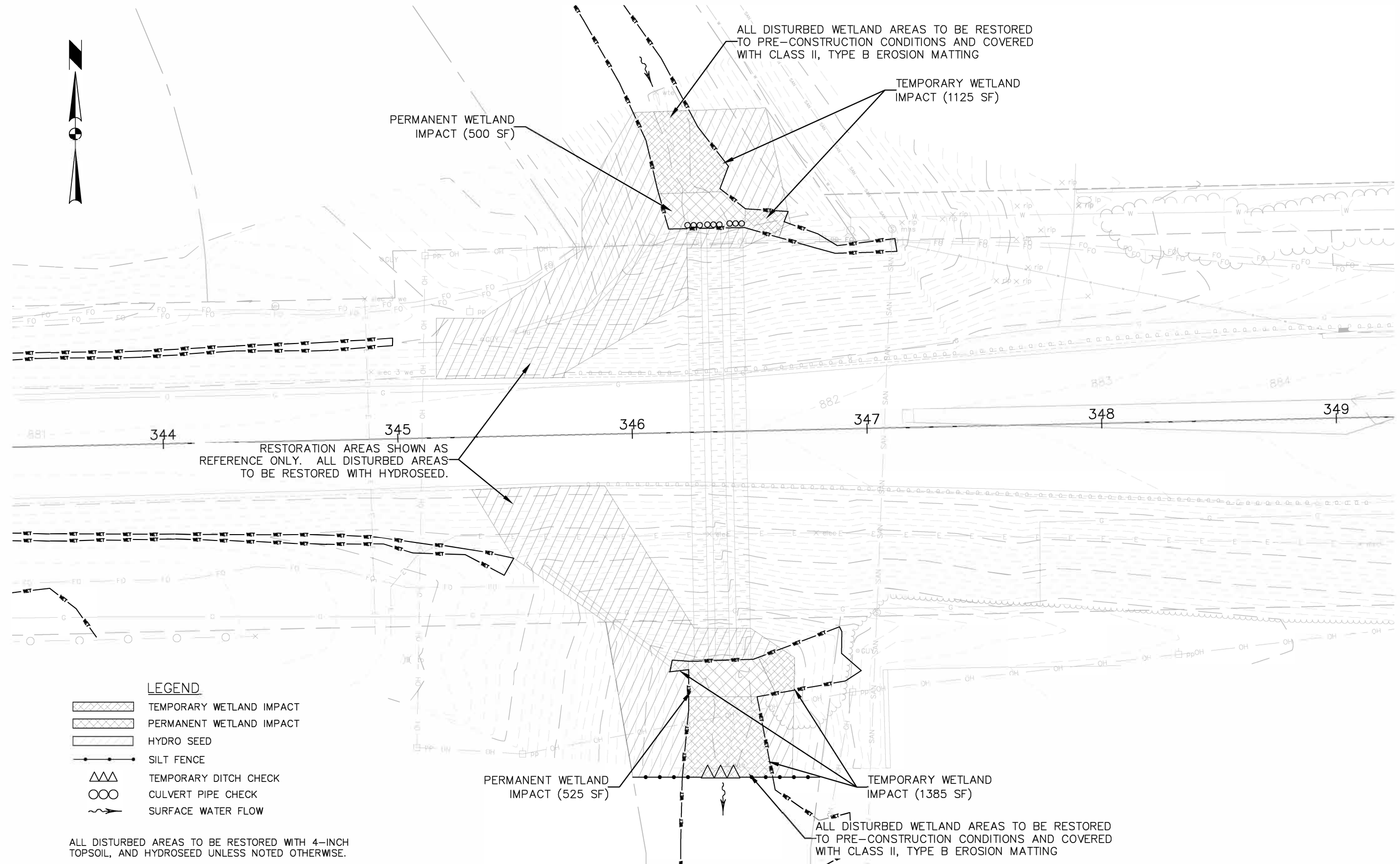
-  TEMPORARY WETLAND IMPACT
-  PERMANENT WETLAND IMPACT
-  HYDRO SEED
-  TEMPORARY DITCH CHECK

ALL DISTURBED AREAS TO BE RESTORED WITH 4-INCH TOPSOIL, AND HYDROSEED UNLESS NOTED OTHERWISE.

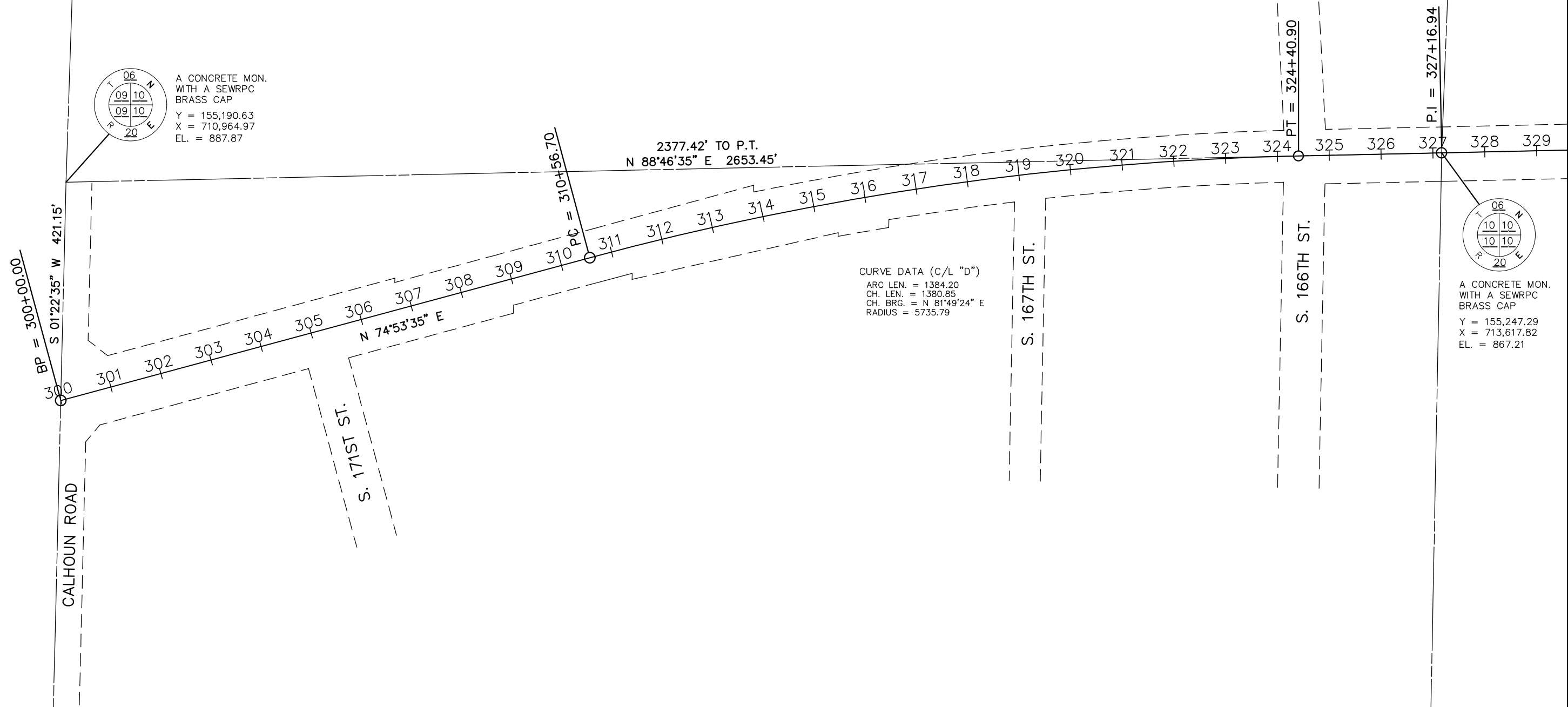


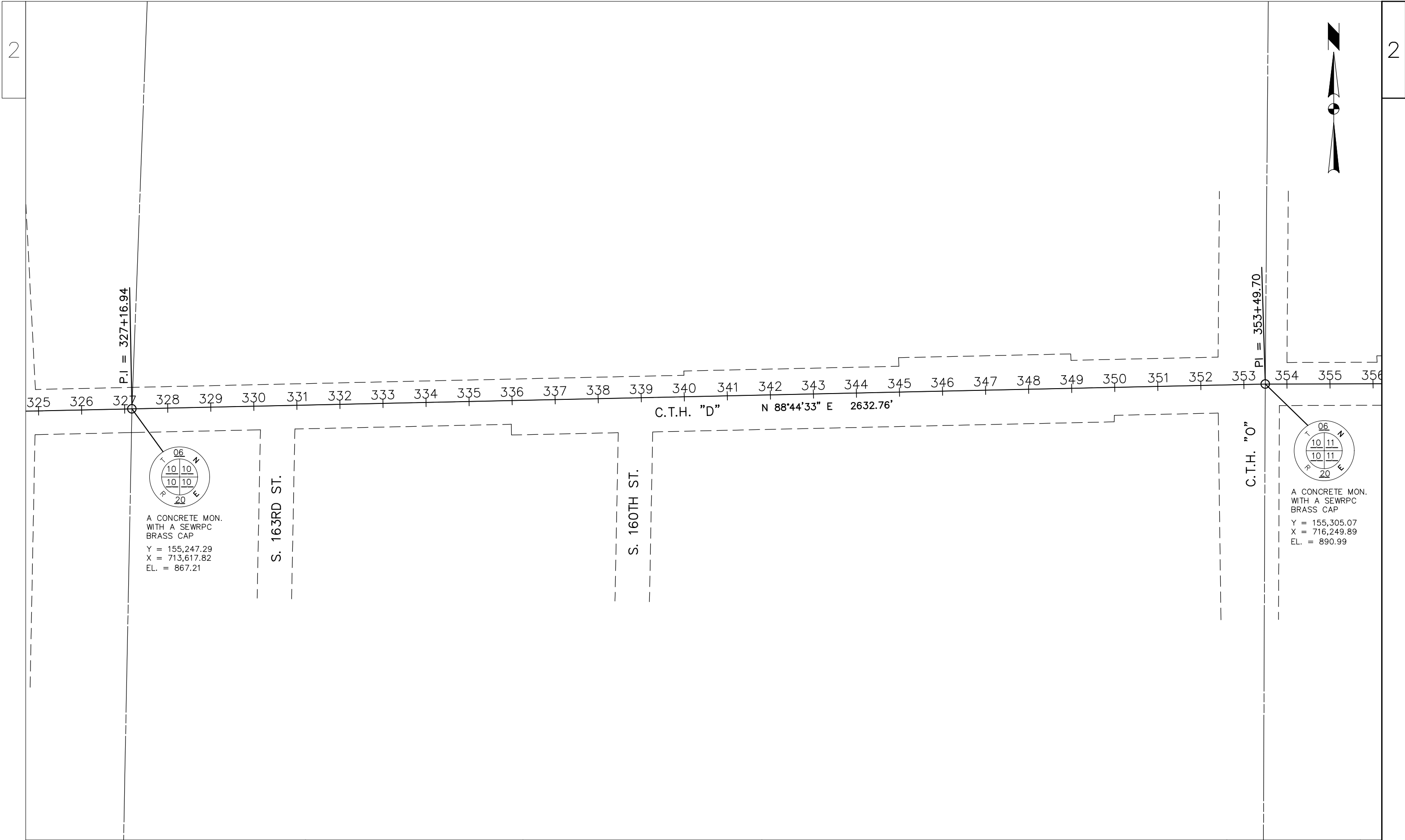


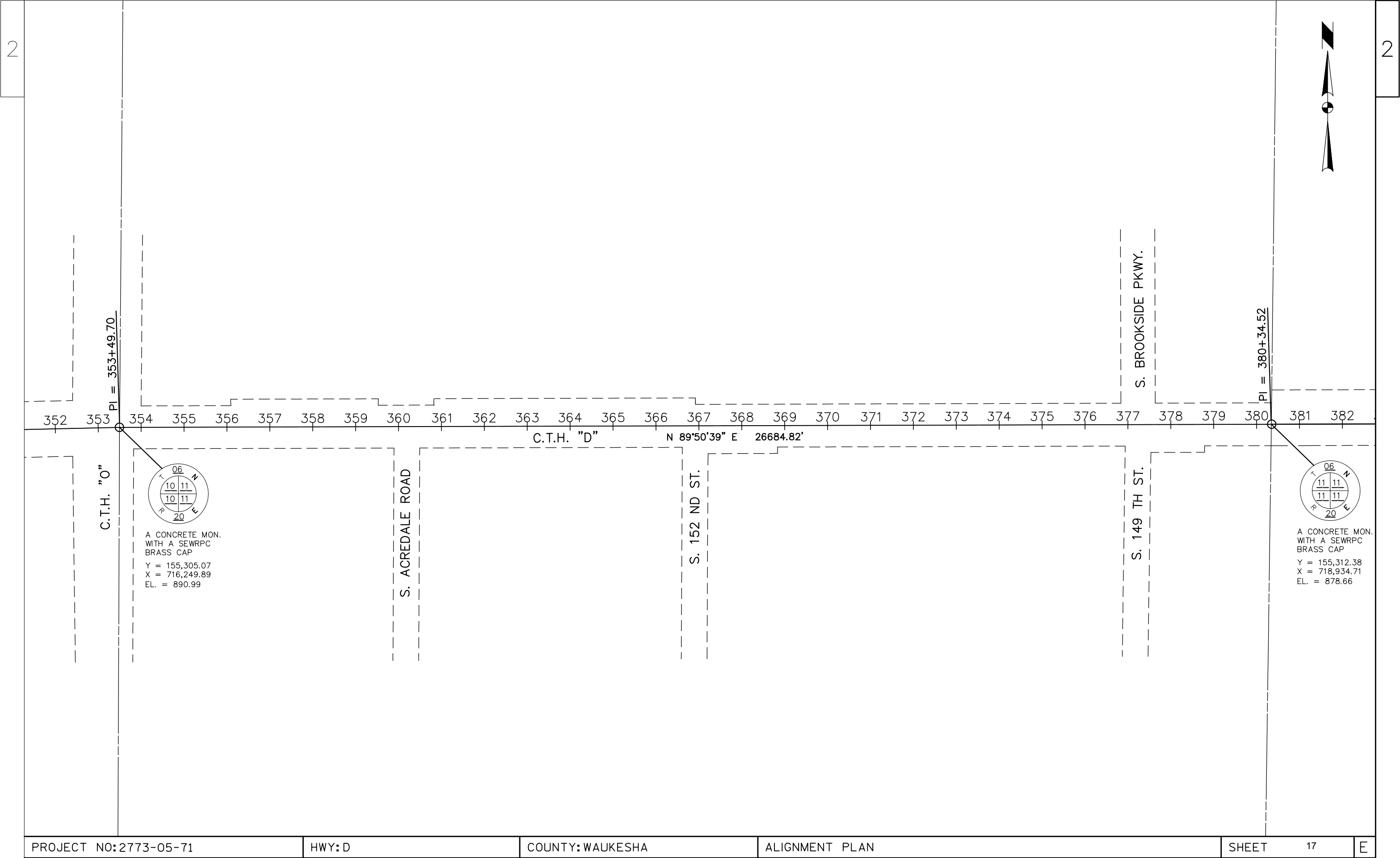




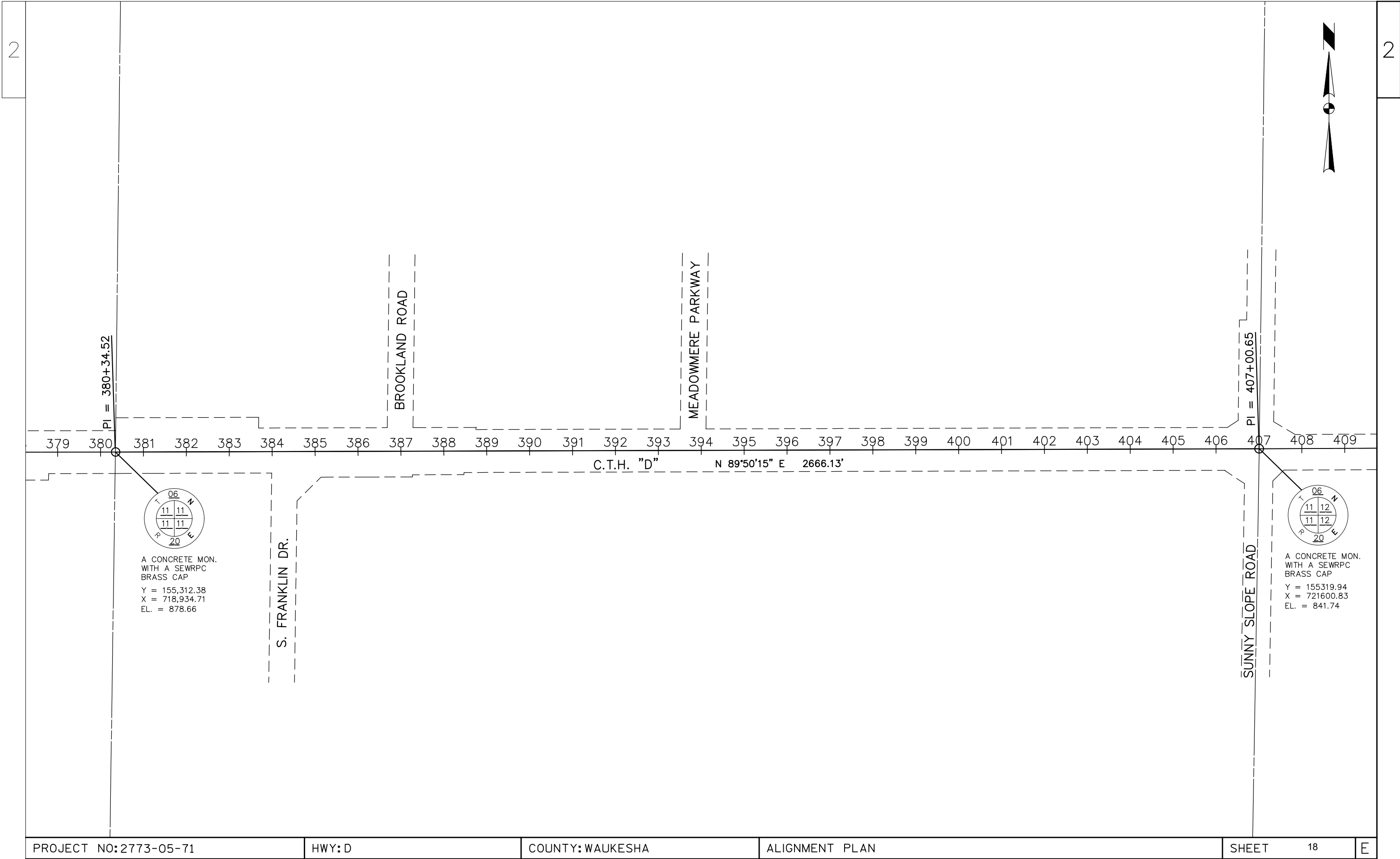




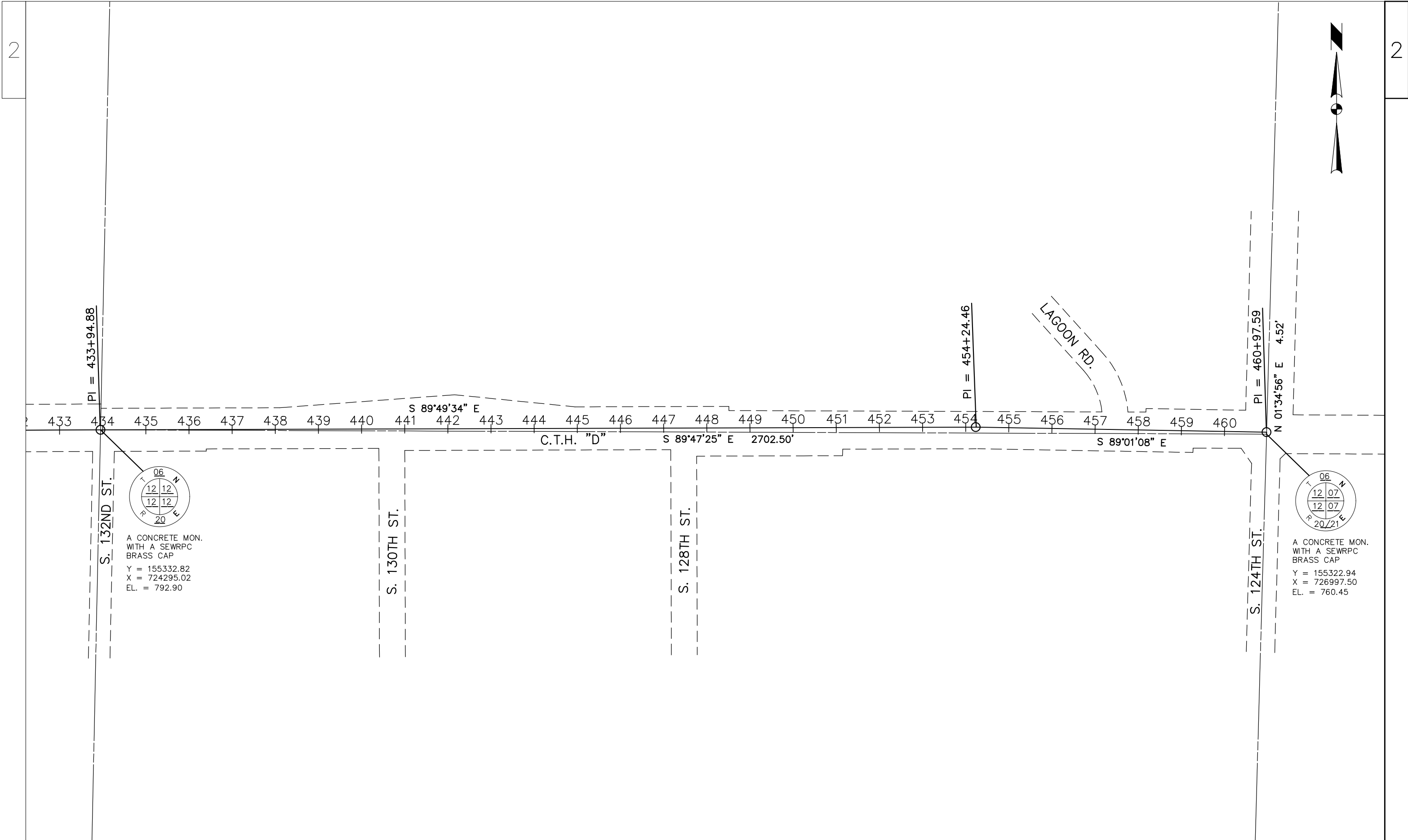


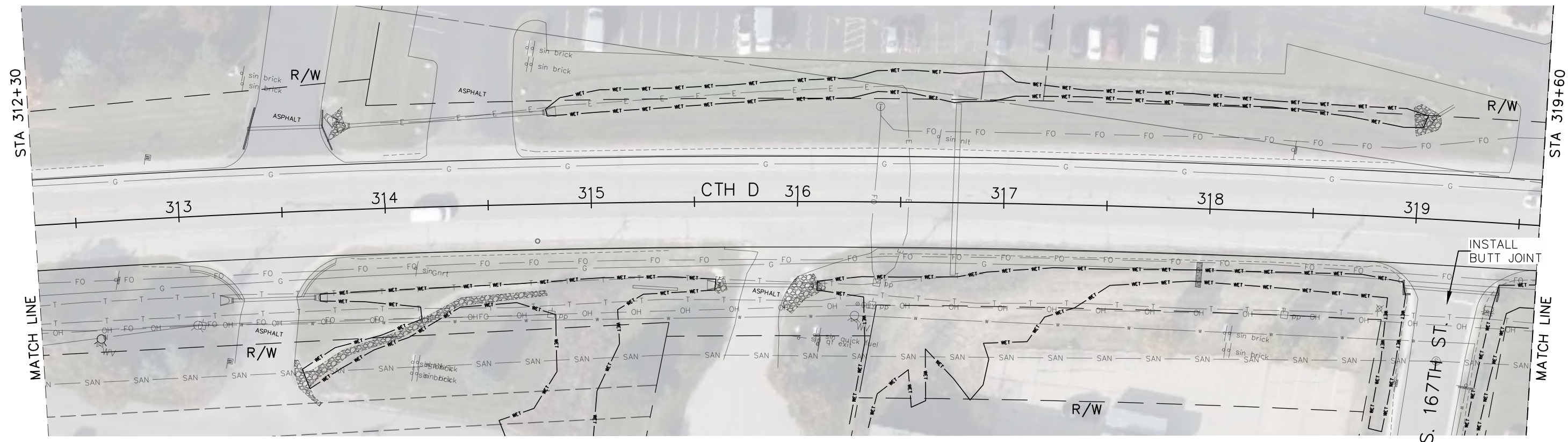
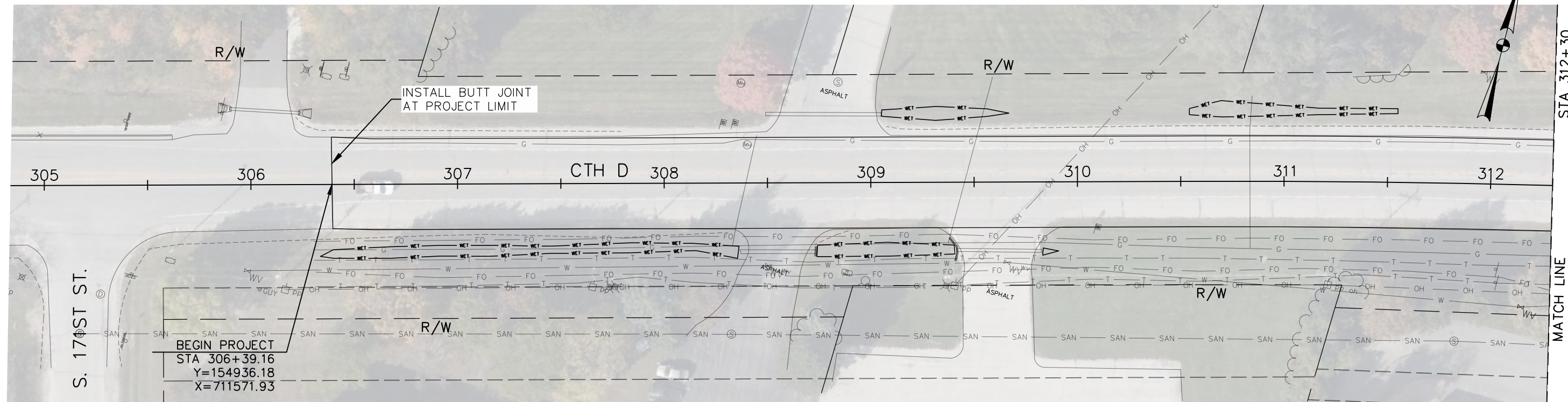




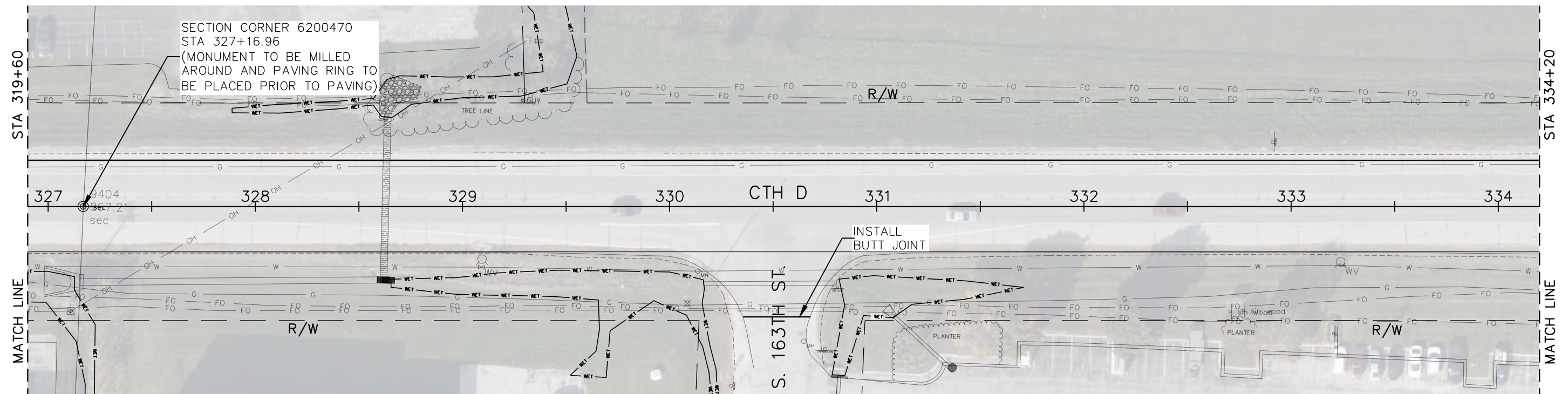
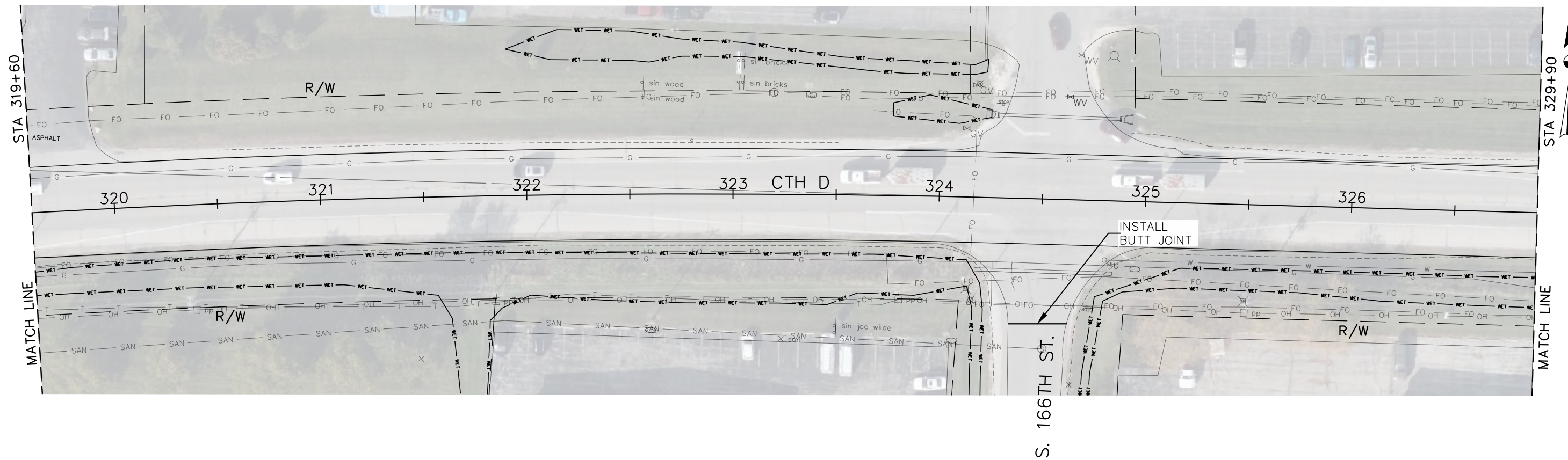


PROJECT NO:2773-05-71	HWY:D	COUNTY:WAUKESHA	ALIGNMENT PLAN	SHEET 18	E
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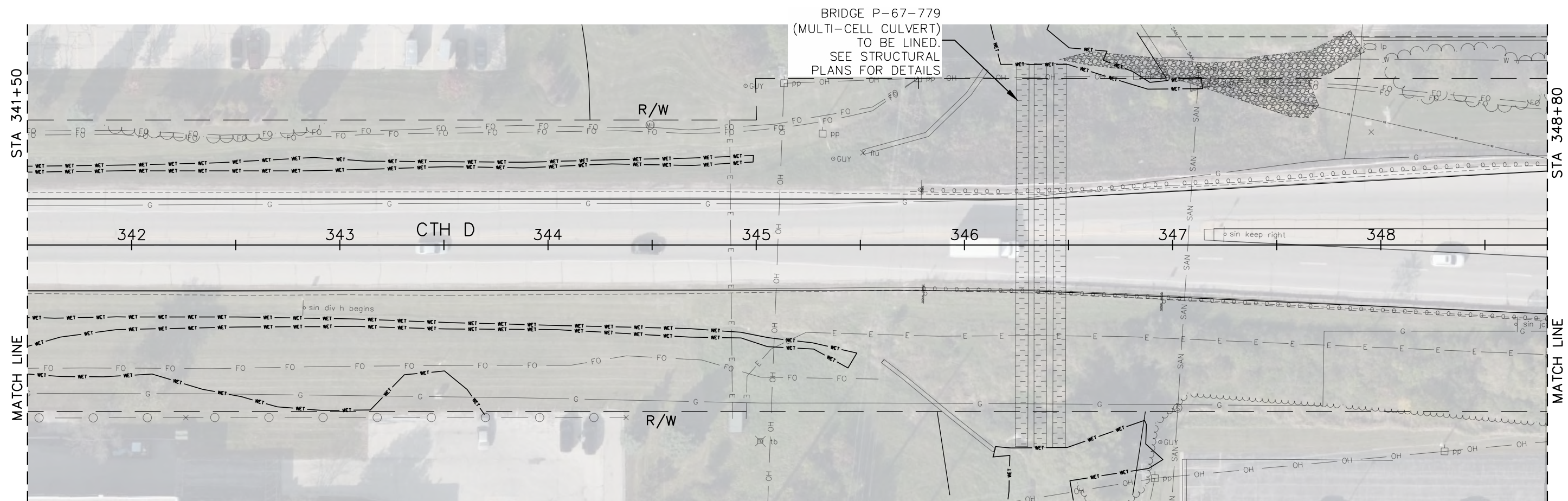
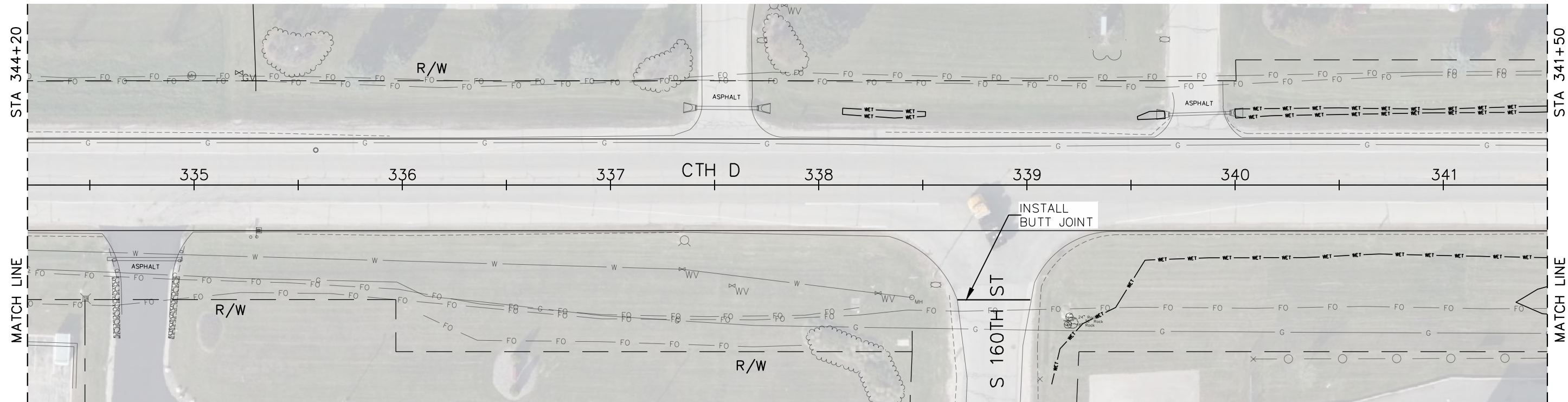




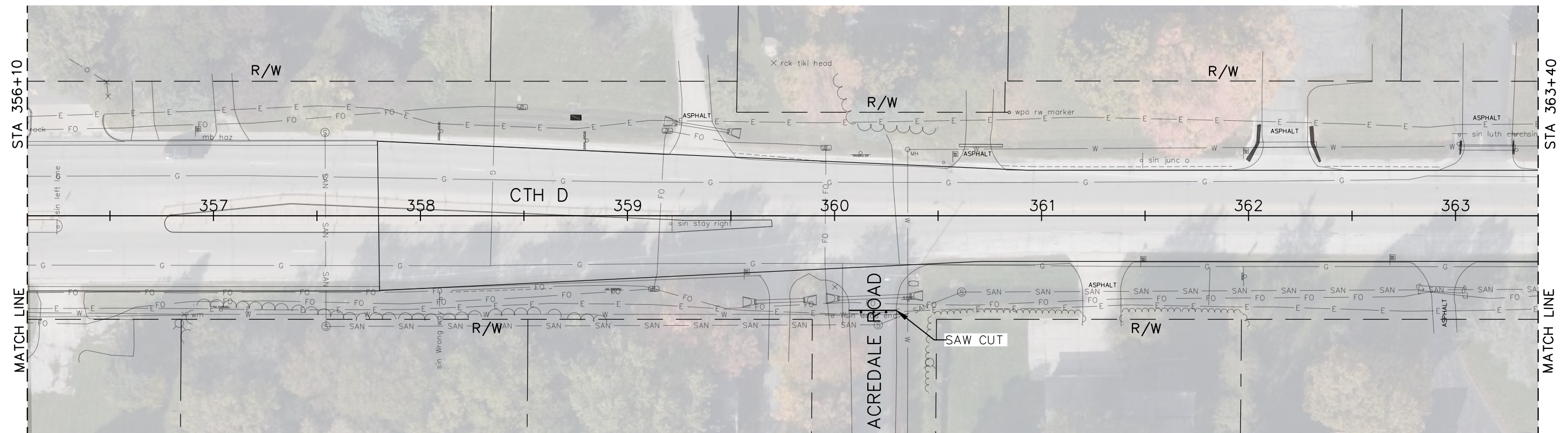
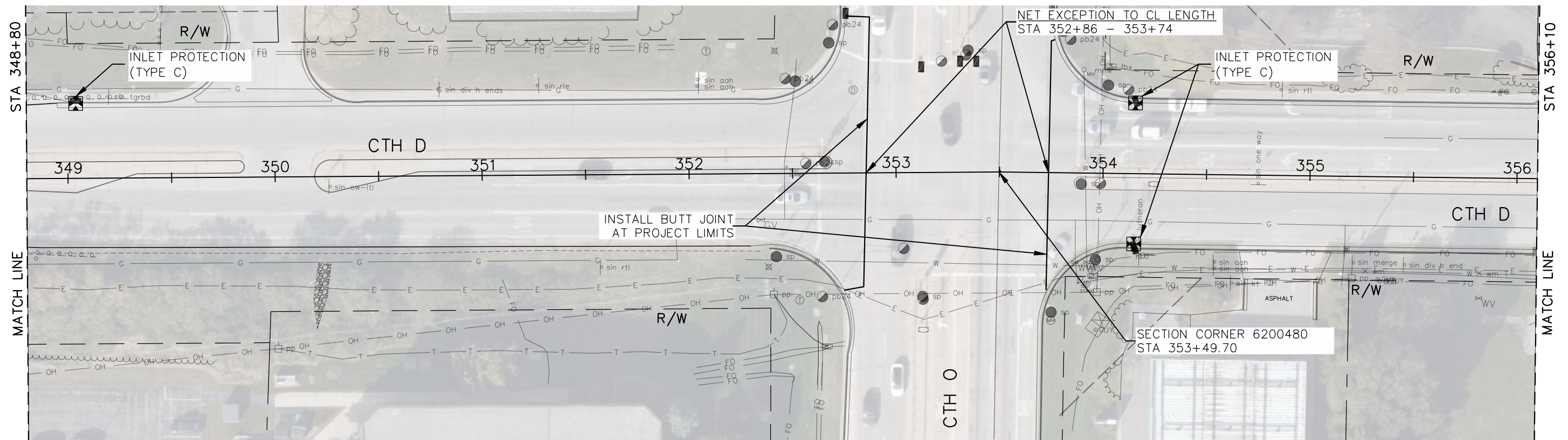




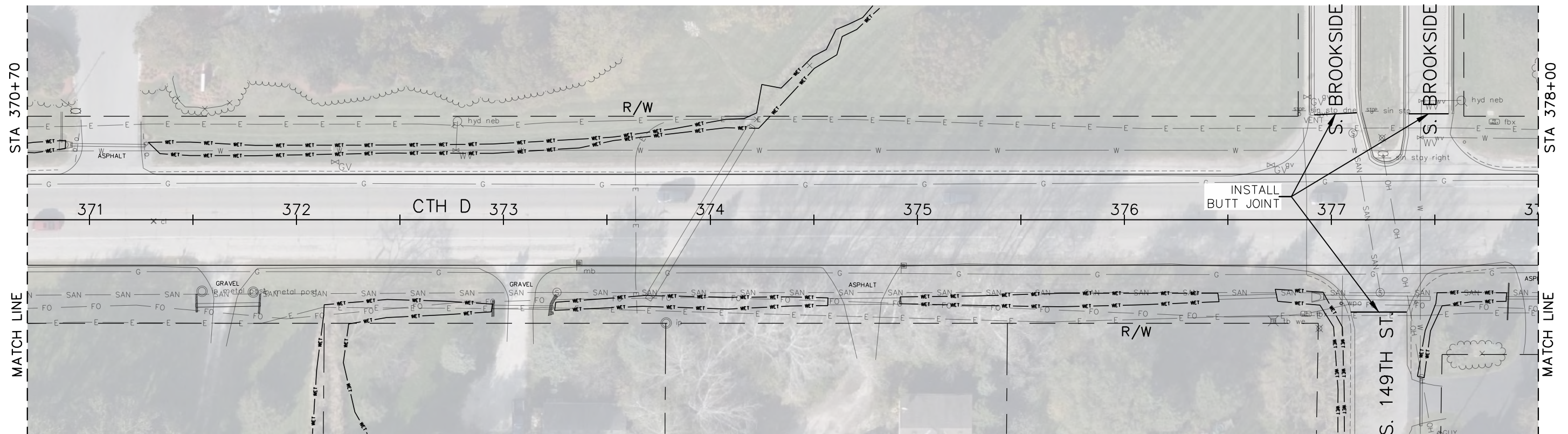
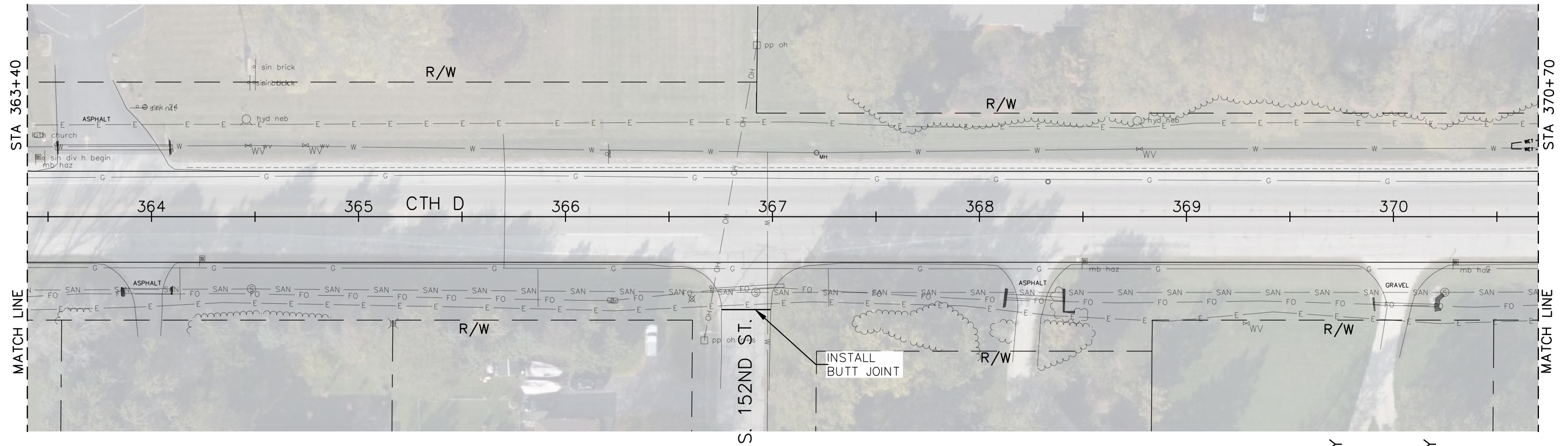




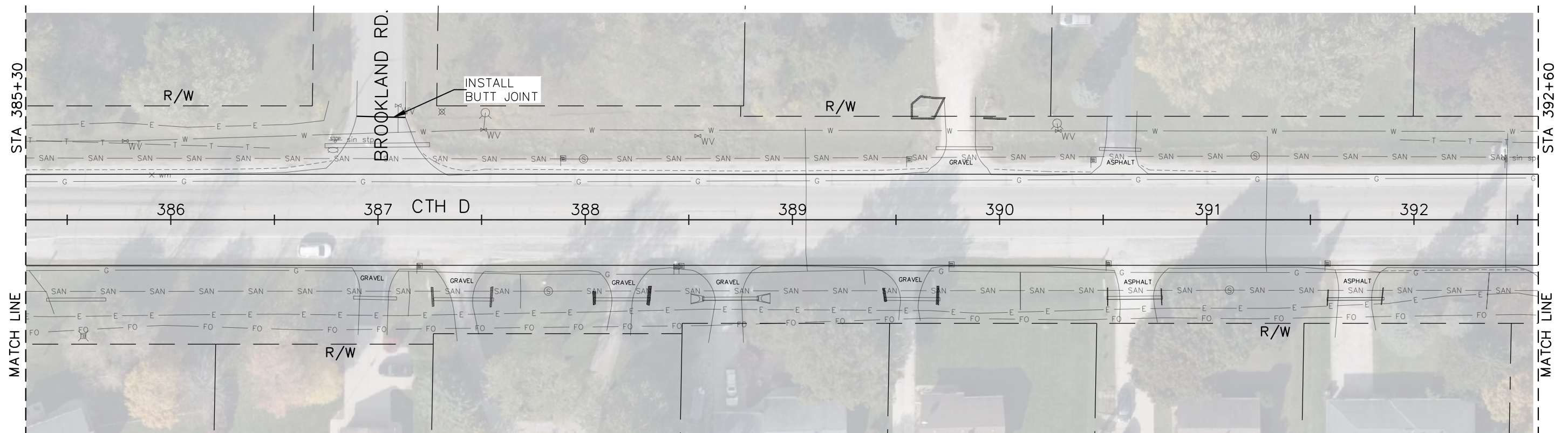
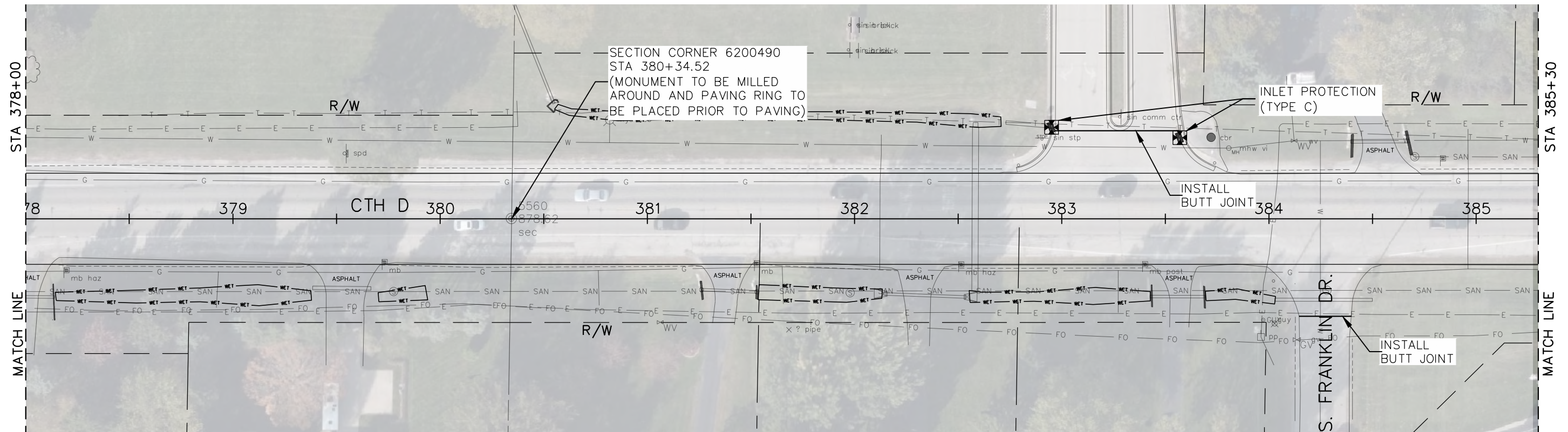




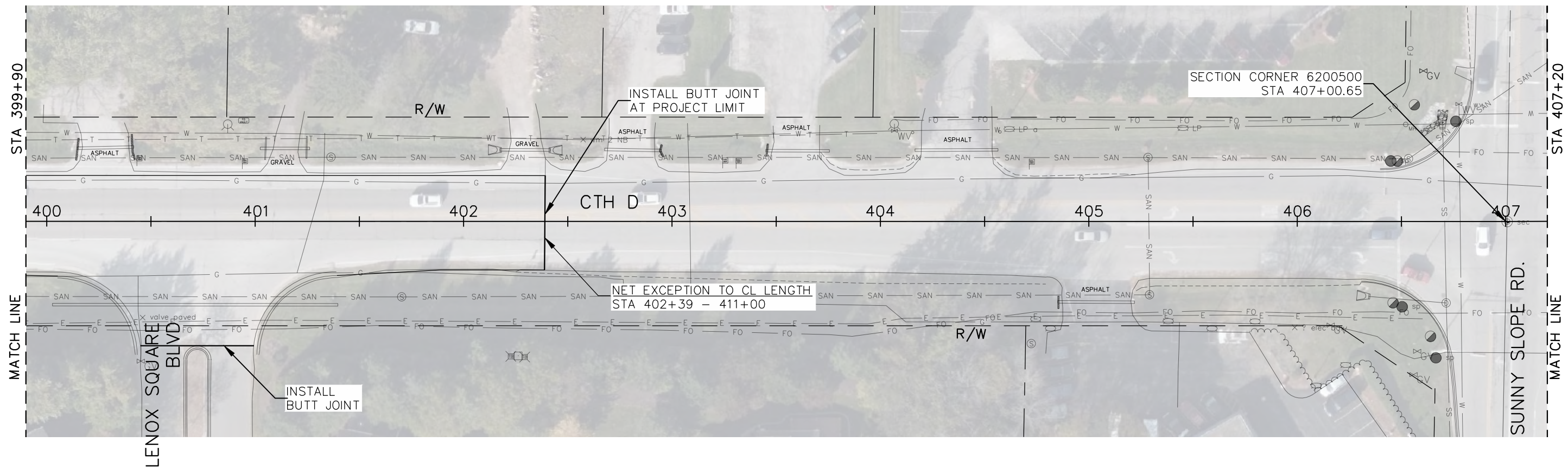
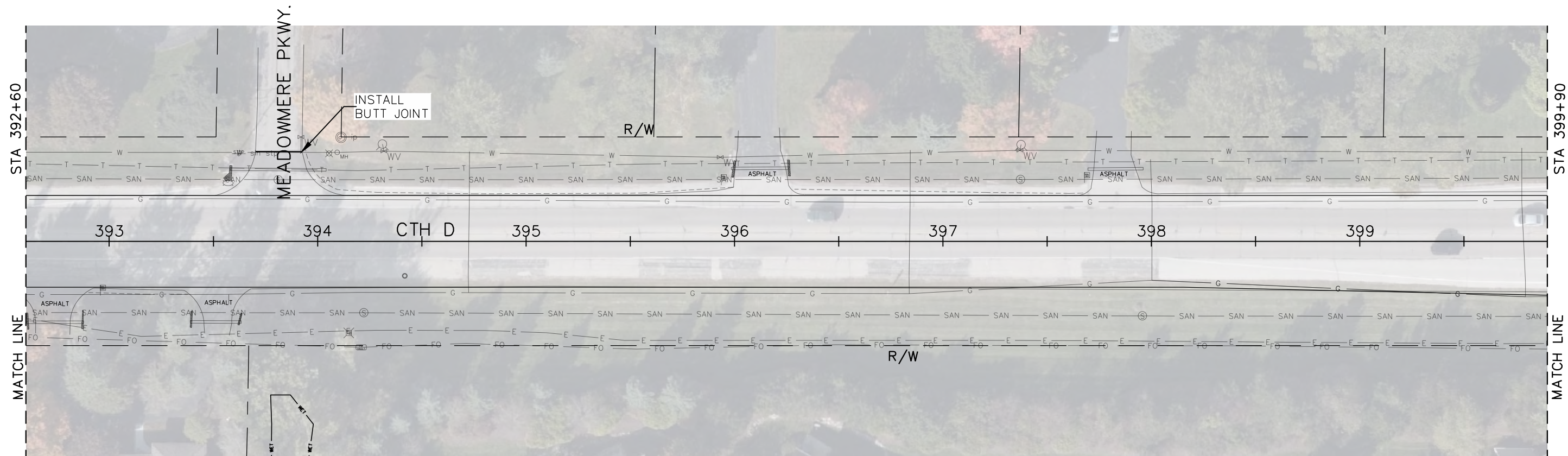




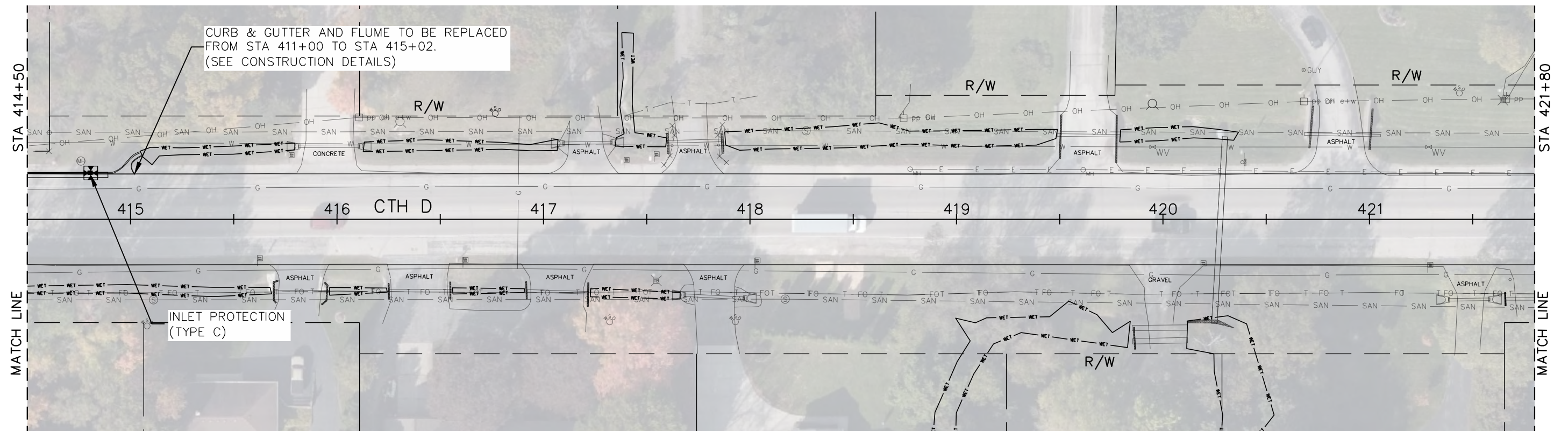
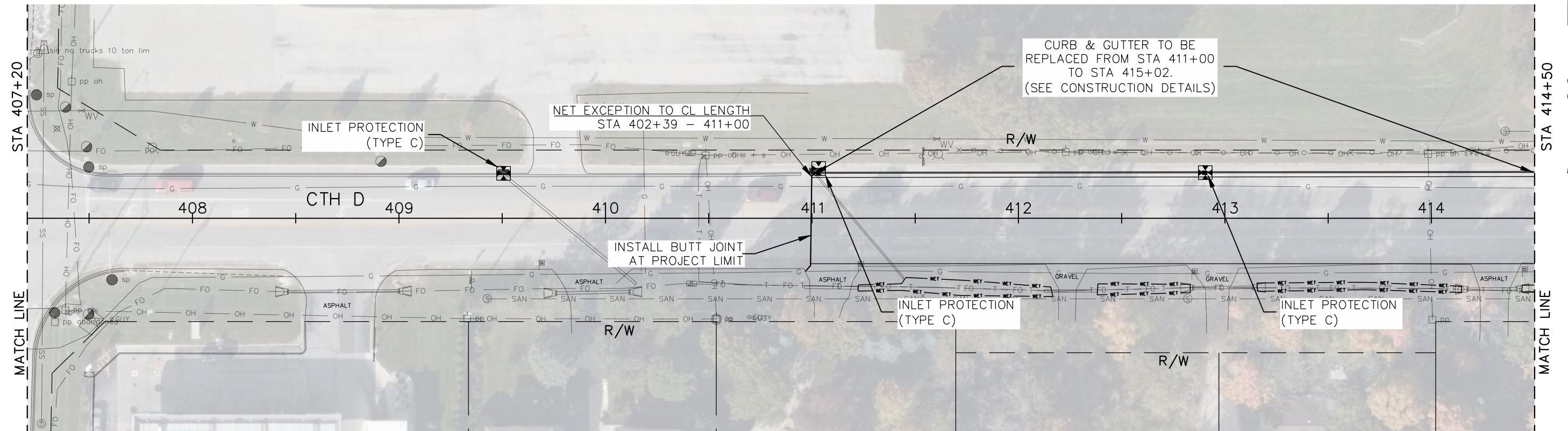














2



2



PROJECT NO:2773-05-01

HWY: CTH D

COUNTY: WAUKESHA

PLAN DETAILS	
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SHEET	28
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E

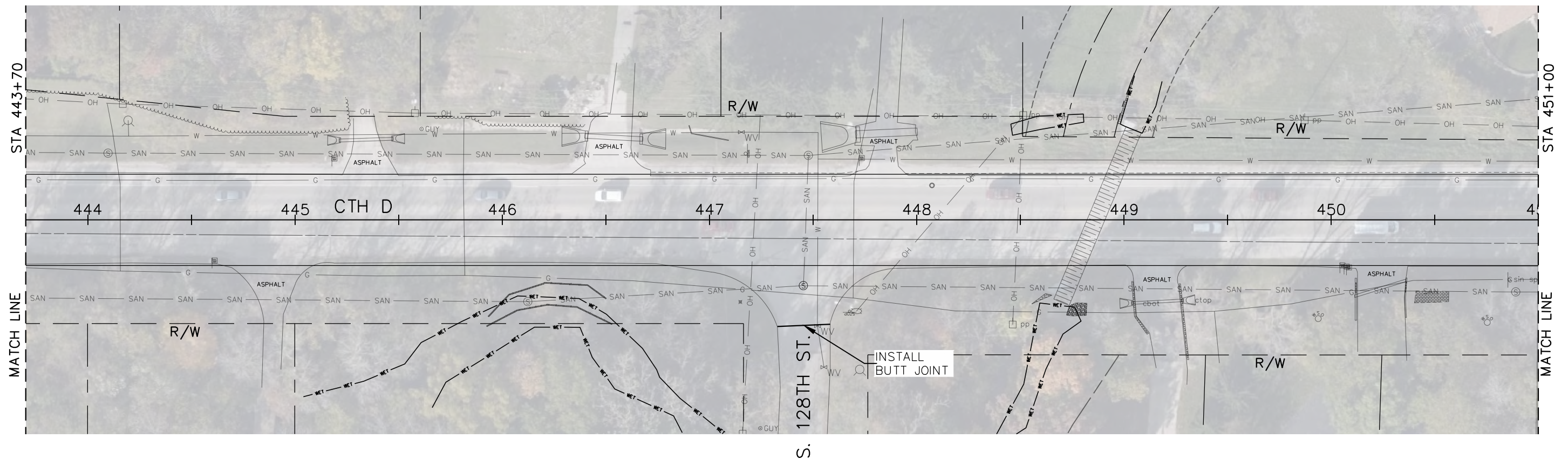
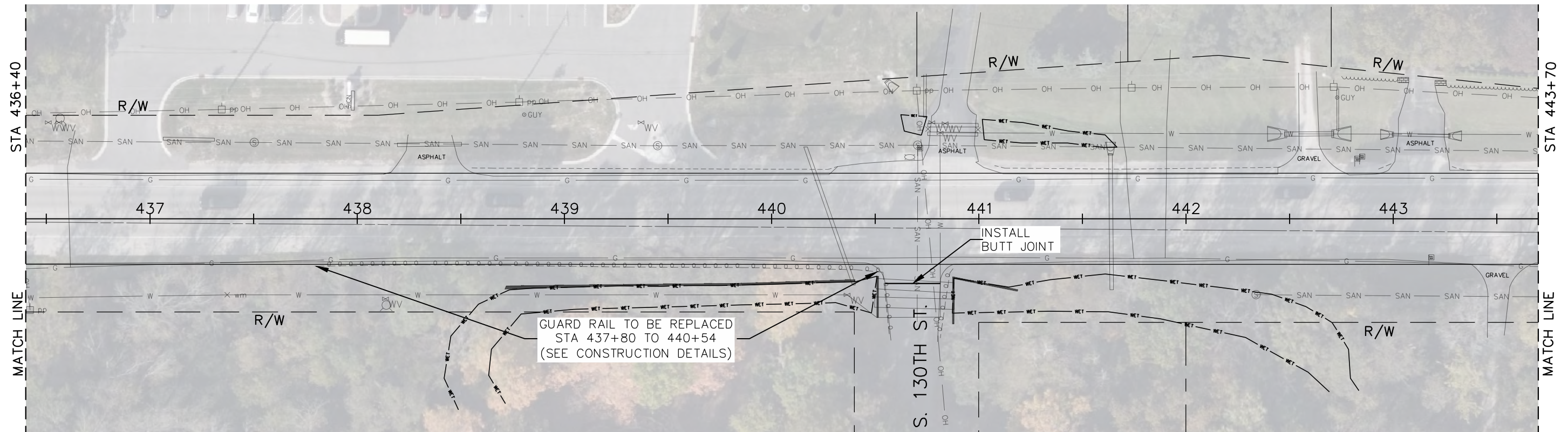
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PLOT DATE : 2/17/2021 2:53 PM      PLOT BY : NATHAN BETH

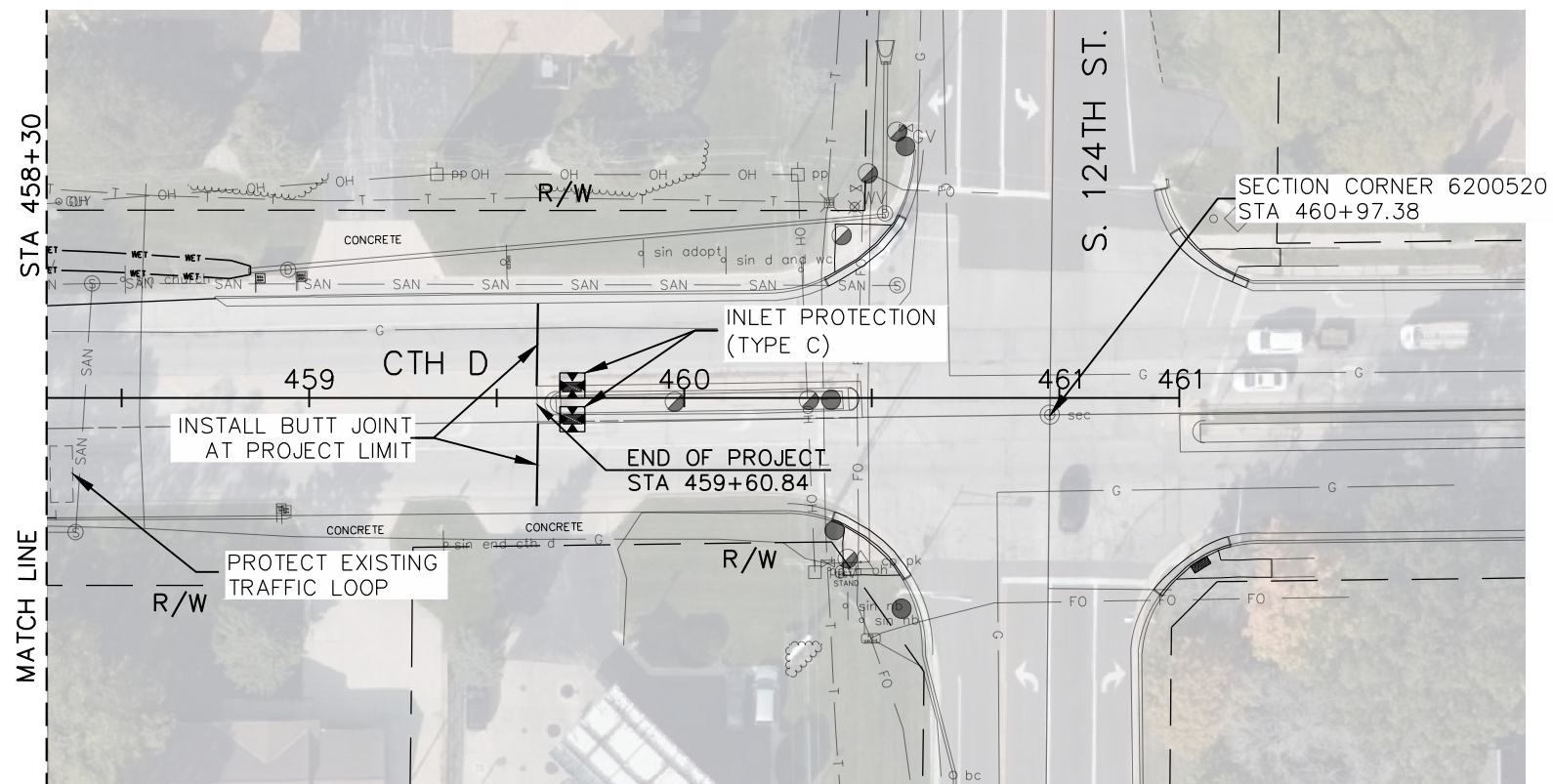
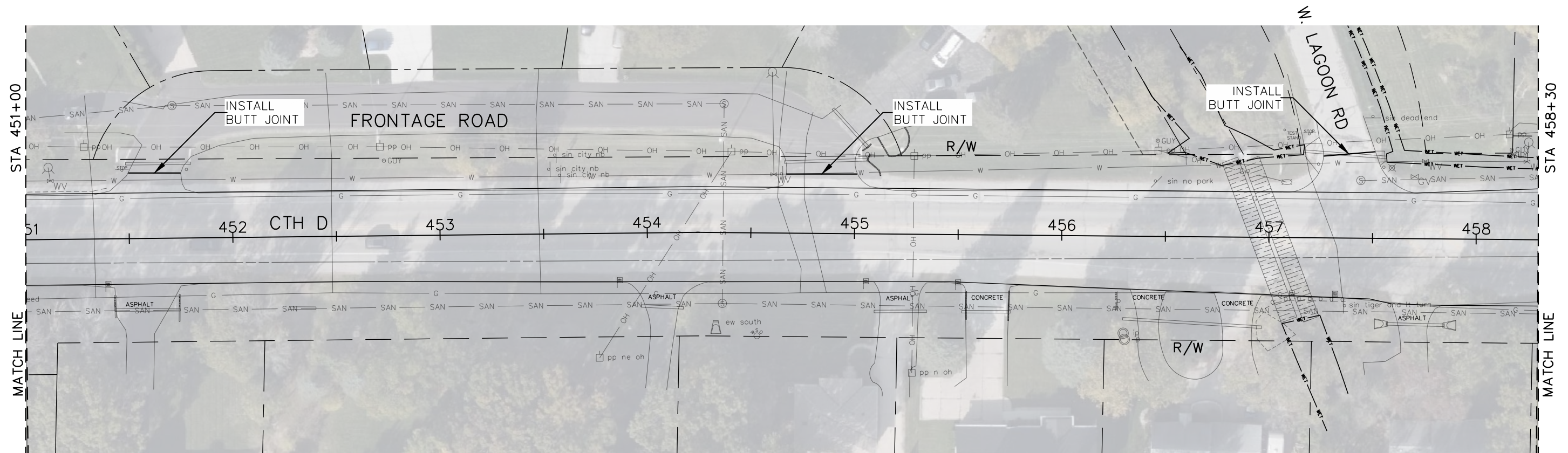
PLOT BY : NATHAN BETH

PLOT SCALE : 1"=50'











**LEGEND**

TYPE II SIGN(S) MOUNTED ON 1.75"x1.75" TUBULAR STEEL POST(S) WITH POST ANCHOR BASE

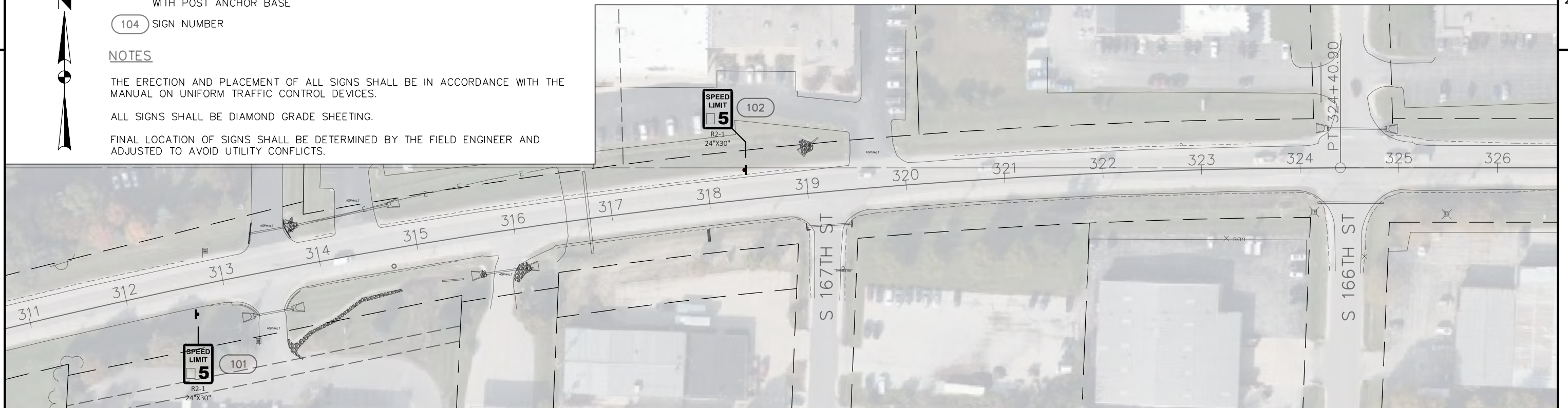
104 SIGN NUMBER

**NOTES**

THE ERECTION AND PLACEMENT OF ALL SIGNS SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

ALL SIGNS SHALL BE DIAMOND GRADE SHEETING.

FINAL LOCATION OF SIGNS SHALL BE DETERMINED BY THE FIELD ENGINEER AND ADJUSTED TO AVOID UTILITY CONFLICTS.



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WITH POST ANCHOR BASE

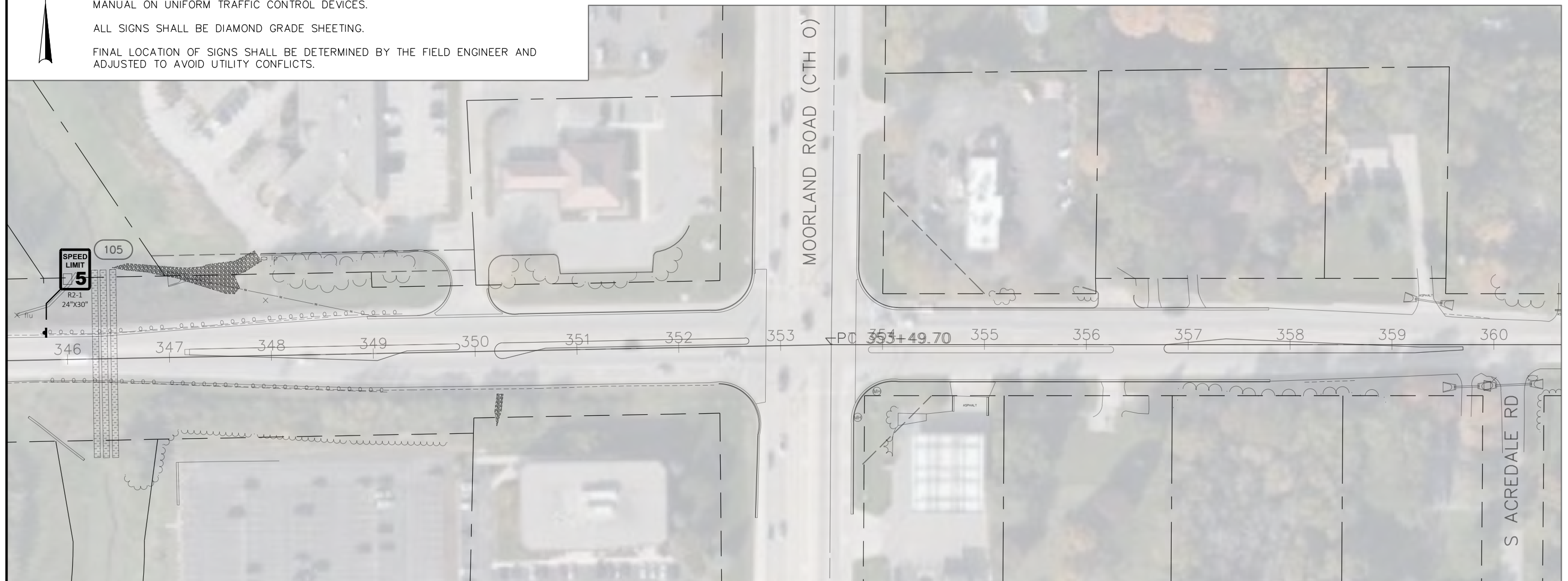
104 SIGN NUMBER

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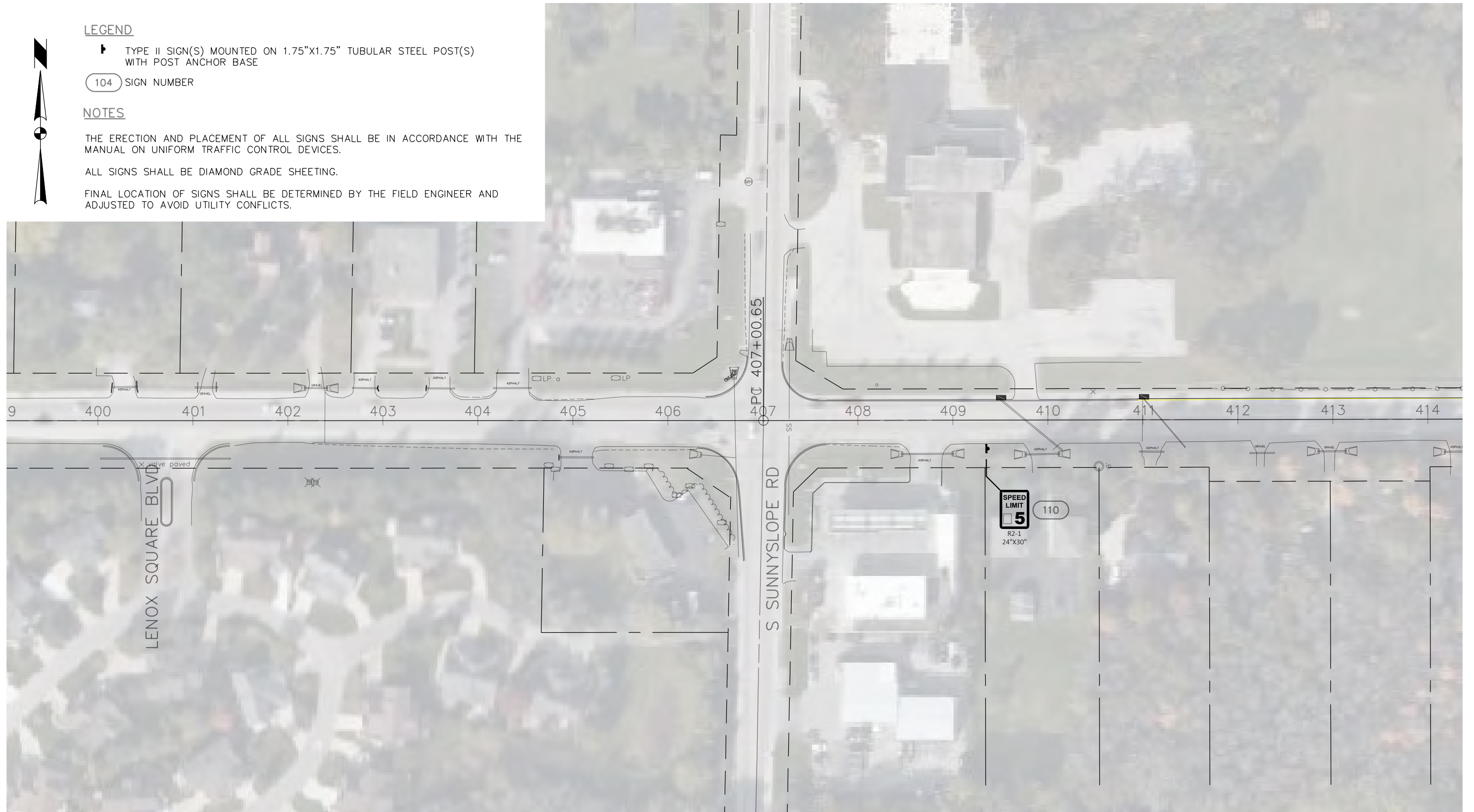
104 SIGN NUMBER

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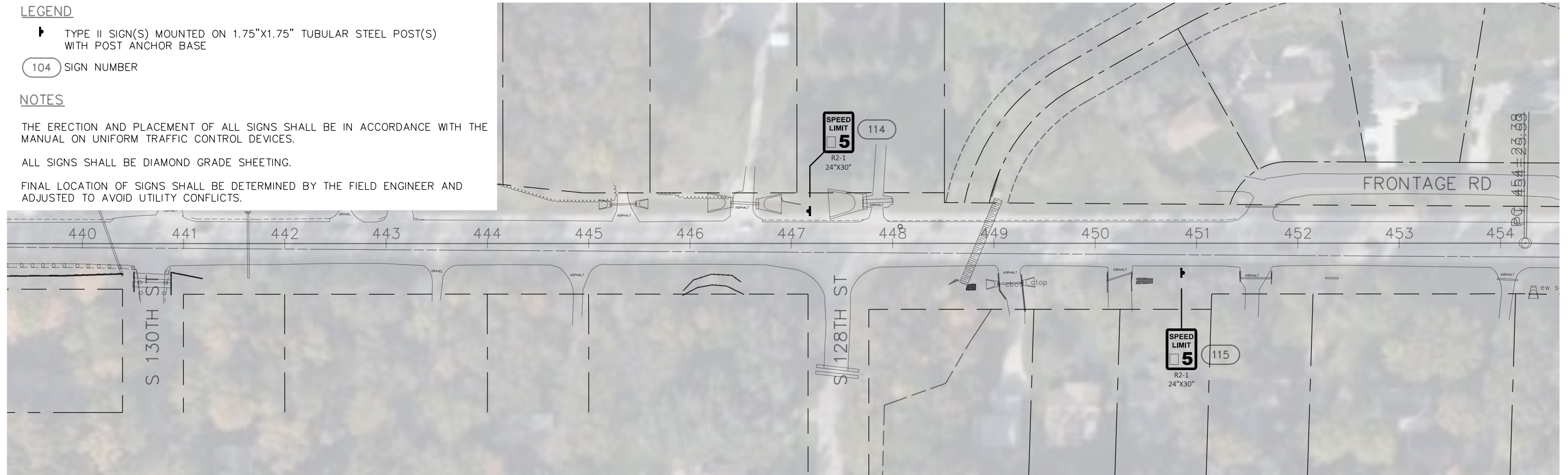
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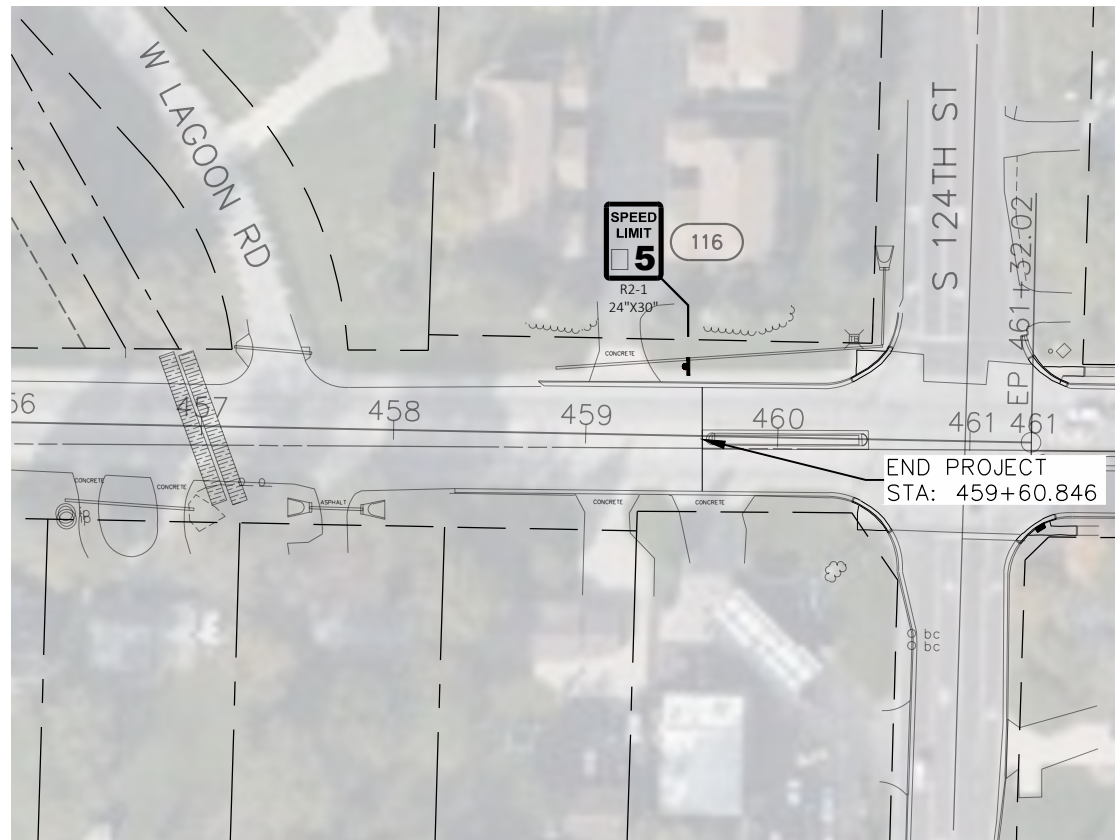
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104 SIGN NUMBER

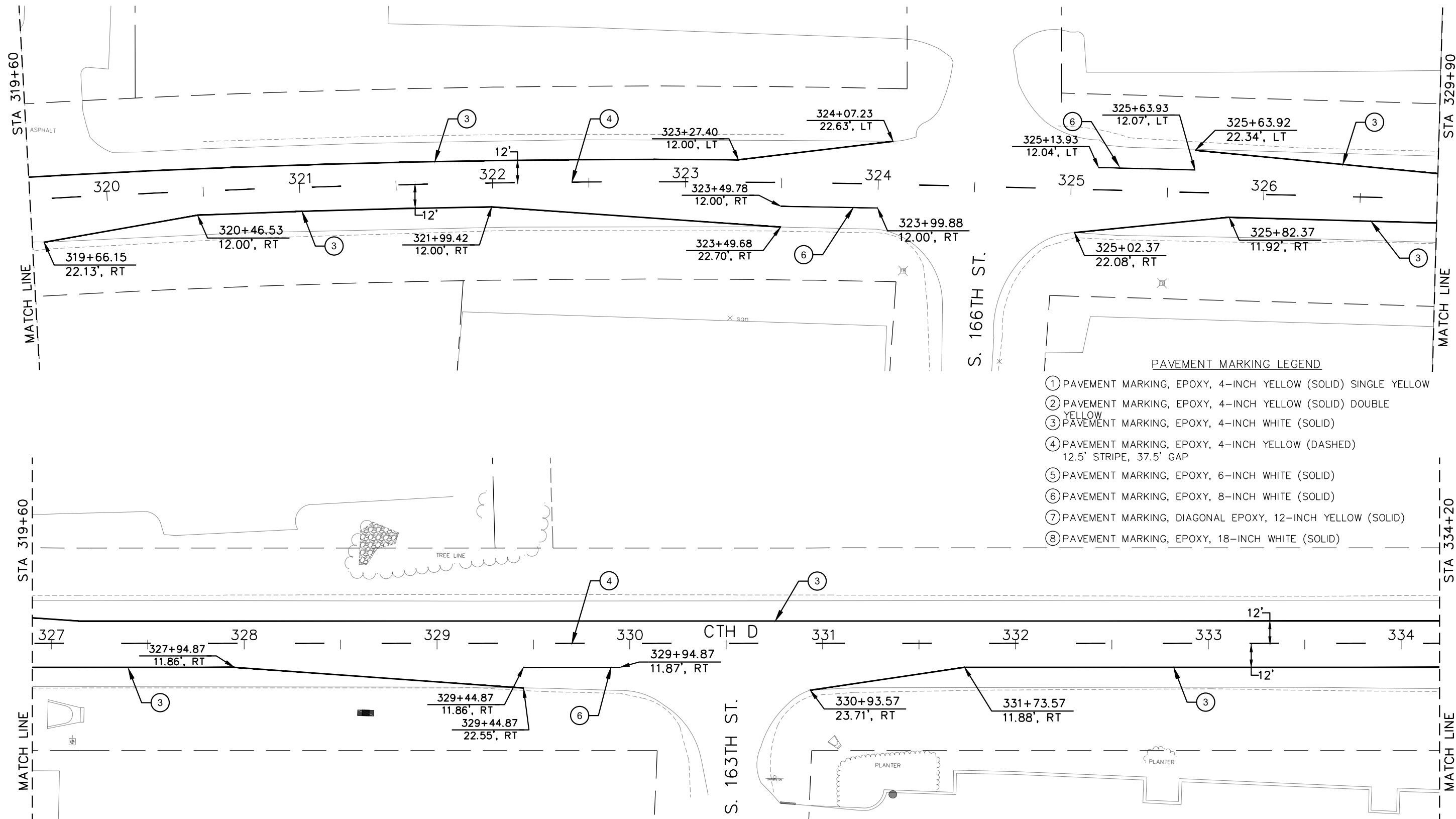
**NOTES**

THE ERECTION AND PLACEMENT OF ALL SIGNS SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

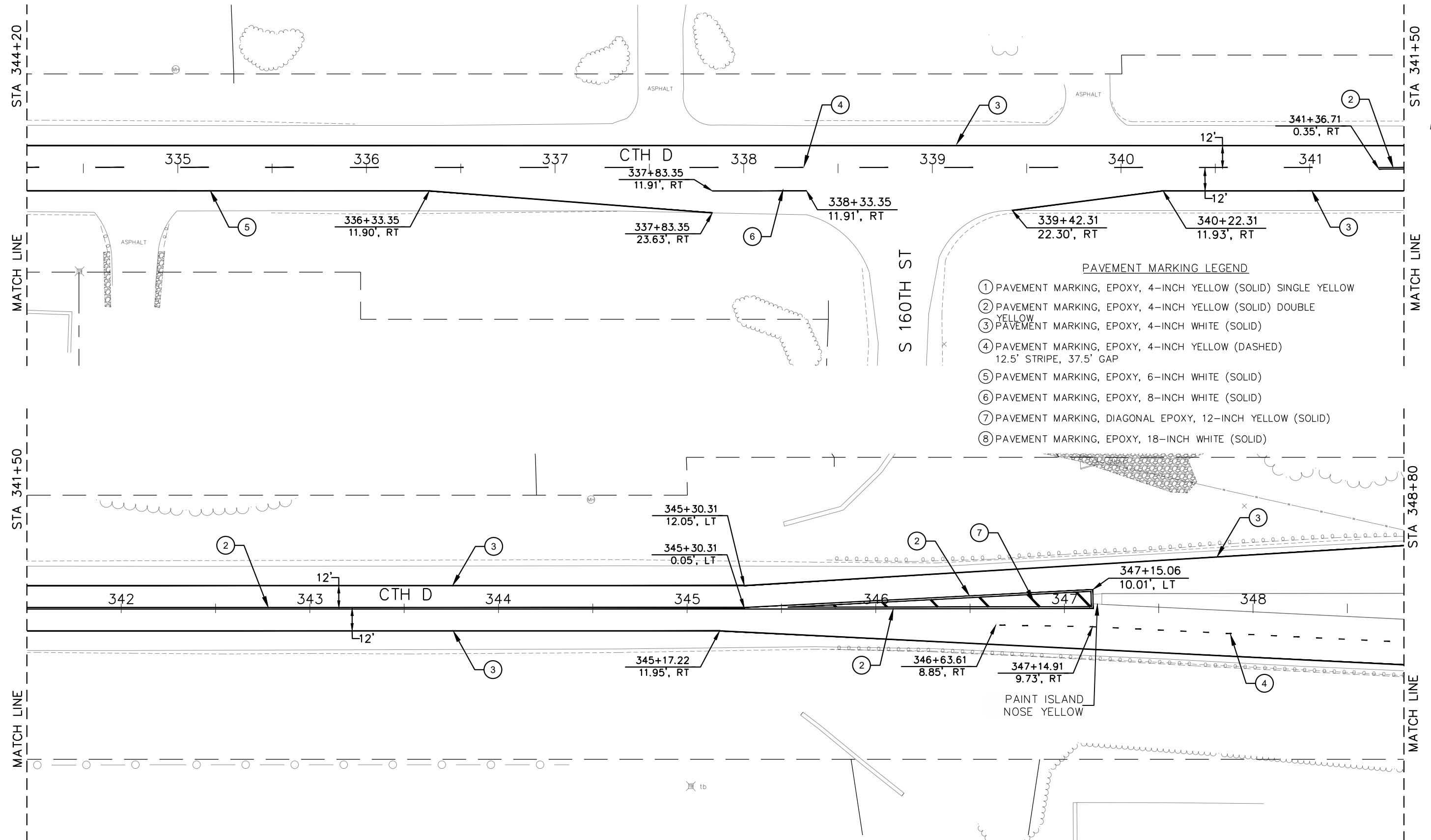
ALL SIGNS SHALL BE DIAMOND GRADE SHEETING.

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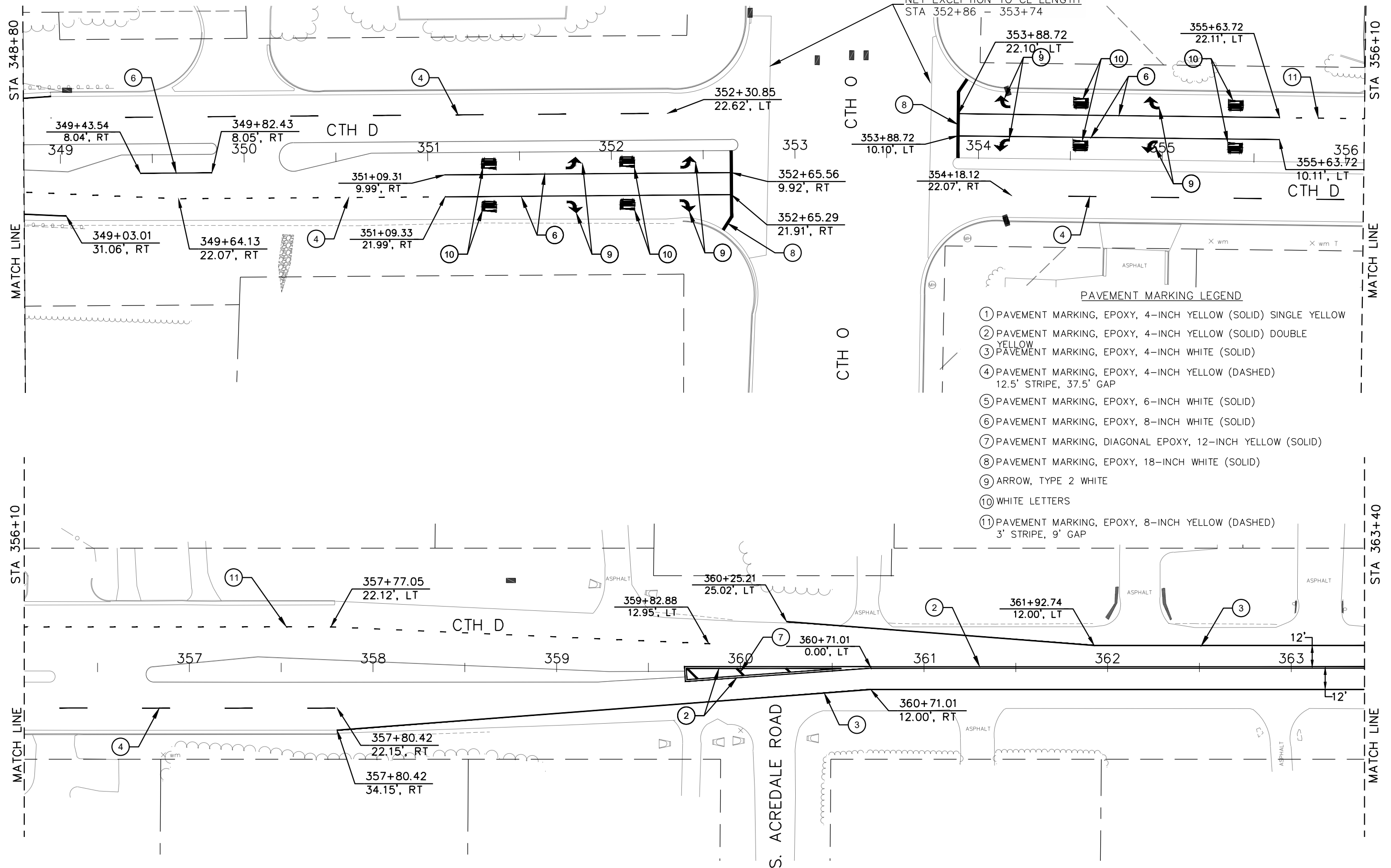




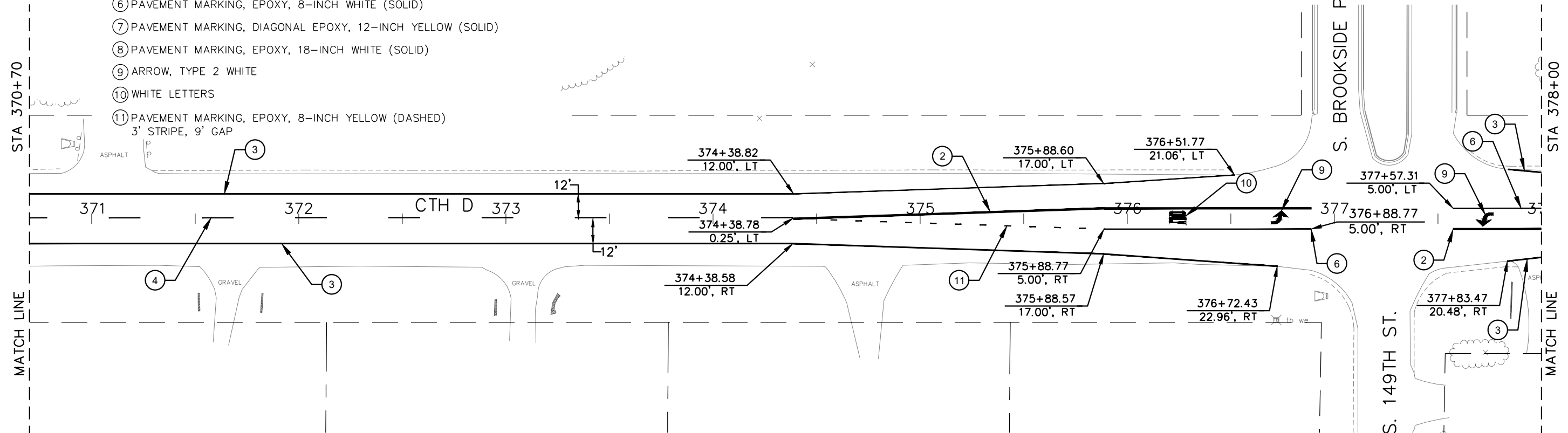


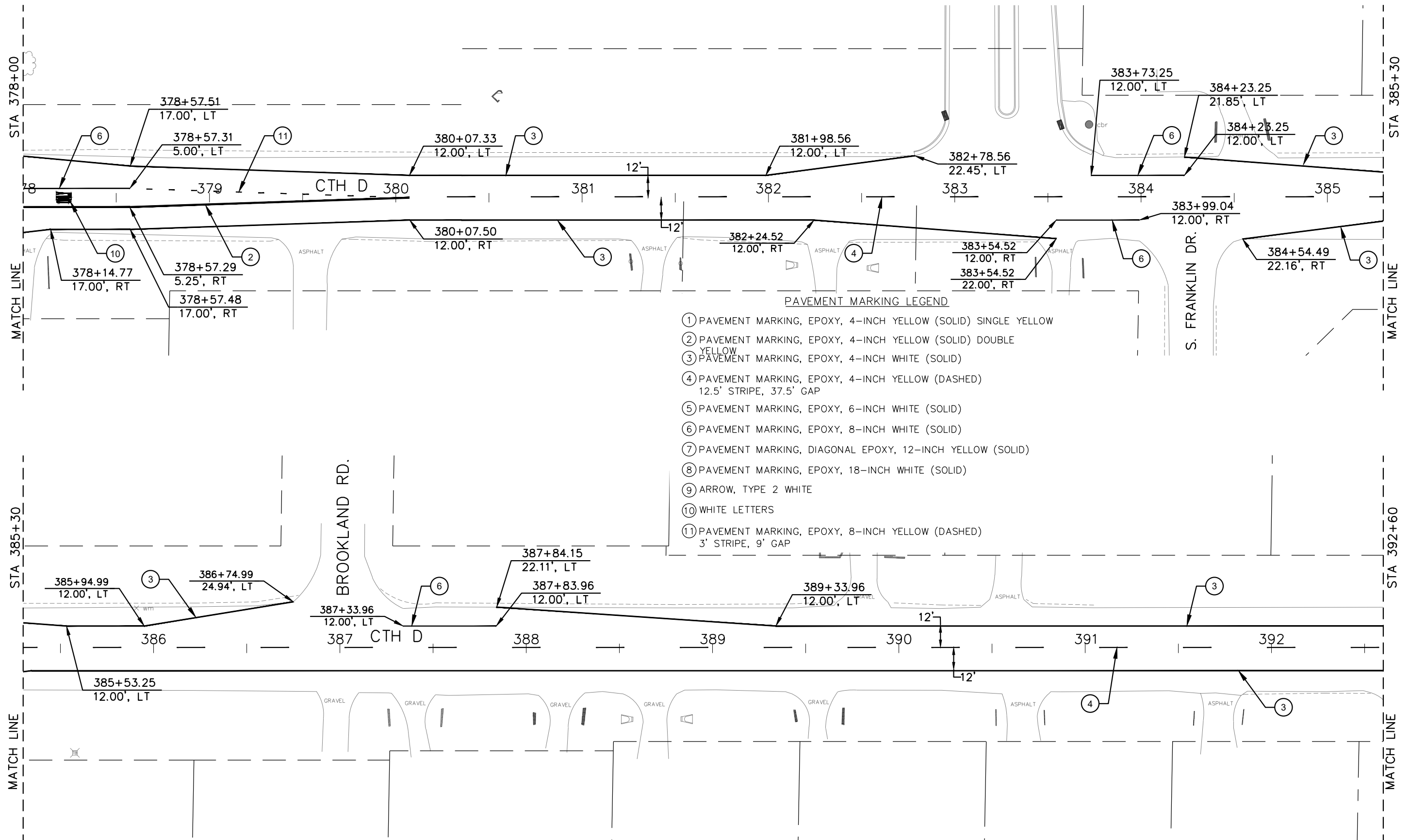


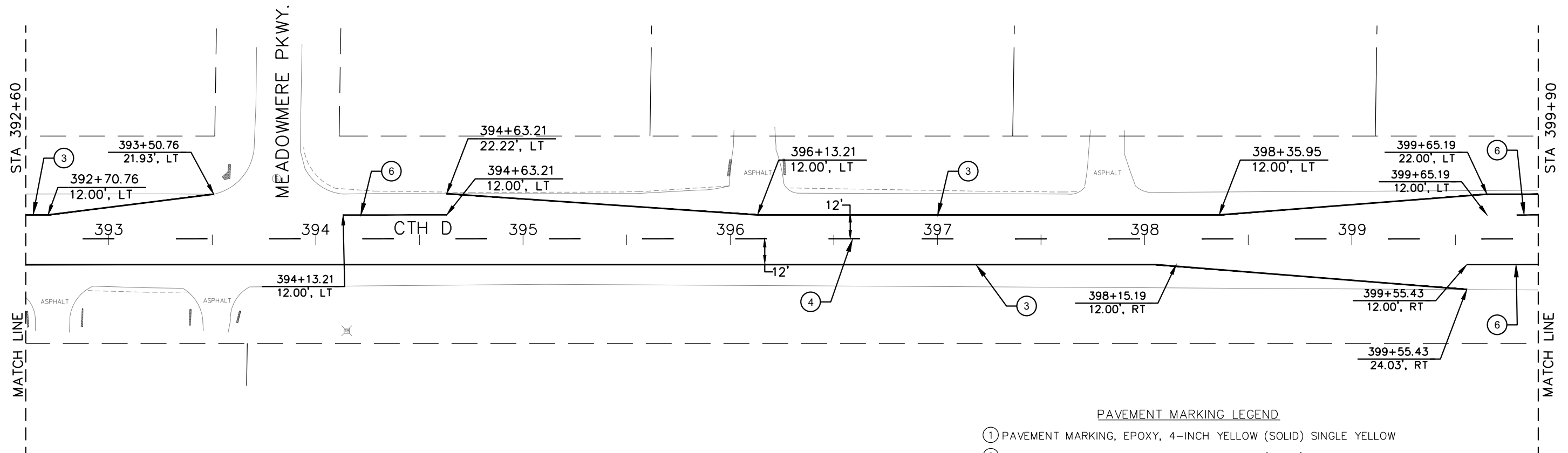
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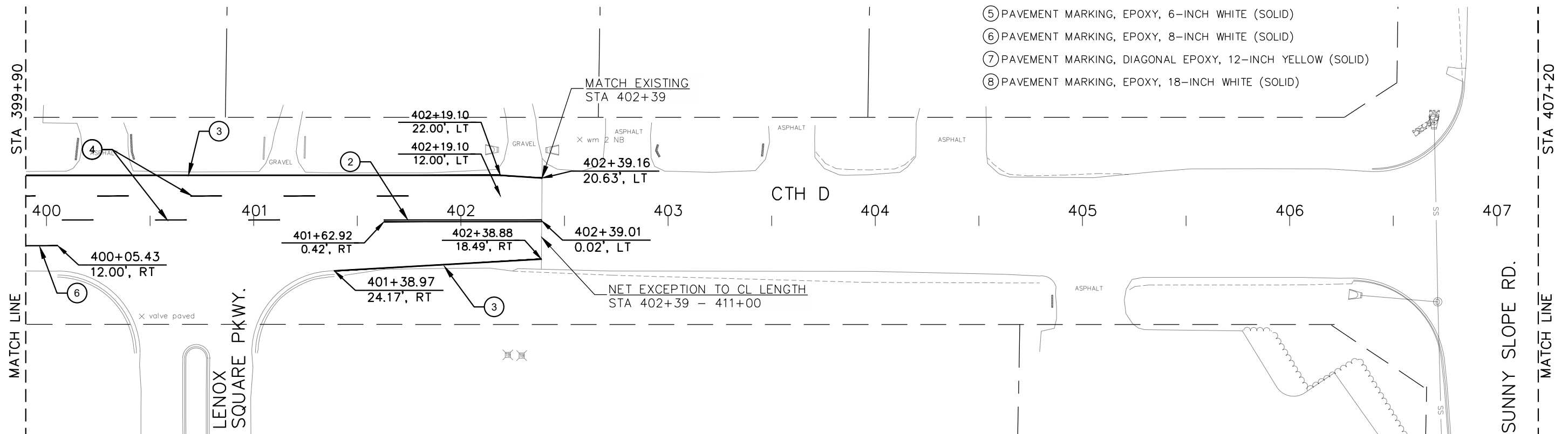


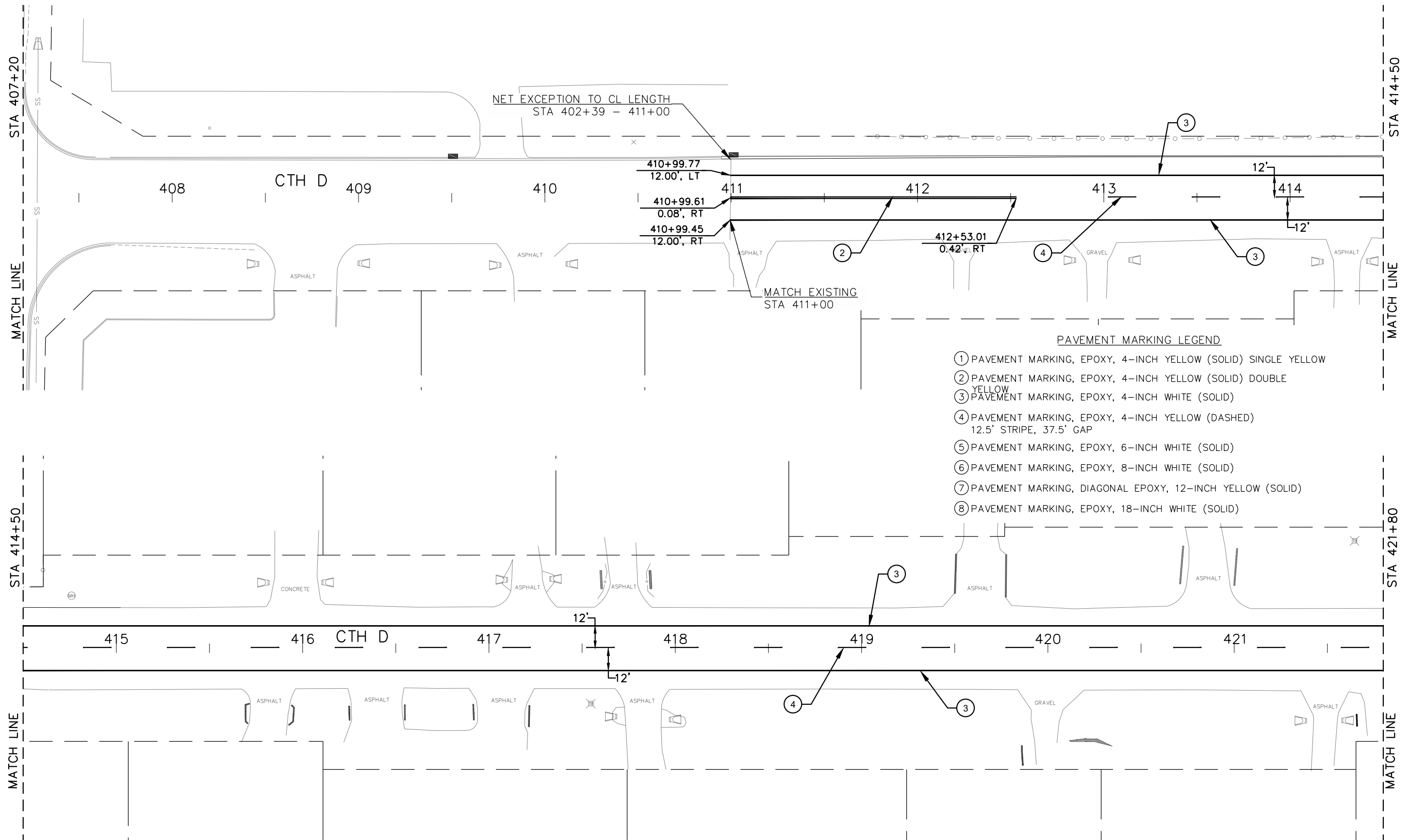




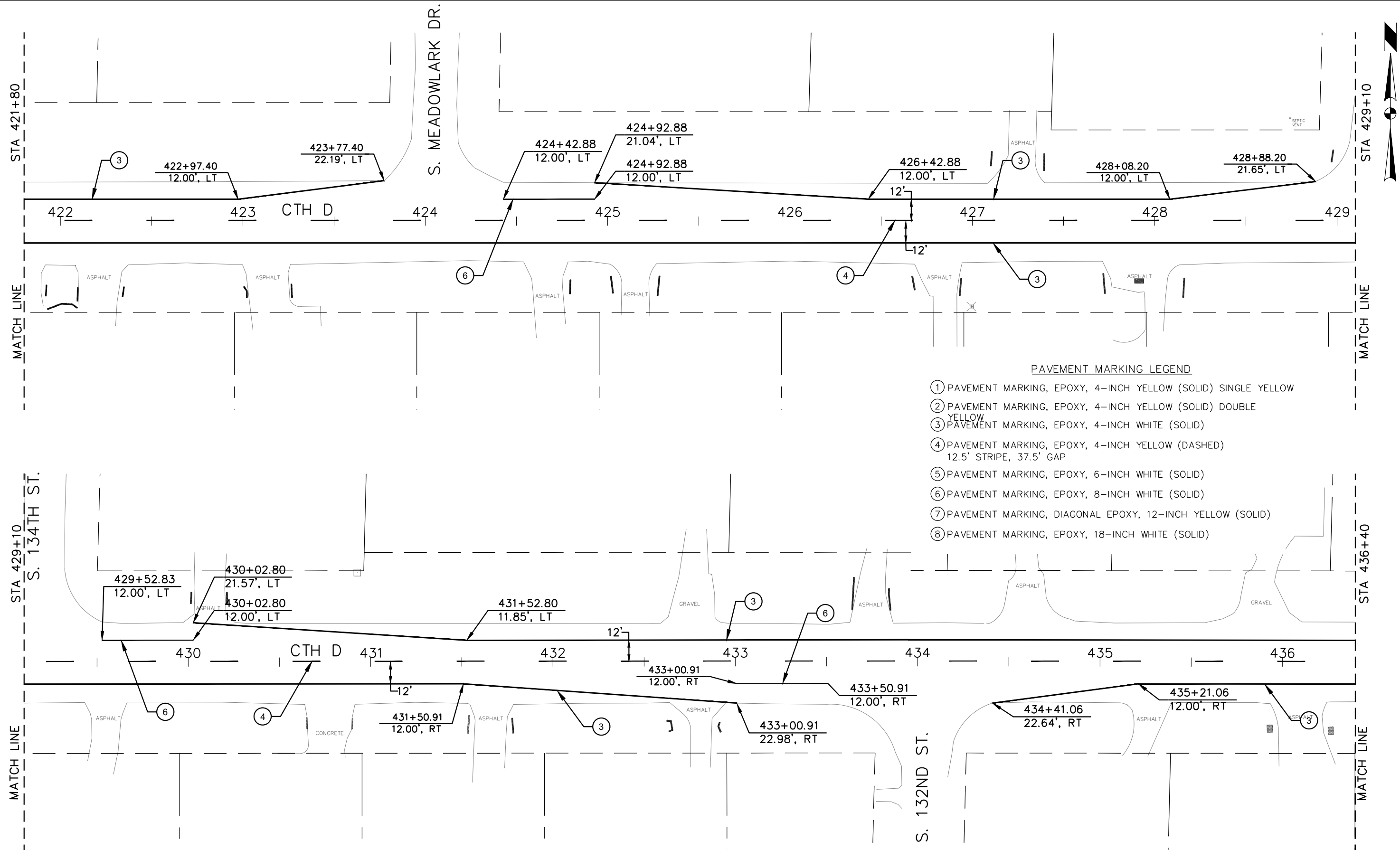
## PAVEMENT MARKING LEGEND

- ① PAVEMENT MARKING, EPOXY, 4-INCH YELLOW (SOLID) SINGLE YELLOW
- ② PAVEMENT MARKING, EPOXY, 4-INCH YELLOW (SOLID) DOUBLE YELLOW
- ③ PAVEMENT MARKING, EPOXY, 4-INCH WHITE (SOLID)
- ④ PAVEMENT MARKING, EPOXY, 4-INCH YELLOW (DASHED) 12.5' STRIPE, 37.5' GAP
- ⑤ PAVEMENT MARKING, EPOXY, 6-INCH WHITE (SOLID)
- ⑥ PAVEMENT MARKING, EPOXY, 8-INCH WHITE (SOLID)
- ⑦ PAVEMENT MARKING, DIAGONAL EPOXY, 12-INCH YELLOW (SOLID)
- ⑧ PAVEMENT MARKING, EPOXY, 18-INCH WHITE (SOLID)



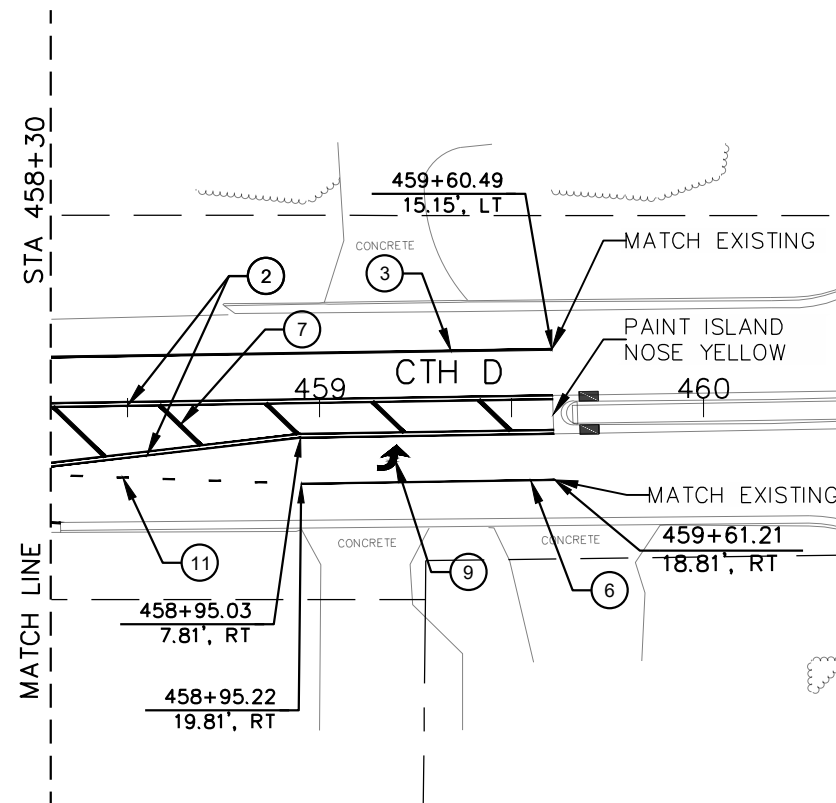
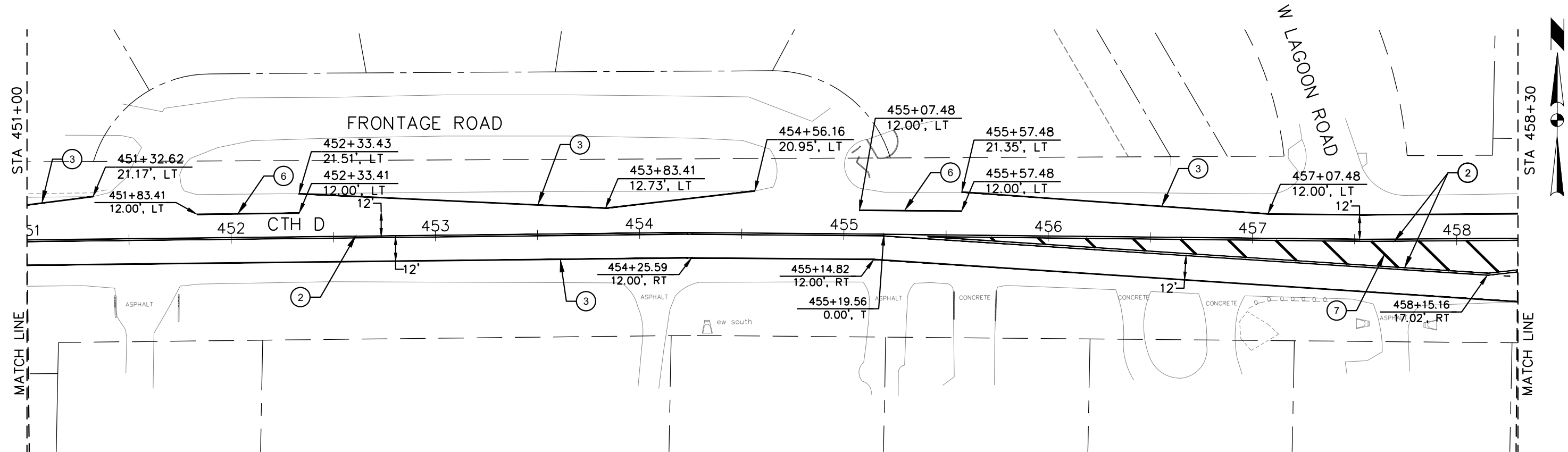






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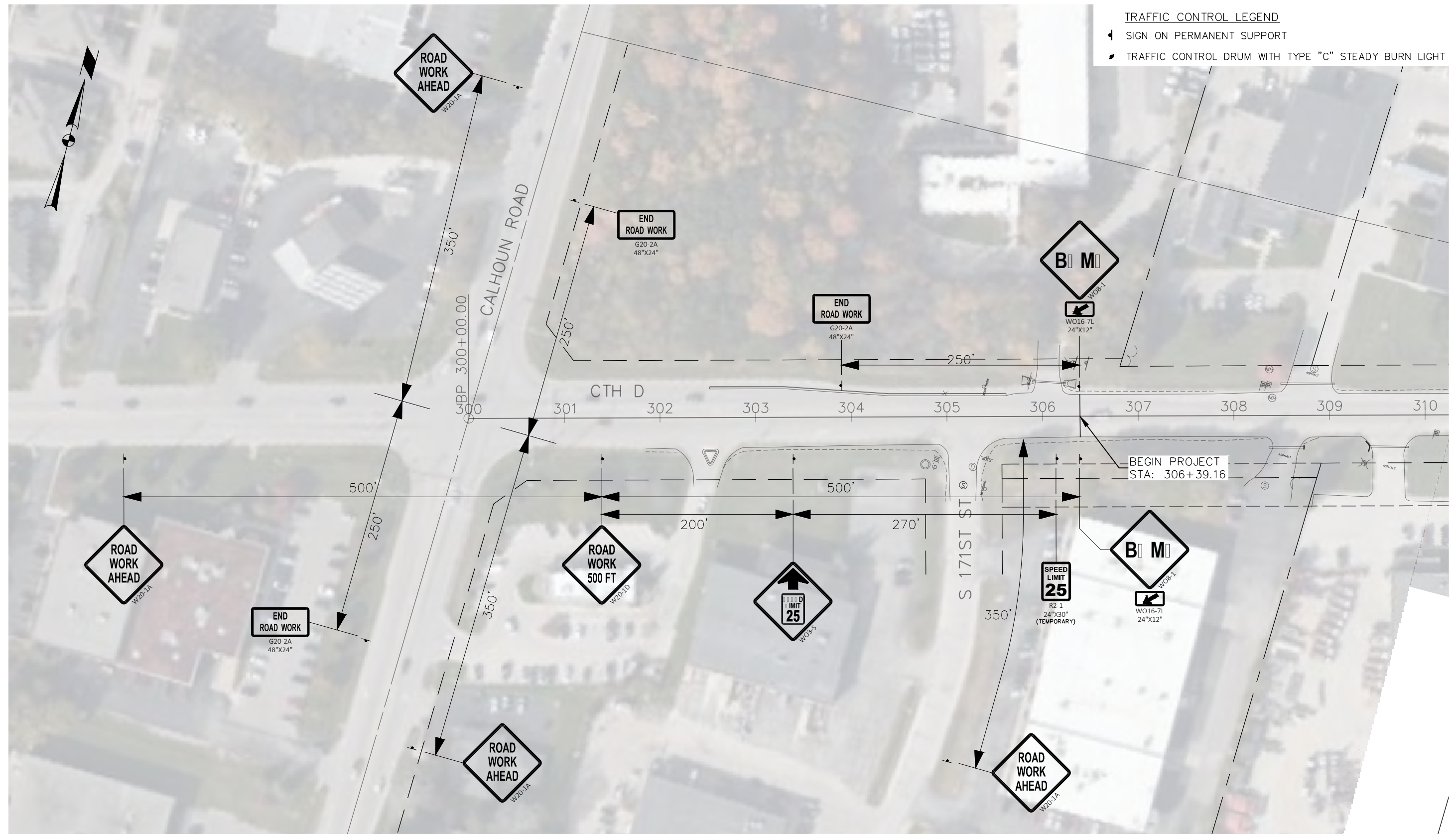




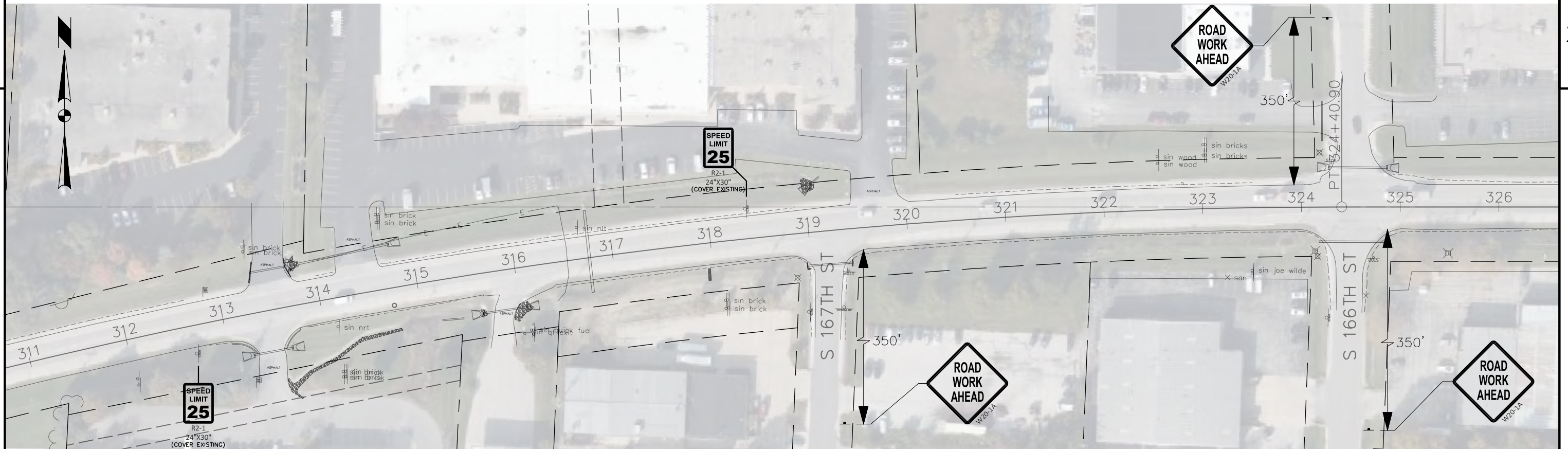
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- ② PAVEMENT MARKING, EPOXY, 4-INCH YELLOW (SOLID) DOUBLE YELLOW
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- ⑧ PAVEMENT MARKING, EPOXY, 18-INCH WHITE (SOLID)
- ⑨ ARROW, TYPE 2 WHITE
- ⑩ WHITE LETTERS
- ⑪ PAVEMENT MARKING, EPOXY, 8-INCH YELLOW (DASHED) 3' STRIPE, 9' GAP





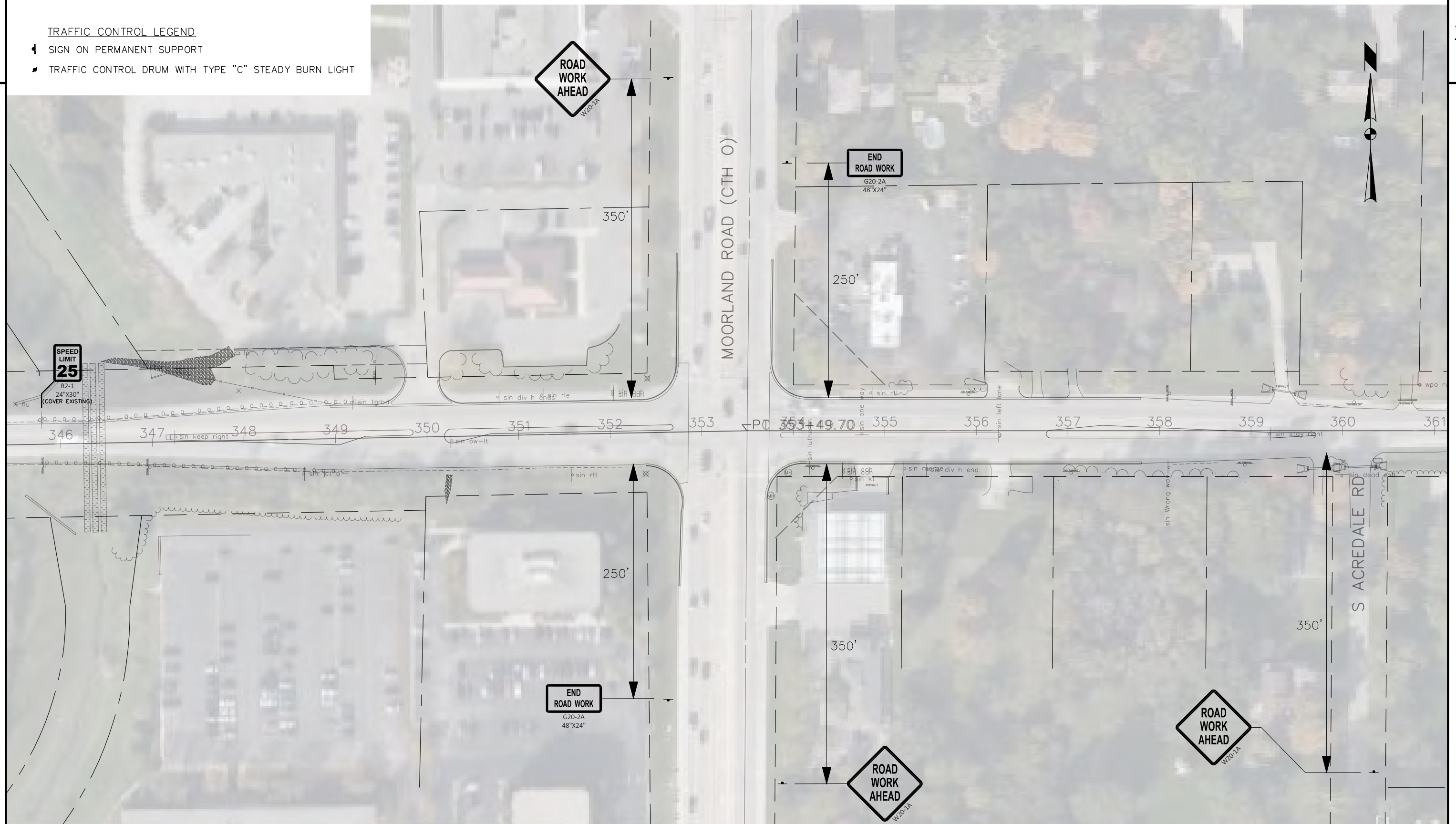






## TRAFFIC CONTROL LEGEND

- SIGN ON PERMANENT SUPPORT
- TRAFFIC CONTROL DRUM WITH TYPE "C" STEADY BURN LIGHT



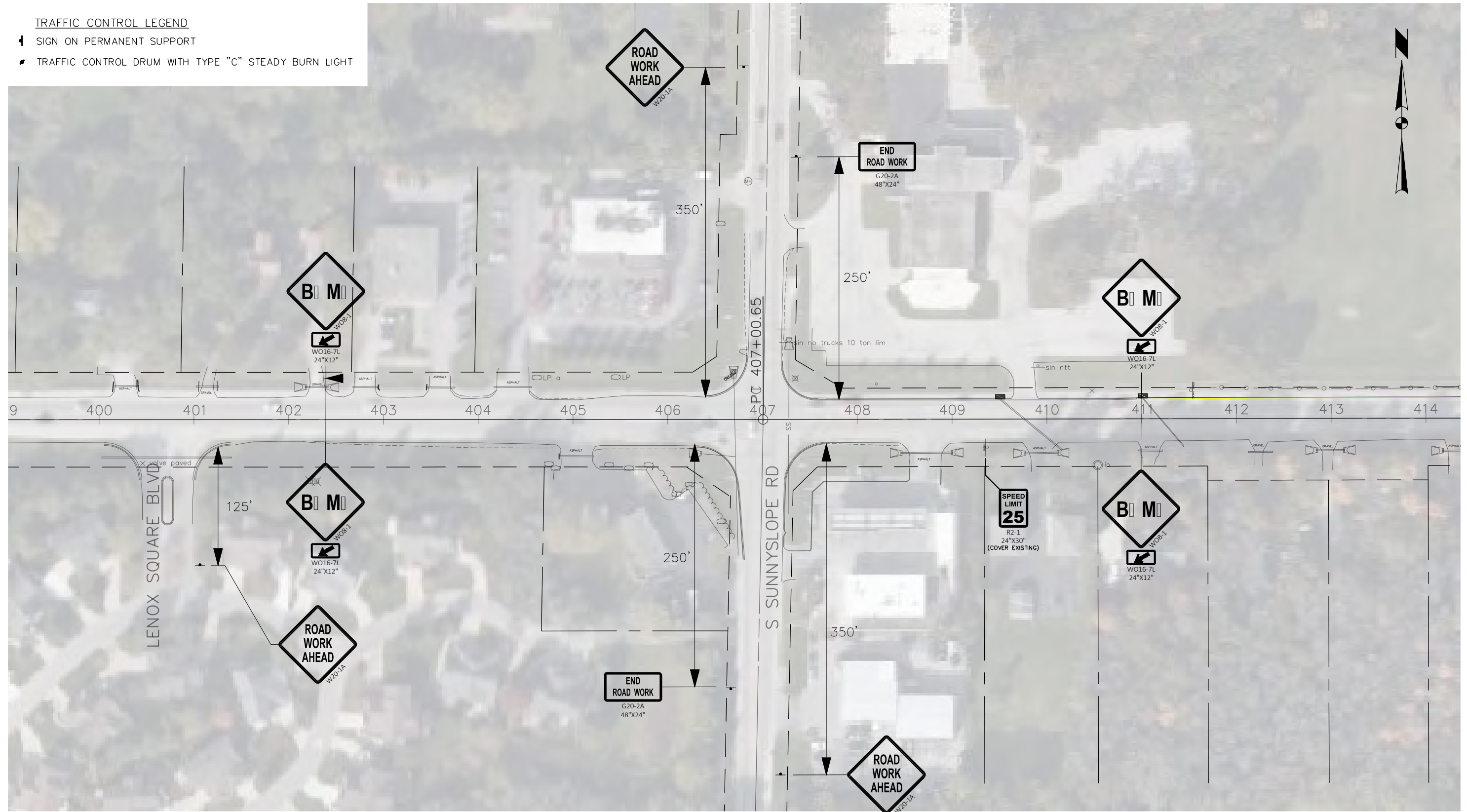


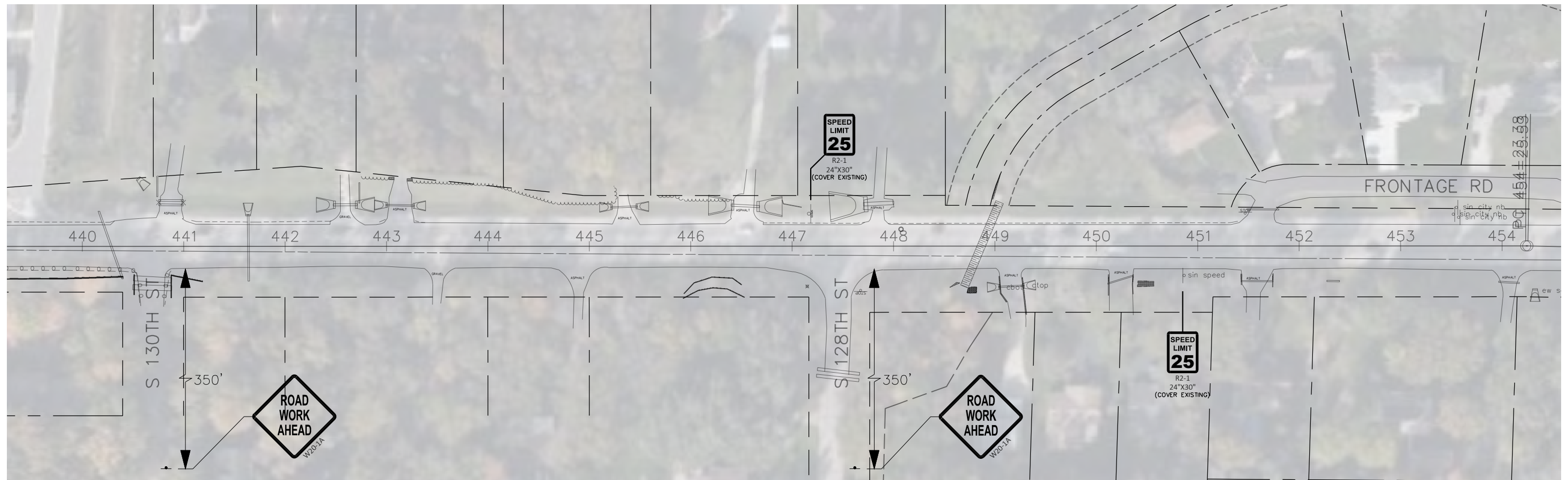
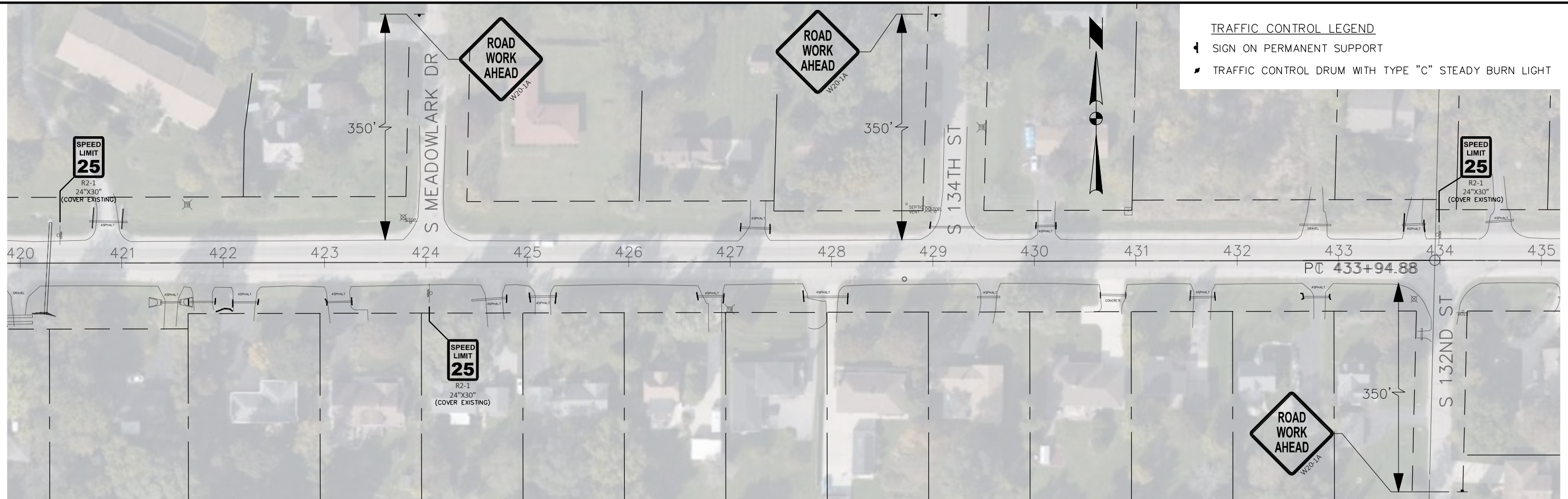




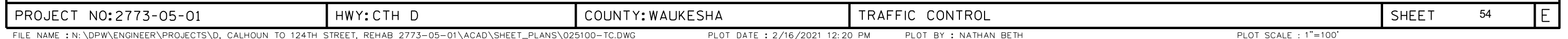
## TRAFFIC CONTROL LEGEND

- SIGN ON PERMANENT SUPPORT
- TRAFFIC CONTROL DRUM WITH TYPE "C" STEADY BURN LIGHT









Estimate Of Quantities

2773-05-71

Line	Item	Item Description	Unit	Total	Qty
0002	203.0600.S	Removing Old Structure Over Waterway With Minimal Debris (station) 01. 346+36	LS	1.000	1.000
0004	204.0115	Removing Asphaltic Surface Butt Joints	SY	2,265.000	2,265.000
0006	204.0120	Removing Asphaltic Surface Milling	SY	76,000.000	76,000.000
0008	204.0150	Removing Curb & Gutter	LF	415.000	415.000
0010	204.0165	Removing Guardrail	LF	275.000	275.000
0012	205.0100	Excavation Common	CY	4,000.000	4,000.000
0014	210.2500	Backfill Structure Type B	TON	117.000	117.000
0016	213.0100	Finishing Roadway (project) 01. 2773-05-71	EACH	1.000	1.000
0018	305.0110	Base Aggregate Dense 3/4-Inch	TON	750.000	750.000
0020	305.0120	Base Aggregate Dense 1 1/4-Inch	TON	8,000.000	8,000.000
0022	305.0500	Shaping Shoulders	STA	190.000	190.000
0024	310.0110	Base Aggregate Open-Graded	TON	30.000	30.000
0026	390.0203	Base Patching Asphaltic	SY	5,000.000	5,000.000
0028	416.1010	Concrete Surface Drains	CY	4.000	4.000
0030	455.0605	Tack Coat	GAL	5,200.000	5,200.000
0032	460.2000	Incentive Density HMA Pavement	DOL	11,430.000	11,430.000
0034	460.6223	HMA Pavement 3 MT 58-28 S	TON	10,000.000	10,000.000
0036	460.6225	HMA Pavement 5 MT 58-28 S	TON	7,600.000	7,600.000
0038	465.0120	Asphaltic Surface Driveways and Field Entrances	TON	250.000	250.000
0040	504.0900	Concrete Masonry Endwalls	CY	24.000	24.000
0042	520.1015	Apron Endwalls for Culvert Pipe 15-Inch	EACH	1.000	1.000
0044	520.9700.S	Culvert Pipe Liners (size) 01. 60-Inch	LF	554.000	554.000
0046	520.9750.S	Cleaning Culvert Pipes for Liner Verification	EACH	3.000	3.000
0048	601.0413	Concrete Curb & Gutter 6-Inch Sloped 30-Inch Type G	LF	415.000	415.000
0050	606.0200	Riprap Medium	CY	77.000	77.000
0052	608.3015	Storm Sewer Pipe Class III-A 15-Inch	LF	205.000	205.000
0054	611.0624	Inlet Covers Type H	EACH	2.000	2.000
0056	611.1230	Catch Basins 2x3-FT	EACH	2.000	2.000
0058	612.0104	Pipe Underdrain 4-Inch	LF	380.000	380.000
0060	614.2300	MGS Guardrail 3	LF	163.000	163.000
0062	614.2610	MGS Guardrail Terminal EAT	EACH	2.000	2.000
0064	619.1000	Mobilization	EACH	1.000	1.000
0066	625.0100	Topsoil	SY	3,000.000	3,000.000
0068	627.0200	Mulching	SY	200.000	200.000
0070	628.1104	Erosion Bales	EACH	20.000	20.000
0072	628.1504	Silt Fence	LF	200.000	200.000
0074	628.1520	Silt Fence Maintenance	LF	200.000	200.000
0076	628.2027	Erosion Mat Class II Type C	SY	1,250.000	1,250.000
0078	628.7015	Inlet Protection Type C	EACH	11.000	11.000

Estimate Of Quantities

2773-05-71

Line	Item	Item Description	Unit	Total	Qty
0080	628.7504	Temporary Ditch Checks	LF	30.000	30.000
0082	628.7570	Rock Bags	EACH	50.000	50.000
0084	630.0200	Seeding Temporary	LB	200.000	200.000
0086	637.2210	Signs Type II Reflective H	SF	80.000	80.000
0088	642.5201	Field Office Type C	EACH	1.000	1.000
0090	643.0300	Traffic Control Drums	DAY	24,500.000	24,500.000
0092	643.0420	Traffic Control Barricades Type III	DAY	2,450.000	2,450.000
0094	643.0715	Traffic Control Warning Lights Type C	DAY	5,000.000	5,000.000
0096	643.0900	Traffic Control Signs	DAY	5,025.000	5,025.000
0098	643.0920	Traffic Control Covering Signs Type II	EACH	16.000	16.000
0100	643.1050	Traffic Control Signs PCMS	DAY	40.000	40.000
0102	643.5000	Traffic Control	EACH	1.000	1.000
0104	645.0111	Geotextile Type DF Schedule A	SY	45.000	45.000
0106	645.0120	Geotextile Type HR	SY	245.000	245.000
0108	646.1020	Marking Line Epoxy 4-Inch	LF	35,000.000	35,000.000
0110	646.3020	Marking Line Epoxy 8-Inch	LF	2,400.000	2,400.000
0112	646.5020	Marking Arrow Epoxy	EACH	11.000	11.000
0114	646.5120	Marking Word Epoxy	EACH	10.000	10.000
0116	646.6120	Marking Stop Line Epoxy 18-Inch	LF	90.000	90.000
0118	646.7120	Marking Diagonal Epoxy 12-Inch	LF	300.000	300.000
0120	646.8220	Marking Island Nose Epoxy	EACH	3.000	3.000
0122	649.0105	Temporary Marking Line Paint 4-Inch	LF	30,000.000	30,000.000
0124	649.0150	Temporary Marking Line Removable Tape 4-Inch	LF	15,410.000	15,410.000
0126	650.5500	Construction Staking Curb Gutter and Curb & Gutter	LF	415.000	415.000
0128	650.6500	Construction Staking Structure Layout (structure) 01. P-67-779	LS	1.000	1.000
0130	650.8000	Construction Staking Resurfacing Reference	LF	15,000.000	15,000.000
0132	690.0150	Sawing Asphalt	LF	3,000.000	3,000.000
0134	ASP.1T0A	On-the-Job Training Apprentice at \$5.00/HR	HRS	500.000	500.000
0136	ASP.1T0G	On-the-Job Training Graduate at \$5.00/HR	HRS	1,200.000	1,200.000
0138	SPV.0060	Special 01. Posts Tubular Steel, 1 3/4"x1 3/4" - 12-ft	EACH	16.000	16.000
0140	SPV.0060	Special 02. Section Corner Monuments	EACH	3.000	3.000
0142	SPV.0180	Special 01. Hydroseeding	SY	5,000.000	5,000.000



3

REMOVING ASPHALT		
	204.0115 REMOVING ASPHALTIC SURFACE BUTT JOINTS	204.0120 REMOVING ASPHALTIC SURFACE MILLING
LOCATION	SY	SY
STA 306+39 TO 352+86	545	23,931
STA 353+74 TO 402+39	940	25,052
STA 411+00 TO 459+61	780	27,017
TOTAL	2,265	76,000

REMOVING CURB & GUTTER	
LOCATION	204.0150 LF
STA 410+94 TO 415+02	415
TOTAL	415

REMOVING GUARDRAIL	
LOCATION	204.0165 LF
STA 437+80 TO 440+50	275
TOTAL	275

EXCAVATION COMMON	
LOCATION	205.0100 CY
STA 306+39 TO 352+86	--
STA 353+74 TO 402+39	2,051
STA 411+00 TO 459+61	1,949
TOTAL	4,000

CONCRETE CURB & GUTTER	
LOCATION	601.0416 30-INCH TYPE G LF
STA 410+94 TO 415+02	415
TOTAL	415

PIPE UNDERDRAIN			
LOCATION	310.0110 BASE AGGREGATE OPEN-GRADED TON	612.0104 PIPE UNDERDRAIN 4-INCH LF	645.0111 GEOTEXTILE TYPE DF SCHEDULE A SY
STA 410+94 TO 415+02	30	380	45
TOTAL	30	380	45

SECTION CORNER MONUMENTS	
LOCATION	SPV.0060.02 EACH
STA 327+16.96	1
STA 380+34.52	1
STA 433+94.79	1
TOTAL	3

ASPHALT					
LOCATION	390.0203 BASE PATCHING ASPHALTIC SY	455.0605 TACK COAT GAL	460.6223 HMA PAVEMENT 3 MT 58-28 S TON	460.6225 5 MT 58-28 S TON	465.0120 ASPHALTIC SURFACE DRIVEWAYS AND FIELD ENTRANCES TON
STA 306+39 TO 352+86	1,666	1,650	2,800	2,390	80
STA 353+74 TO 402+39	1,667	1,700	3,500	2,480	85
STA 411+00 TO 459+61	1,667	1,850	3,700	2,730	85
TOTAL	5,000	5,200	10,000	7,600	250

PERMANENT SIGNAGE		
LOCATION	637.2210 SIGN TYPE II REFLECTIVE H SF	SPV.0060.01 POST TUBULAR STEEL 1 3/4"x1 3/4"x12' EACH
STA 312+69 R	5	1
STA 318+40 L	5	1
STA 332+92 L	5	1
STA 340+67 R	5	1
STA 345+78 L	5	1
STA 361+98 R	5	1
STA 366+21 L	5	1
STA 379+55 L	5	1
STA 392+44 L	5	1
STA 409+35 R	5	1
STA 420+39 L	5	1
STA 424+03 R	5	1
STA 433+99 L	5	1
STA 447+18 L	5	1
STA 450+85 R	5	1
STA 459+53 L	5	1
TOTAL	80	16

BASE AGGREGATE DENSE			
LOCATION	305.0110 BASE AGGREGATE DENSE 3/4-INCH TON	305.0120 BASE AGGREGATE DENSE 1 1/4-INCH TON	305.0500 SHAPING SHOULDER STA
STA 306+39 TO 352+86	240	--	--
STA 353+74 TO 402+39	255	4,100	90
STA 411+00 TO 459+61	255	3,900	100
TOTAL	750	8,000	190

STORM SEWER					
LOCATION	416.1010 CONCRETE SURFACE DRAIN CY	520.1015 APRON ENDWALLS FOR CULVERT PIPE 15-INCH EACH	608.3015 STORM SEWER PIPE REINFORCED CONCRETE CLASS III 15-INCH LF	611.0624 INLET COVERS TYPE H EACH	611.1230 CATCH BASINS 2X3-FT EACH
STA 414+99.02	4	1	--	--	--
STA 410+94 TO 415+02	--	--	205	--	--
STA 412+90.15	--	--	--	1	1
STA 414+80.47	--	--	--	1	1
TOTAL	4	1	205	2	2

3

3

CONSTRUCTION STAKING				TRAFFIC CONTROL												
	650.5500	650.6500	650.8000	643.0300		643.0420		643.0705		643.0900		643.0920		643.1050		
	CURB & GUTTER	STRUCTURE LAYOUT	RESURFACING REFERENCE									COVERING SIGNS				
LOCATION	LF	LS	LF	DRUMS		BARRICADES TYPE III		WARNING LIGHTS TYPE C		SIGNS		TYPE II		SIGNS PCMS		
				EACH	DAY	EACH	DAY	EACH	DAY	EACH	DAY	EACH	CYCLES	EACH	DAY	
STA 410+94 TO 415+02	415	--	--	STA 306+39 TO 352+86	100	7,500	10	750	20	1,500	21	1,575	5	1	2	10
STA 346+35	--	1	--	STA 353+74 TO 402+39	100	7,500	10	750	20	1,500	16	1,200	4	1	2	10
STA 306+39 TO 352+86	--	--	5000	STA 411+00 TO 459+61	100	7,500	10	750	20	1,500	24	1,800	7	1	2	10
STA 353+74 TO 402+39	--	--	5000	UNDISTRIBUTED	--	2,000	--	200	--	500	--	450	--	--	--	10
STA 411+00 TO 459+61	--	--	5000													
TOTAL	415	1	15,000	TOTAL	24,500		2,450		5,000		5,025		16		40	

3

MGS GUARDRAIL			MARKING											
	614.2300	614.2610												
	MGS	MGS GUARDRAIL												
	GUARDRAIL 3	TERMINAL EAT												
LOCATION	LF	EACH	LOCATION	646.1020		646.3020		646.5020	646.5120	646.6120	646.7120	646.8220	649.0150	649.0150
				LINE EPOXY 4-INCH		LINE EPOXY 8-INCH		ARROW		STOP LINE	DIAGONAL EPOXY	ISLAND NOSE	TEMPORARY	TEMPORARY
				YELLOW	WHITE	WHITE	YELLOW	EPOXY	WORD	EPOXY	12-INCH	EPOXY	PAINT	REFLECTIVE
				SOLID	DOUBLE	SOLID	3' LINE	TYPE 2	EPOXY	18-INCH	YELLOW	YELLOW	4-INCH	TAPE
				LF	LF	LF	LF	EACH	EACH	LF	LF	EACH	LF	LF
STA 438+33 TO 439+96 R	163	--	STA 306+39 TO 352+86	730	1,540	1,065	7,780	4	4	45	40	1	9,800	4,930
STA 437+80 TO 438+33 R	--	1	STA 353+74 TO 402+39	--	2,520	925	7,680	6	6	45	40	1	10,100	5,240
STA 439+96 TO 440+49 R	--	1	STA 411+00 TO 459+61	--	2,930	970	8,860	1	--	--	220	1	10,100	5,240
TOTAL	163	2	SUBTOTAL	730	6,990	2,960	24,320	--	--	--	300	--	--	--
			TOTAL	35,000		2,400		11	10	90	300	3	30,000	15,410

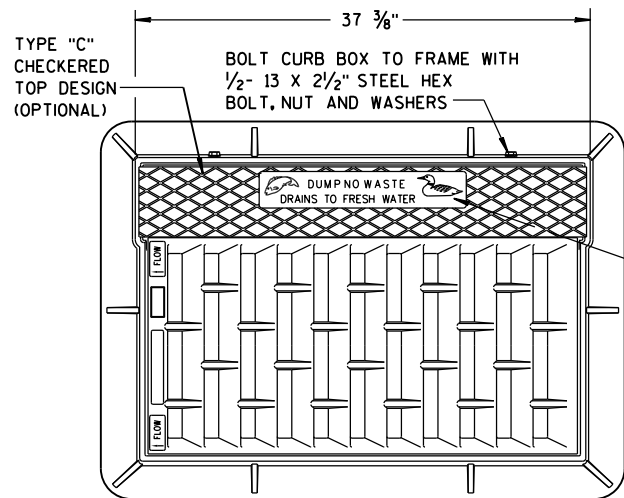
EROSION CONTROL														MOBILIZATION	
	606.0200	625.0100	627.0200	628.1104	628.1504	628.1520	628.2027	628.7015	628.7504	628.7570	630.0200	645.0120	SPV.0180.01	LOCATION	619.1000
	RIPRAP	TOPSOIL	MULCHING	EROSION	SILT	SILT FENCE	EROSION MAT	INLET	TEMPORARY	ROCK	SEEDING	GEOTEXTILE	HYDROSEED		EACH
	MEDIUM	SY	SY	BALES	FENCE	MAINTENANCE	CLASS II	PROTECTION	DITCH	BAGS	TEMPORARY	TYPE HR			
LOCATION	CY			EACH	LF	LF	TYPE C	TYPE C	CHECKS	EACH	LB	SY	SY		
STA 415+11	5	--	--	--	--	--	--	--	--	--	--	--	--		
STA 344+00 TO 348+00	--	40	--	--	--	--	500	--	20	--	--	--	1,000		
STA 415+28	--	--	--	--	--	--	--	--	10	--	--	--	--		
STA 349+04 L	--	--	--	--	--	--	--	1	--	--	--	--	--		
STA 354+15 L & R	--	--	--	--	--	--	--	2	--	--	--	--	--		
STA 382+94 L	--	--	--	--	--	--	--	1	--	--	--	--	--		
STA 383+56 L	--	--	--	--	--	--	--	1	--	--	--	--	--		
STA 409+50 L	--	--	--	--	--	--	--	1	--	--	--	--	--		
STA 411+00 L	--	--	--	--	--	--	--	1	--	--	--	--	--		
STA 412+90 L	--	--	--	--	--	--	--	1	--	--	--	--	--		
STA 414+80 L	--	--	--	--	--	--	--	1	--	--	--	--	--		
STA 459+70 L & R	--	--	--	--	--	--	--	2	--	--	--	--	--		
UNDISTRIBUTED	--	2,960	200	20	200	200	750	--	--	50	200	40	4,000		
TOTAL	5	3,000	200	20	200	200	1,250	11	30	50	200	40	5,000		

SAWING	
	690.0150
	SAWING
	ASPHALT
LOCATION	CY
STA 306+39 TO 352+86	950
STA 353+74 TO 402+39	1,010
STA 411+00 TO 459+61	1,040
TOTAL	3,000

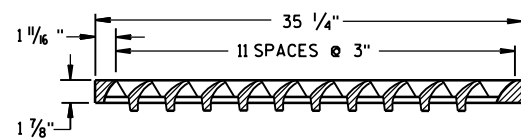
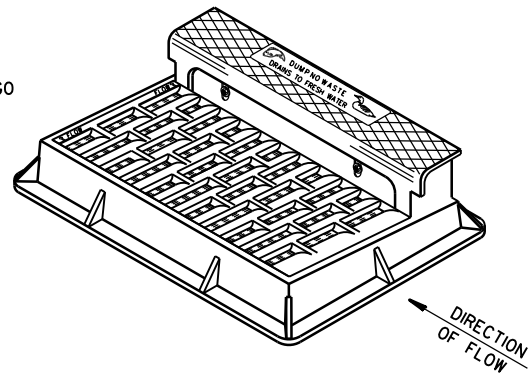


Standard Detail Drawing List

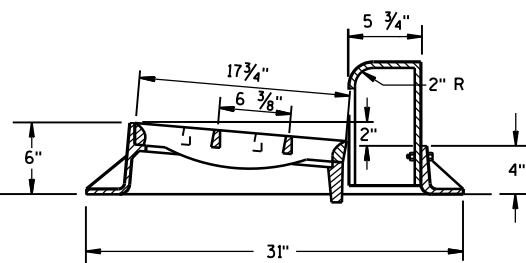
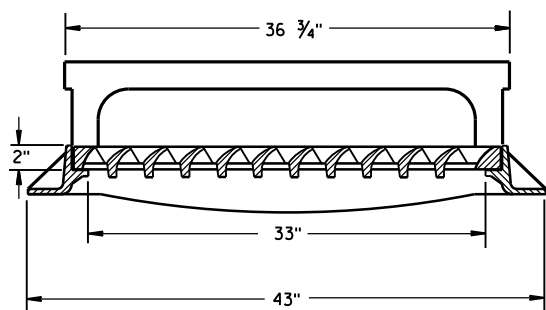
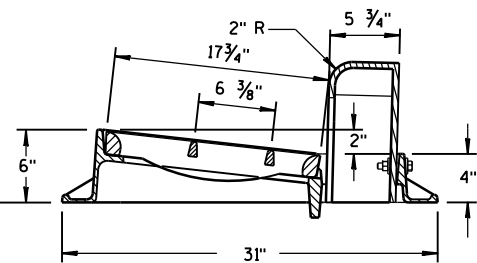
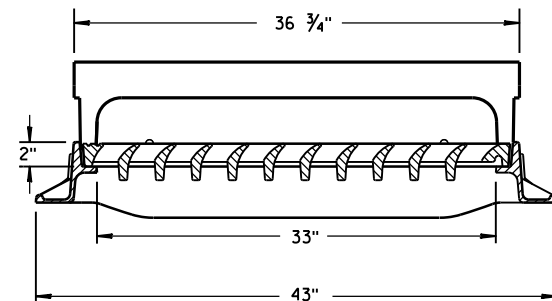
08A05-19A	INLET COVERS TYPE A, H, A-S, H-S & Z
08A09-02	CATCH BASINS 2X3-FT AND 2.5X3-FT
08D01-21A	CONCRETE CURB & GUTTER
08D04-05	CONCRETE SURFACE DRAINS & ASPHALTIC FLUMES
08E08-03	TYPICAL INSTALLATIONS OF EROSION BALES / TEMPORARY DITCH CHECKS
08E09-06	SILT FENCE
08E10-02	INLET PROTECTION TYPE A, B, C AND D
08F01-11	APRON ENDWALLS FOR CULVERT PIPE
14B42-06A	MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL
14B42-06B	MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL
14B42-06C	MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL
14B42-06D	MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL
14B44-04A	MIDWEST GUARDRAIL SYSTEM ENERGY ABSORBING TERMINAL (MGS)
14B44-04B	MIDWEST GUARDRAIL SYSTEM ENERGY ABSORBING TERMINAL (MGS)
14B44-04C	MIDWEST GUARDRAIL SYSTEM ENERGY ABSORBING TERMINAL (MGS)
15C05-05	TRAFFIC CONTROL, ADVANCE WARNING SIGNS 40 M.P.H. OR LESS
15C07-15B	PAVEMENT MARKING WORDS
15C07-15C	PAVEMENT MARKING ARROWS
15C08-20A	LONGITUDINAL MARKING (MAINLINE)
15C08-20B	PAVEMENT MARKING (TURN LANES)
15C08-20C	PAVEMENT MARKING (TURN LANES)
15C11-08B	CHANNELIZING DEVICES DRUMS, CONES, BARRICADES AND VERTICAL PANELS
15C12-07	TRAFFIC CONTROL FOR LANE CLOSURE WITH FLAGGING OPERATION
15C18-04	MEDIAN ISLAND MARKING
15C33-04	STOP LINE AND CROSSWALK PAVEMENT MARKING
15C35-04A	PAVEMENT MARKING (INTERSECTIONS)
15D38-02A	TEMPORARY TRAFFIC CONTROL SIGN MOUNTING
15D38-02B	ATTACHMENT OF SIGNS TO POSTS
16A01-07	LANDMARK REFERENCE MONUMENTS AND COVERS



NOTE:  
GRATE IS REVERSIBLE.

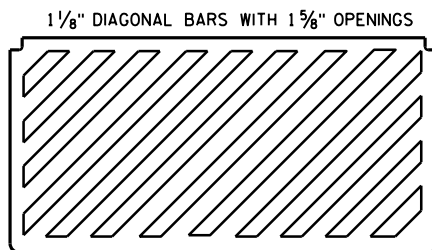


NOTE: CURB BOX HEIGHT ADJUSTABLE 6" TO 9"



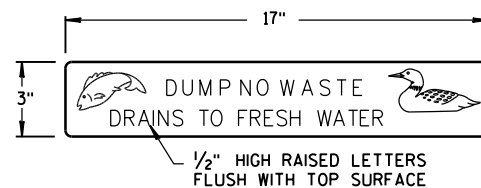
TYPE "H"

NOTE: EITHER CASTING IS ACCEPTABLE

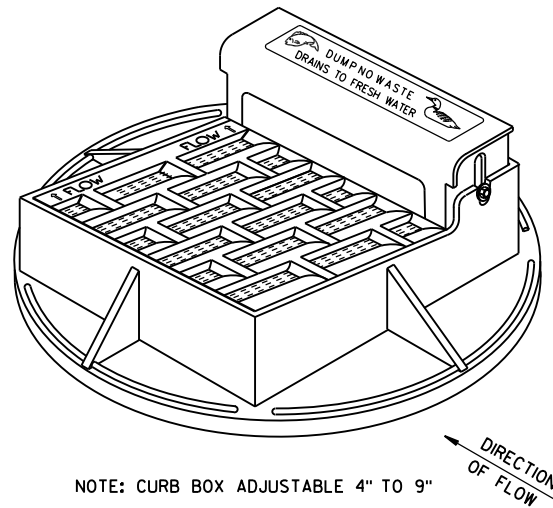


SPECIAL GRATE FOR  
TYPE "H" COVER

(MEASURES 35 1/4" X 17 3/4" X 2")  
(NOTED AS TYPE H-S ON DRAINAGE TABLE)

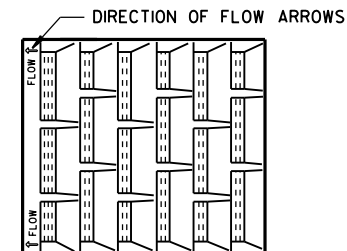


LOGO DETAIL

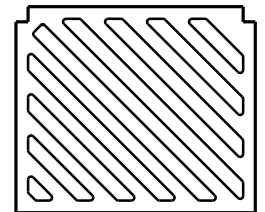


NOTE: CURB BOX ADJUSTABLE 4" TO 9"

NOTE:  
GRATE IS REVERSIBLE.

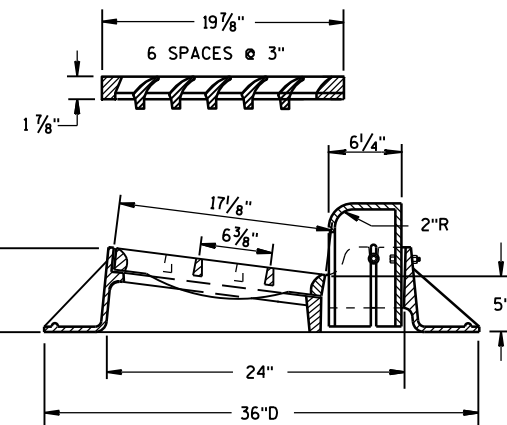
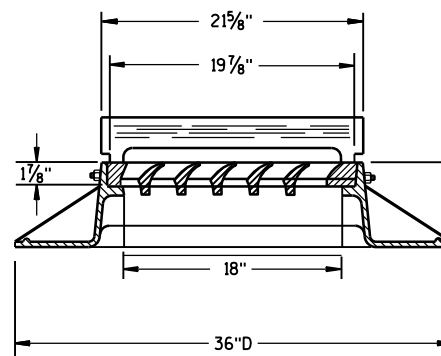


1" DIAGONAL BARS  
WITH 1 1/2" OPENINGS

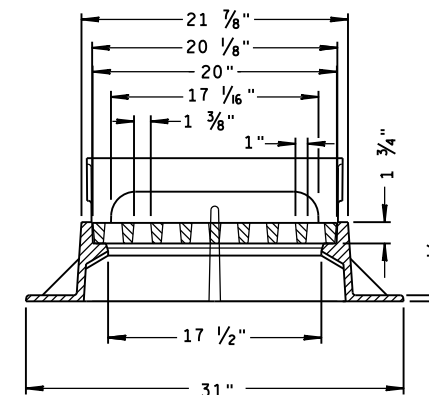
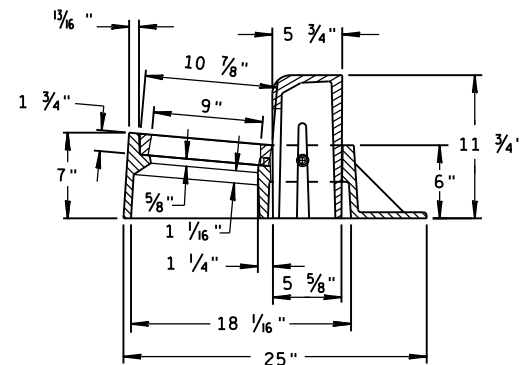


SPECIAL GRATE FOR  
TYPE "A" COVER

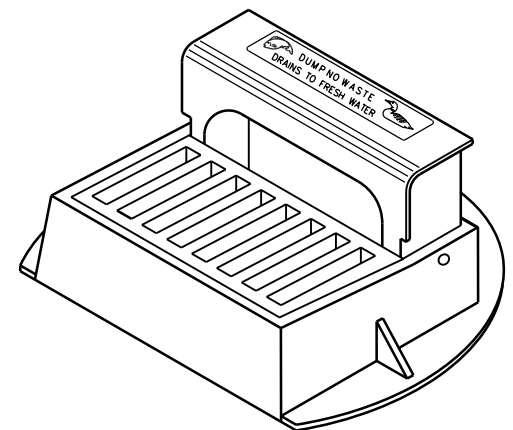
(MEASURES 19 3/4" X 17" X 1 1/8")  
(NOTED AS TYPE A-S ON DRAINAGE TABLE)



TYPE "A"



TYPE "Z"



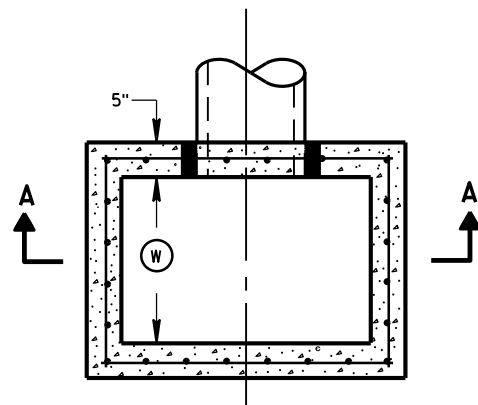
INLET COVERS  
TYPE A, H, A-S, H-S & Z

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

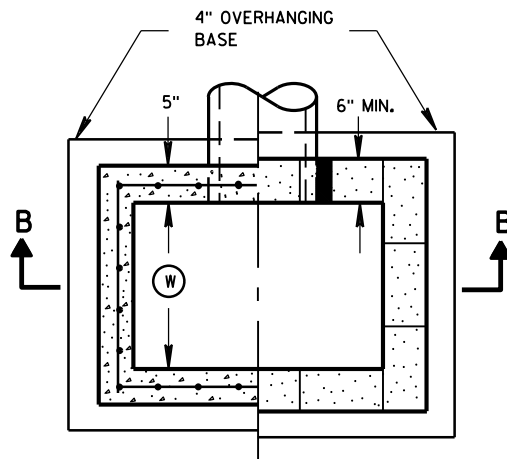
APPROVED  
11-27-13  
DATE  
FHWA

/S/ Jerry H. Zogg  
ROADWAY STANDARDS DEVELOPMENT  
ENGINEER

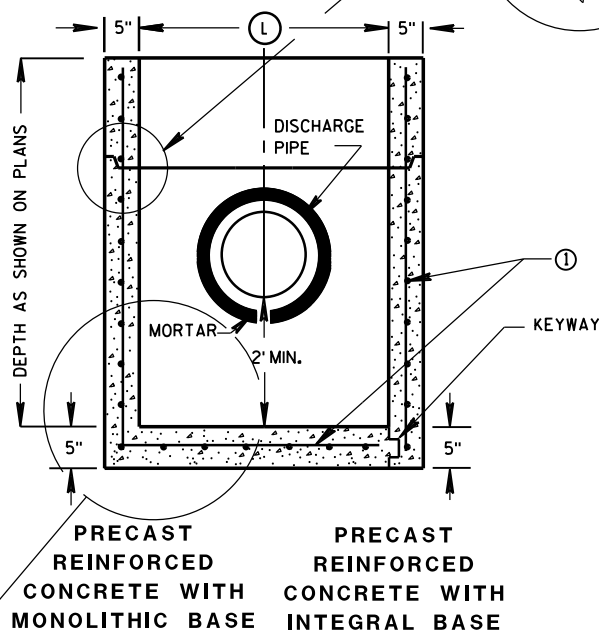
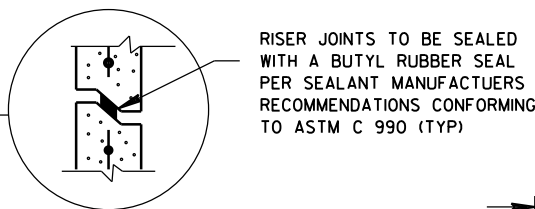




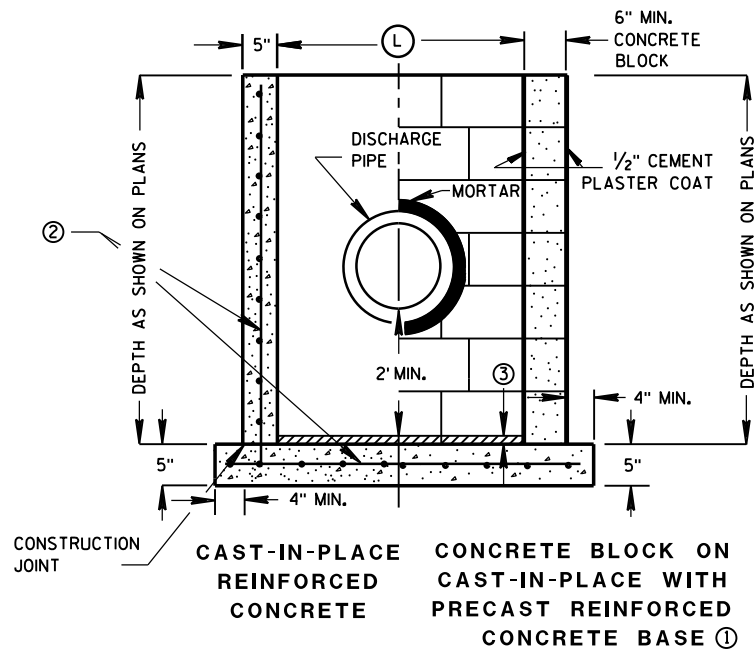
PLAN VIEW



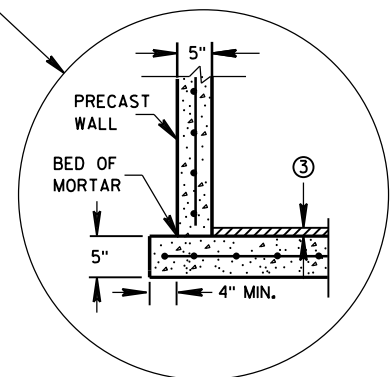
PLAN VIEW



SECTION A-A



SECTION B-B



SEPARATE PRECAST REINFORCED CONCRETE BASE OPTION

CATCH BASINS 2X3-FT AND 2.5X3-FT

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

UNLESS OTHERWISE AUTHORIZED IN WRITING BY THE ENGINEER, THE CONTRACTOR SHALL NOT ORDER AND DELIVER PRECAST CATCH BASIN UNITS REQUIRED FOR THE PROJECT UNTIL A LIST OF SIZES IS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR PROPOSED ALTERNATE DESIGNS FOR UNDERGROUND DRAINAGE STRUCTURES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PROVIDING THAT SUCH ALTERNATE DESIGNS MAKE PROVISION FOR EQUIVALENT CAPACITY AND STRENGTH.

ALL PRECAST CATCH BASIN UNITS SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF ASTM C 913.

ALL DRAINAGE STRUCTURES ARE DESIGNATED ON THE PLANS AS "MANHOLES 3X3-L", "CATCH BASINS 4-B", "INLETS 2X3-H", ETC. THE FIRST NUMBERS DESIGNATES THE SIZE OF THE STRUCTURE, AND THE FOLLOWING LETTER DESIGNATES THE TYPE OF COVER TO BE USED TO COMPRISE THE COMPLETE UNIT.

BASES SHALL BE PLACED ON A BED OF MATERIAL AT LEAST 6 INCHES IN DEPTH, WHICH MEETS THE REQUIREMENTS OF FOUNDATION BACKFILL. THIS BEDDING SHALL BE COMPACTED AND PROVIDE UNIFORM SUPPORT FOR THE ENTIRE AREA OF THE BASE.

ALL BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2 INCHES CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

PRECAST REINFORCED RISERS SHALL HAVE A TONGUE AND GROOVE JOINT WITH TONGUE UP OR DOWN.

4" OVERHANGING BASES ARE REQUIRED FOR CAST-IN-PLACE REINFORCED CONCRETE AND CONCRETE BLOCK INSTALLATIONS. 4" OVERHANG IS REQUIRED WHEN SEPARATE PRECAST BASE IS PROVIDED. OVERHANG IS NOT REQUIRED ON PRECAST STRUCTURES WITH AN INTEGRAL OR MONOLITHIC BASE.

MAXIMUM INSIDE PIPE DIAMETER DETERMINED BY 3" CLEARANCE ON EACH SIDE OF THE OUTSIDE WALL OF THE PIPE. SEE DETAIL "A". ASSUMES PIPE ENTERS PERPENDICULAR TO THE STRUCTURE.

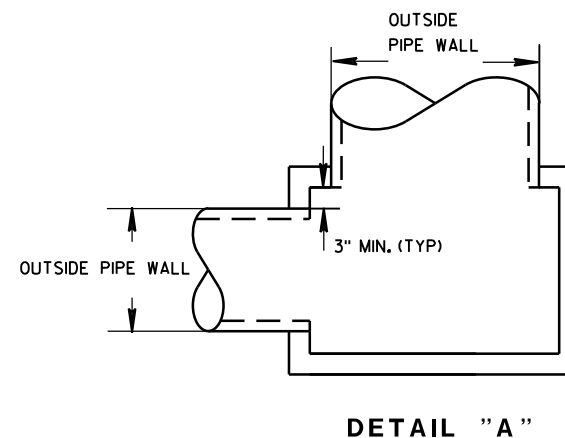
- ① FOR PRECAST CATCH BASINS PROVIDE REINFORCING STEEL IN ACCORDANCE TO ASTM C 913.
- ② CONTRACTOR TO PROVIDE DRAWING(S) STAMPED BY A PROFESSIONAL ENGINEER FOR STEEL REINFORCING DESIGN FOR CAST-IN-PLACE STRUCTURES.
- ③ 1" CONCRETE KEY POURED AFTER INSTALLATION. 2" SUMP MEASURED FROM TOP OF KEY.

CATCH BASIN COVER MATRIX

CATCH BASIN SIZE	WIDTH ① (FT)	LENGTH ② (FT)	F	ALL H'S
2X3-FT	2	3		X
2.5X3-FT	2.5	3	X	

PIPE MATRIX

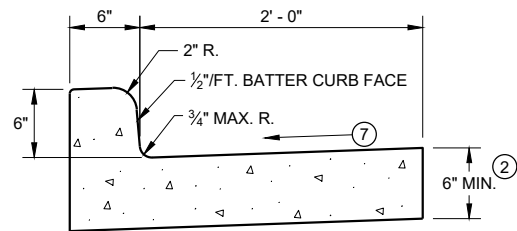
CATCH BASIN SIZE	MAXIMUM INSIDE PIPE DIAMETER FOR TWO PIPES	
	WIDTH (IN)	LENGTH (IN)
2X3-FT	12	24
2.5X3-FT	18	24



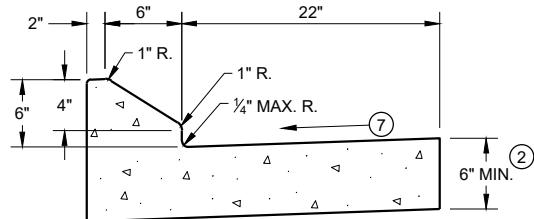
CATCH BASINS 2X3-FT AND 2.5X3-FT

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

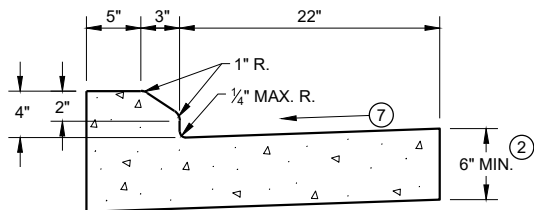
APPROVED  
Sep 1, 2016 /S/ Rodney Taylor  
DATE ROADWAY STANDARDS DEVELOPMENT  
FHWA UNIT SUPERVISOR



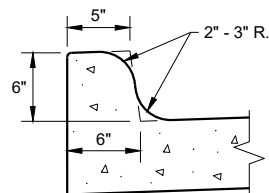
TYPES A<sup>①</sup> & D



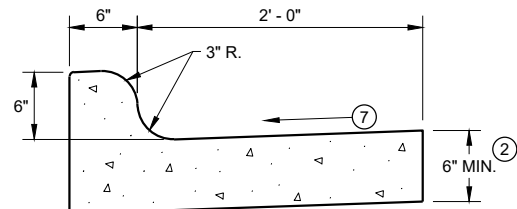
6" SLOPED CURB TYPES G<sup>①</sup> & J



4" SLOPED CURB TYPES G<sup>①</sup> & J

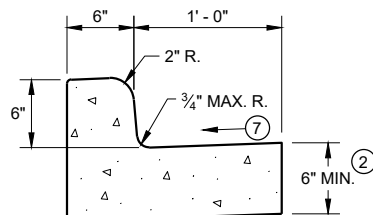


TYPES K<sup>①</sup> & L  
(OPTIONAL CURB SHAPE)



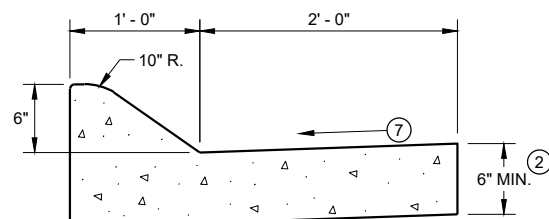
TYPES K<sup>①</sup> & L

CONCRETE CURB AND GUTTER 30"

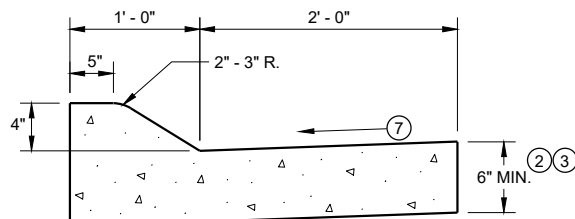


TYPES A<sup>①</sup> & D

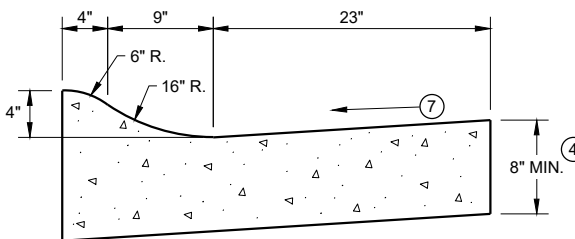
CONCRETE CURB AND GUTTER 18"



6" SLOPED CURB TYPES A<sup>①</sup> & D



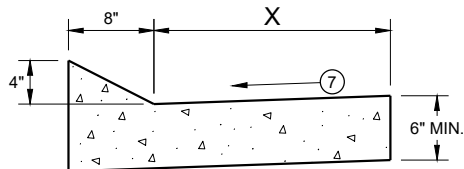
4" SLOPED CURB TYPES A<sup>①</sup> & D



4" SLOPED CURB TYPES R<sup>①</sup> & T<sup>⑤</sup>

CONCRETE CURB AND GUTTER 36"

TBT & TBTT	X
30"	22"
36"	28"

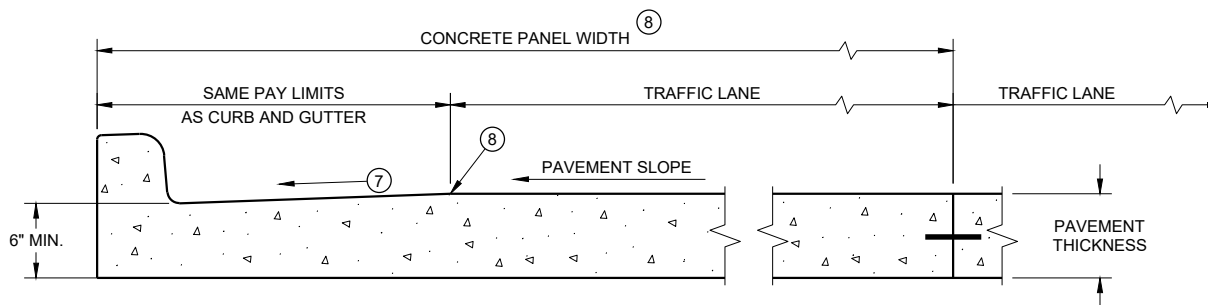


TYPES TBT & TBTT<sup>①</sup>

CONCRETE CURB AND GUTTER

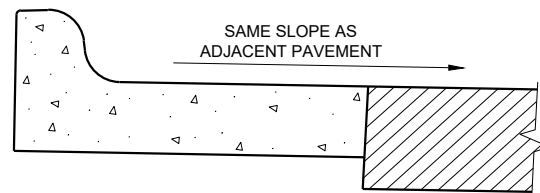
PAVEMENT THICKNESS  
AND MAXIMUM CONCRETE  
PANEL WIDTH TABLE

PAVEMENT THICKNESS	MAXIMUM PANEL WIDTH
LESS THAN 10"	12'
10" & ABOVE	15'



PARTIAL SECTION OF PAVEMENT \*  
WITH INTEGRAL CURB AND GUTTER

\* BIKE LANE IS NOT SHOWN



REVERSE SLOPE GUTTER<sup>⑥</sup>  
(TYPICAL FOR ALL CURB & GUTTER TYPES)

CONCRETE CURB AND GUTTER

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

GENERAL NOTES

DETAILS OF CONSTRUCTION AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE CONTRACT.

PAVEMENT TIES AND TIE BARS SHALL BE EPOXY COATED IN CONFORMANCE WITH SUBSECTION 505.2.6.2 OF THE STANDARD SPECIFICATIONS.

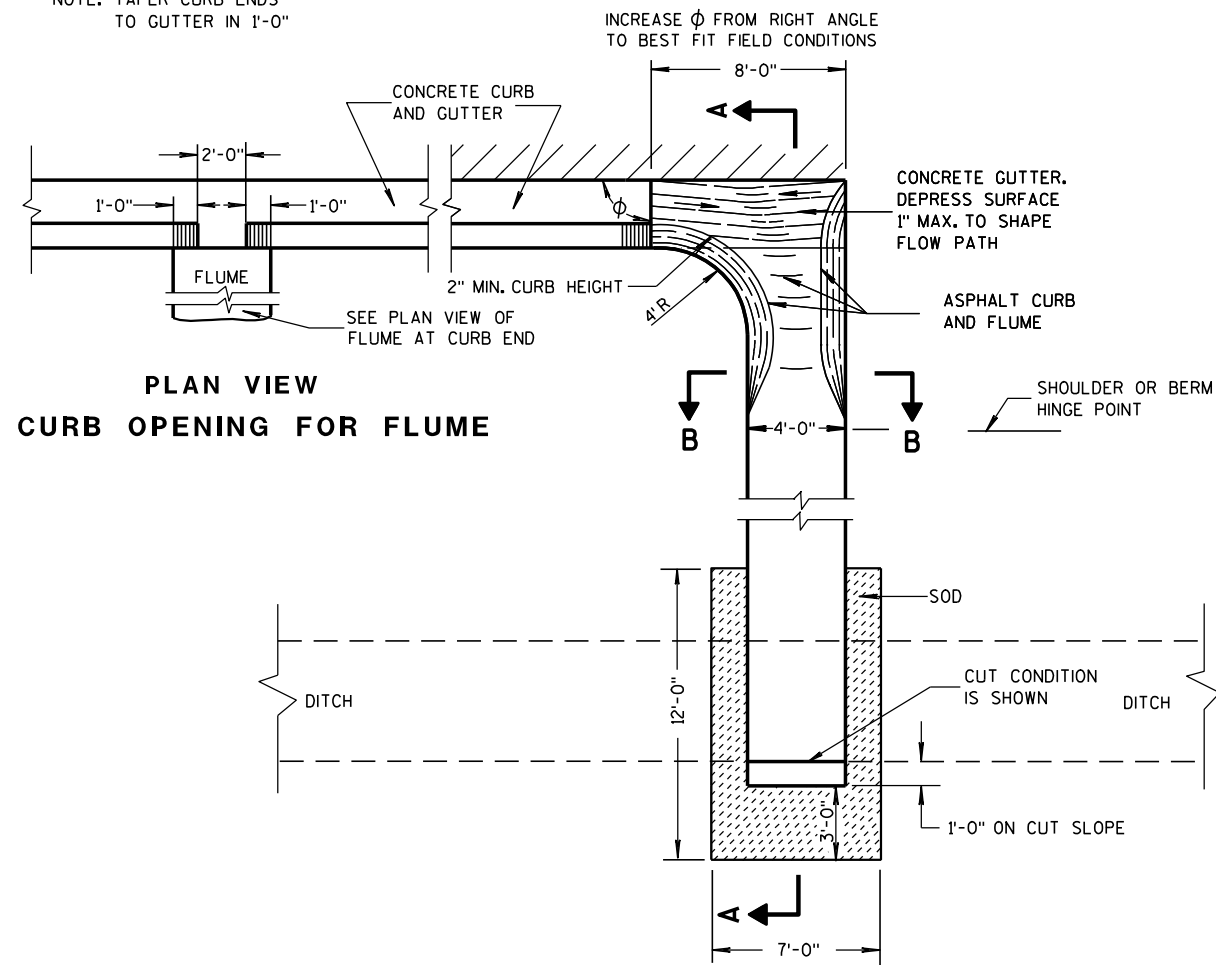
INTEGRAL CURB AND GUTTER SHALL CONFORM TO THE DETAILS SHOWN FOR CONCRETE CURB AND GUTTER INCLUDING THE TRANSVERSE GUTTER SLOPE.

UNLESS OTHERWISE SHOWN ON THE TYPICAL CROSS SECTIONS, THE BASE AGGREGATE AND COMMON EXCAVATION LIMITS ARE 2' - 0" BEHIND THE BACK OF CURBS.

- ① TIE BARS ARE REQUIRED FOR CURB AND GUTTERS TYPES A, G, K, R, AND TBTT.
- ② THE BOTTOM OF CURB AND GUTTER MAY BE CONSTRUCTED EITHER LEVEL OR PARALLEL TO THE SLOPE OF THE SUBGRADE OR BASE AGGREGATE PROVIDED A 6" MINIMUM GUTTER THICKNESS IS MAINTAINED.
- ③ USE 8" MINIMUM GUTTER THICKNESS WHEN USED WITH AN ADJACENT CONCRETE TRUCK APRON PLACED BEHIND BACK OF CURB.
- ④ THE BOTTOM OF CURB AND GUTTER MAY BE CONSTRUCTED EITHER LEVEL OR PARALLEL TO THE SLOPE OF THE SUBGRADE OR BASE AGGREGATE PROVIDED A 8" MINIMUM GUTTER THICKNESS IS MAINTAINED.
- ⑤ THE FACE OF CURB IS 6" FROM THE BACK OF CURB.
- ⑥ WHEN REVERSE SLOPE GUTTER IS REQUIRED, THE LOCATION(S) WILL BE SHOWN ELSEWHERE IN THE PLAN.
- ⑦ USE 4% GUTTER CROSS SLOPE UNLESS OTHERWISE NOTED IN THE PLANS.
- ⑧ INCLUDE LONGITUDINAL JOINT AND TIE BARS ALONG LANE EDGE WHEN CONCRETE PANEL WIDTH EXCEEDS THE MAXIMUM WIDTH PER TABLE BELOW. LONGITUDINAL JOINT(S) ARE NOT ALLOWED WITHIN TRAFFIC LANES AND BIKE LANES. LONGITUDINAL JOINT MAY BE SAWED.

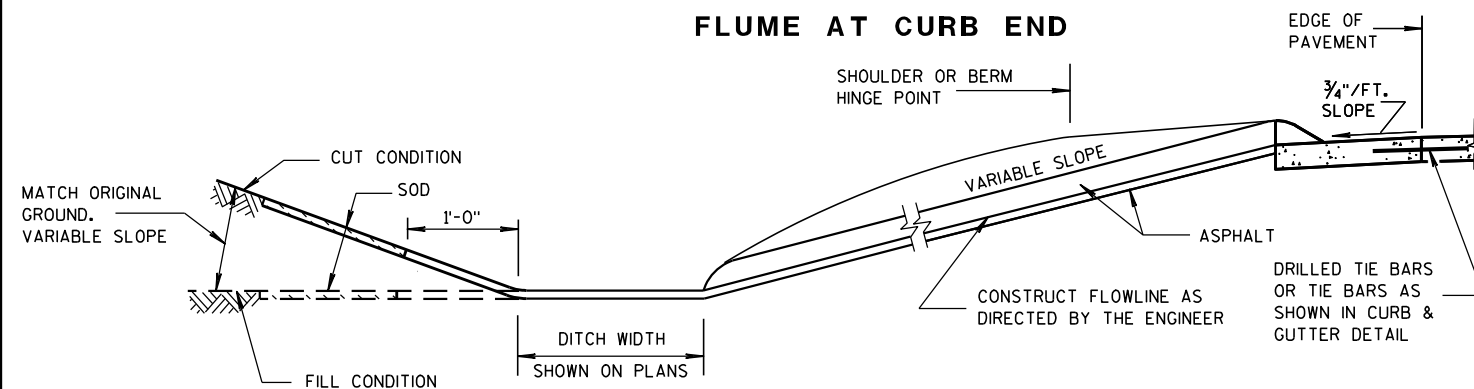
## ASPHALTIC FLUME

NOTE: TAPER CURB ENDS  
TO GUTTER IN 1'-0"

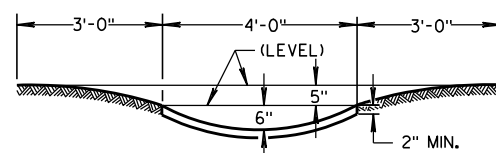


PLAN VIEW  
CURB OPENING FOR FLUME

PLAN VIEW  
FLUME AT CURB END



SECTION A-A



SECTION B-B

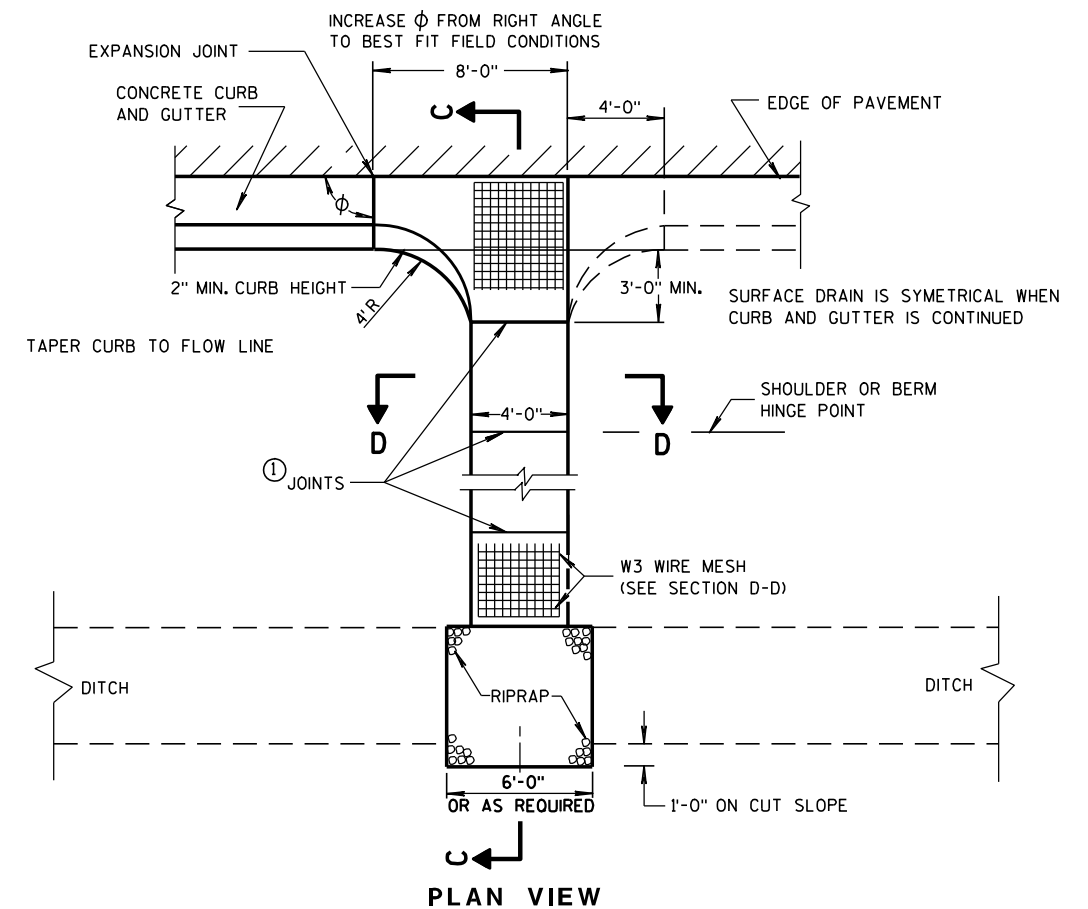
## GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.

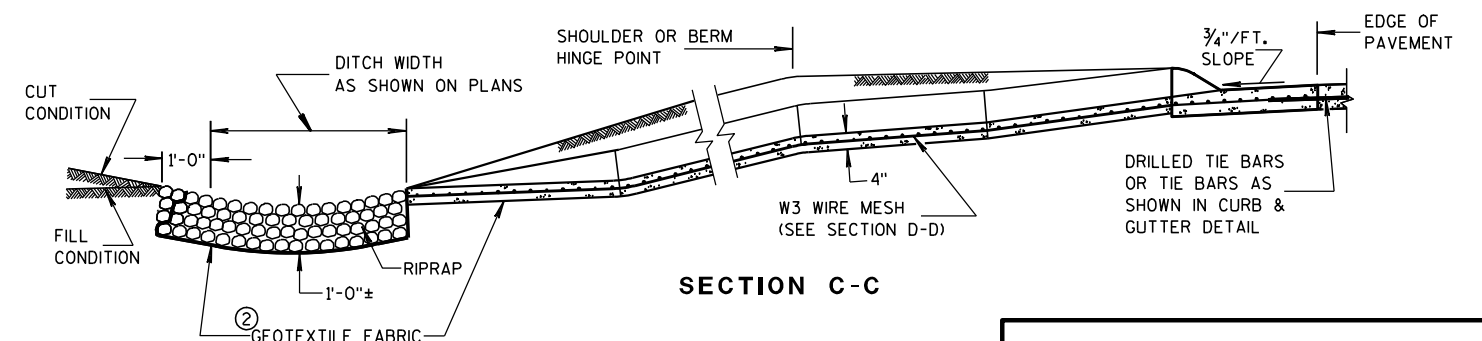
WELDED STEEL WIRE FABRIC SHALL BE IN ACCORDANCE WITH AASHTO SPECIFICATION M55.

- ① JOINTS SHALL BE 1/8" TO 1/4" INCH WIDE BY 1 1/2" INCHES DEEP AND SPACED AT UNIFORM INTERVALS OF APPROXIMATELY 4 FEET.
- ② GEOTEXTILE FABRIC TYPE "R" SHALL UNDERLAY THE FULL LENGTH AND WIDTH OF THE CONCRETE SURFACE DRAIN AND RIPRAP.
- ③ CONCRETE SURFACE DRAIN WITHOUT CURB AND GUTTER MAY BE USED ON BACKSLOPES WHEN SPECIFIED

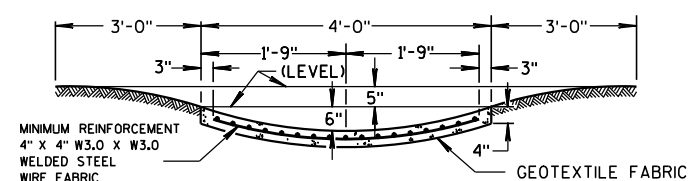
## ③ CONCRETE SURFACE DRAIN



PLAN VIEW



SECTION C-C



SECTION D-D

## CONCRETE SURFACE DRAINS & ASPHALTIC FLUMES

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED

9-4-08

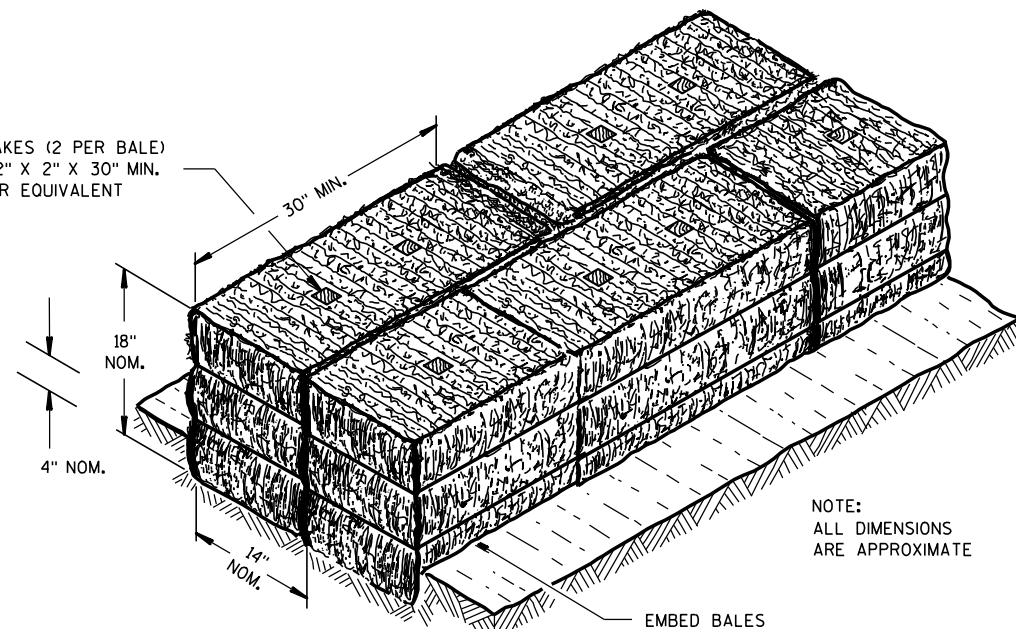
DATE

FHWA

/S/ Jerry H. Zogg  
ROADWAY STANDARDS DEVELOPMENT  
ENGINEER



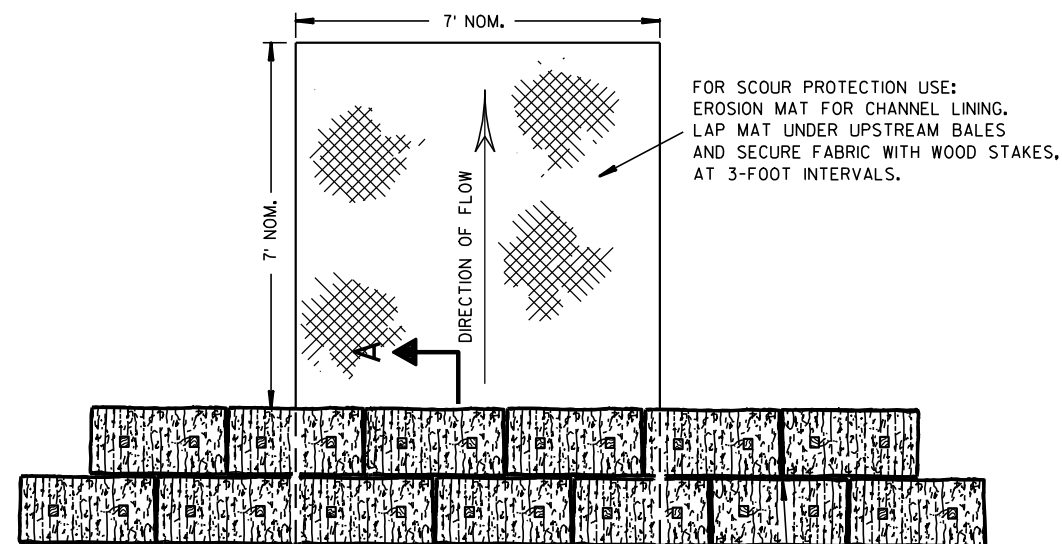
WOOD STAKES (2 PER BALE)  
NOMINAL 2" X 2" X 30" MIN.  
LENGTH OR EQUIVALENT



NOTE:  
ALL DIMENSIONS  
ARE APPROXIMATE

EMBED BALES

SECTION A-A

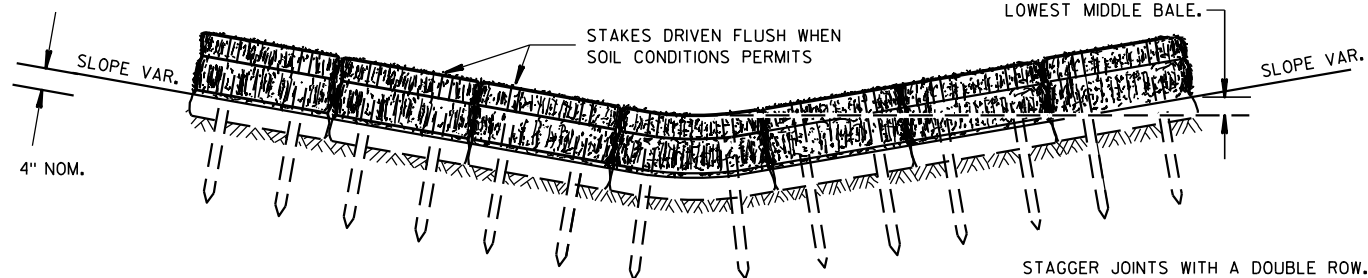


FOR SCOUR PROTECTION USE:  
EROSION MAT FOR CHANNEL LINING.  
LAP MAT UNDER UPSTREAM BALES  
AND SECURE FABRIC WITH WOOD STAKES,  
AT 3-FOOT INTERVALS.

STAGGER JOINTS BETWEEN ADJACENT  
ROWS OF BALES.

PLAN VIEW

BOTTOM ELEVATION OF END BALE SHALL  
BE EQUAL TO OR GREATER THAN TOP OF  
LOWEST MIDDLE BALE.



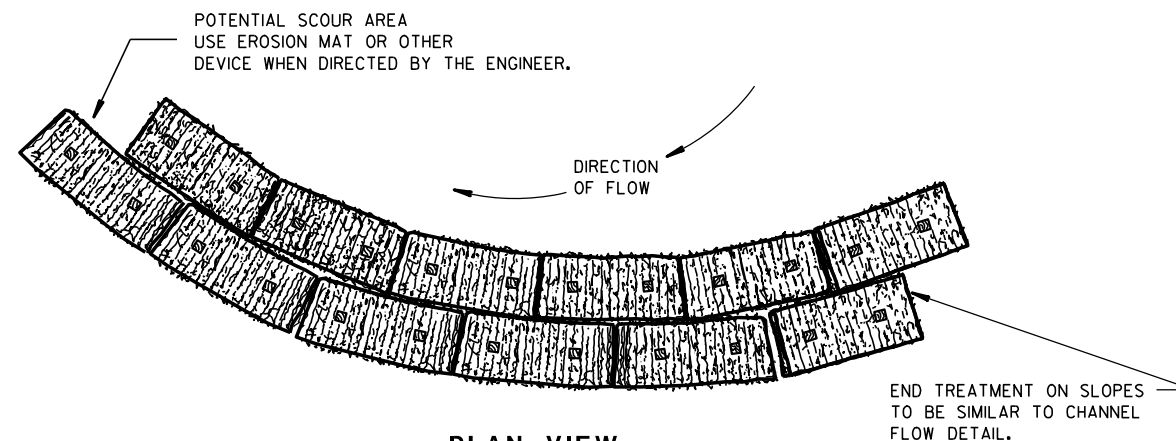
FRONT ELEVATION

TEMPORARY DITCH CHECK USING EROSION BALES ①

## GENERAL NOTES

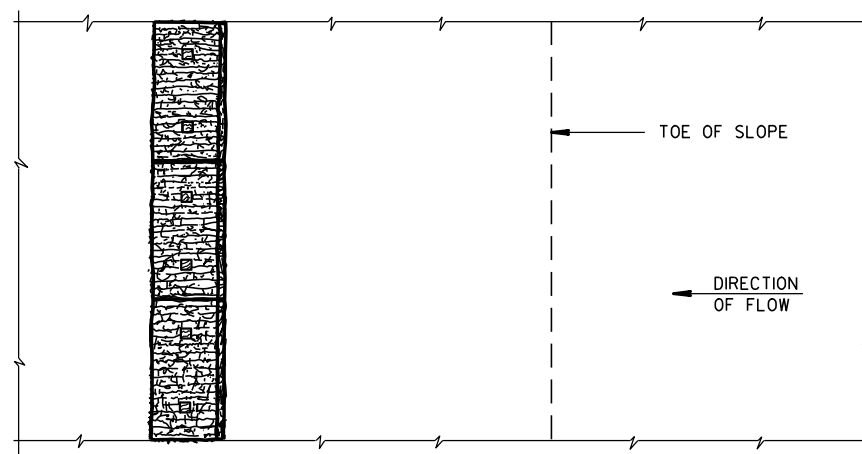
DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

- ① TEMPORARY DITCH CHECKS EITHER EROSION BALES OR MANUFACTURED SHALL BE PAID FOR UNDER THE BID ITEM OF TEMPORARY DITCH CHECK. THE DEPARTMENT WILL NOT PAY FOR TEMPORARY DITCH CHECKS CONSTRUCTED OF A SINGLE ROW OF EROSION BALES.

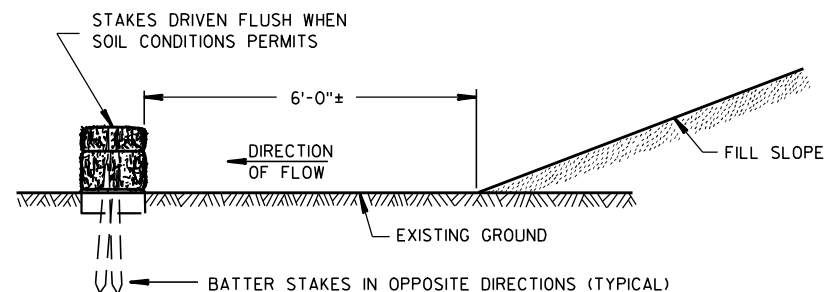


PLAN VIEW

WHEN ALTERING THE DIRECTION OF FLOW



PLAN VIEW



FRONT ELEVATION

WHEN EXISTING GROUND SLOPES AWAY FROM FILL SLOPE

EROSION BALES FOR SHEET FLOW

## TYPICAL INSTALLATIONS OF EROSION BALES / TEMPORARY DITCH CHECKS

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED

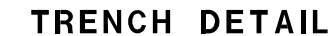
6/04/02  
DATE

/S/ Beth Canestra  
CHIEF ROADWAY DEVELOPMENT ENGINEER

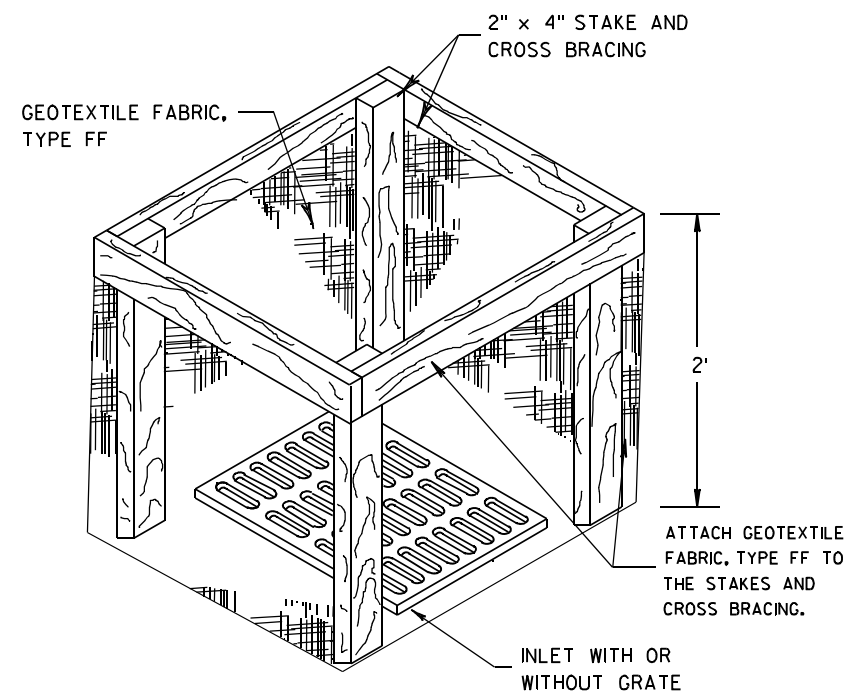
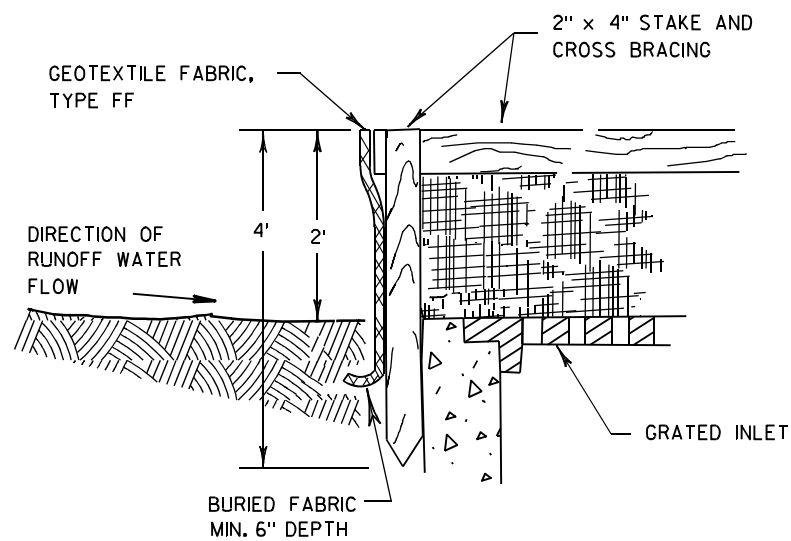
FHWA



- ① HORIZONTAL BRACE REQUIRED WITH 2" X 4" WOODEN FRAME OR EQUIVALENT AT TOP OF POSTS.
- ② FOR MANUAL INSTALLATIONS THE TRENCH SHALL BE A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
- ③ WOOD POSTS SHALL BE A MINIMUM SIZE OF 1½" X 1½" OF OAK OR HICKORY.
- ④ SILT FENCE TO EXTEND ACROSS THE TOP OF THE PIPE.
- ⑤ CONSTRUCT SILT FENCE FROM A CONTINUOUS ROLL IF POSSIBLE BY CUTTING LENGTHS TO AVOID JOINTS. IF A JOINT IS NECESSARY USE ONE OF THE FOLLOWING TWO METHODS; A) OVERLAP THE END POSTS AND TWIST, OR ROTATE, AT LEAST 180 DEGREES, B) HOOK THE END OF EACH SILT FENCE LENGTH.



<div style="text-align: center;"><b>SILT FENCE</b></div>	
<div style="text-align: center;"><b>STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION</b></div>	
<div>APPROVED <u>4-29-05</u> DATE</div>	<div><u>/S/ Beth Cannestra</u> CHIEF ROADWAY DEVELOPMENT ENGINEER</div>



**INLET PROTECTION, TYPE A**

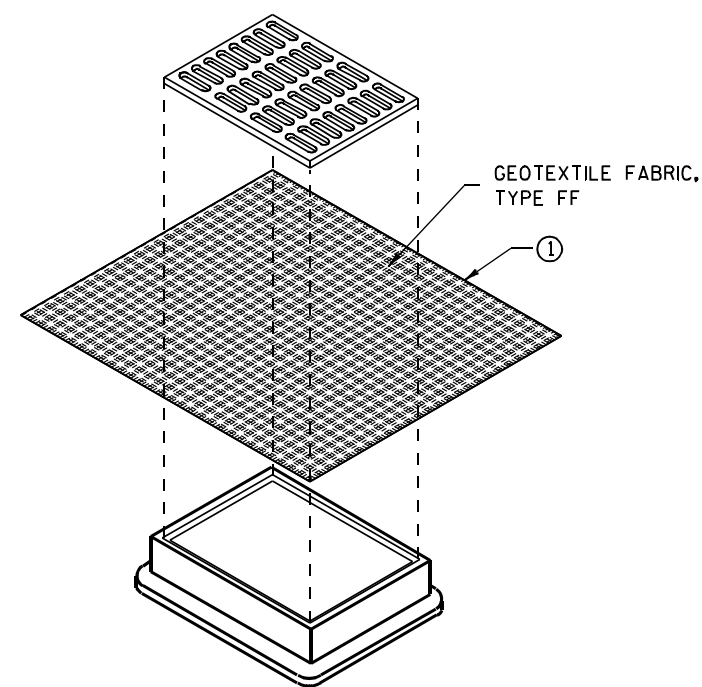
**GENERAL NOTES**

INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

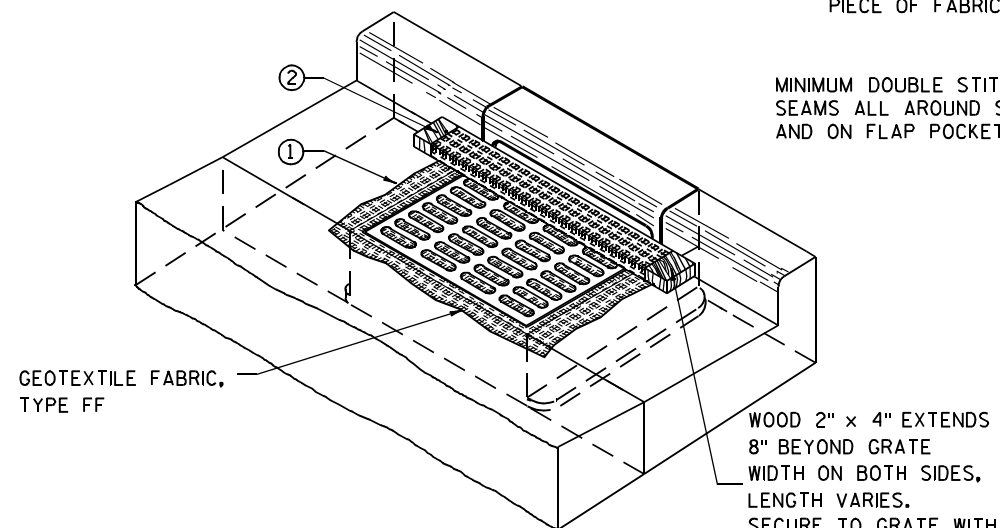
WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

- ① FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- ② FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
- ③ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.



**INLET PROTECTION, TYPE B  
(WITHOUT CURB BOX)**

(CAN BE INSTALLED IN ANY INLET WITHOUT A CURB BOX)



**INLET PROTECTION, TYPE C (WITH CURB BOX)**

**INSTALLATION NOTES**

**TYPE B & C**

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

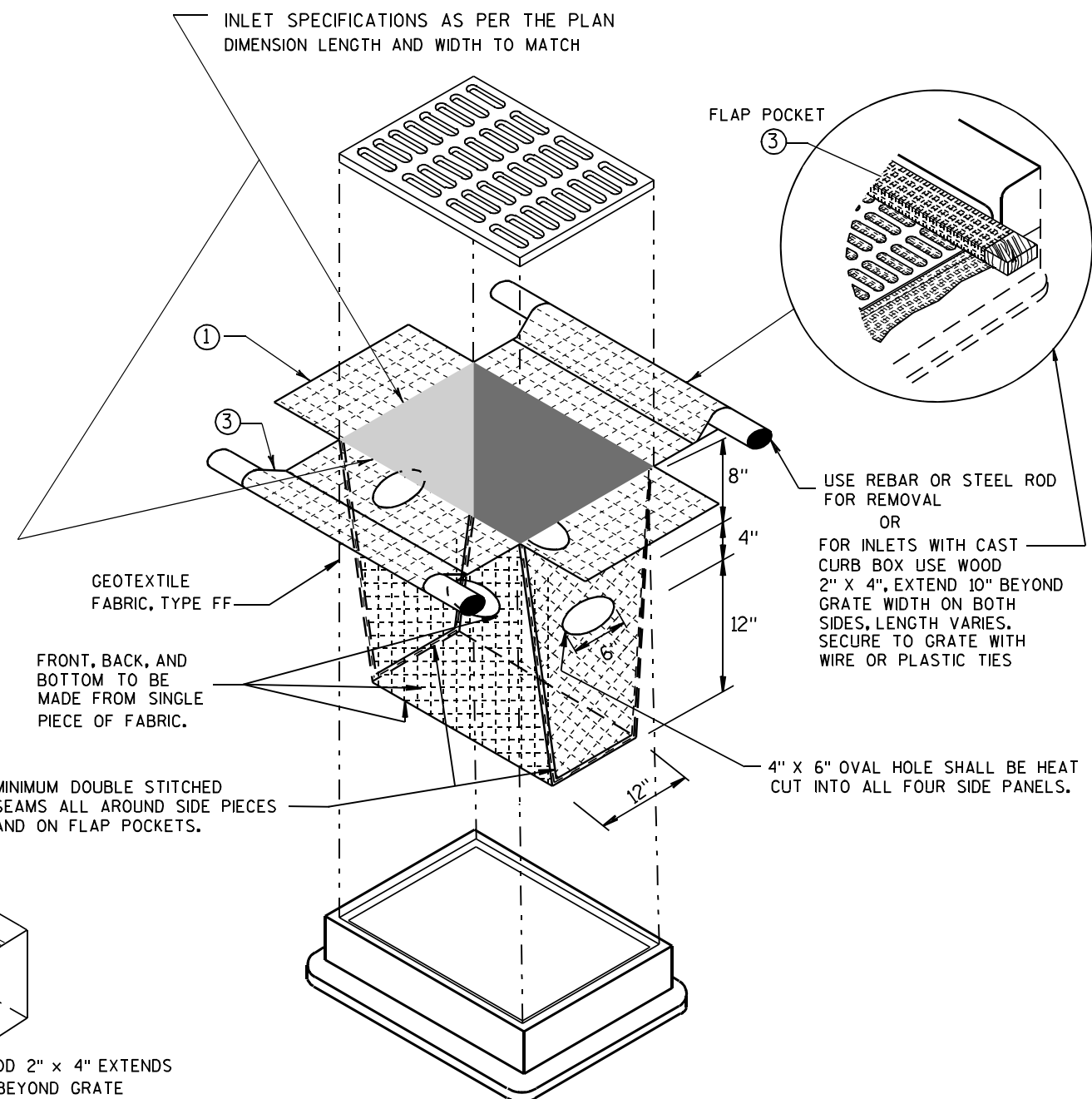
THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.

**TYPE D**

DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLower THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.



**INLET PROTECTION, TYPE D**

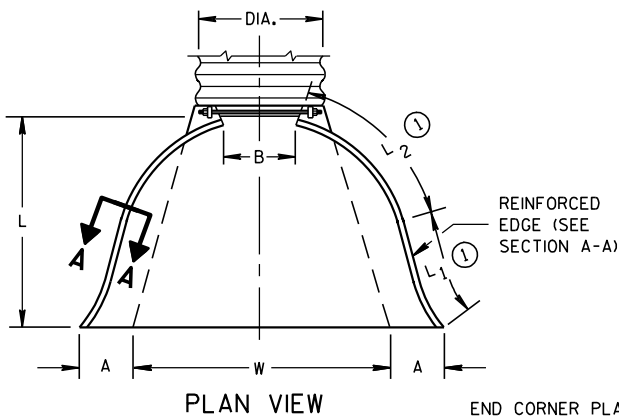
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX AS PER NOTE ②)

<b>INLET PROTECTION TYPE A, B, C, AND D</b>	
<b>STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION</b>	
APPROVED 10/16/02 DATE	/S/ Beth Cannestra CHIEF ROADWAY DEVELOPMENT ENGINEER
FHWA	



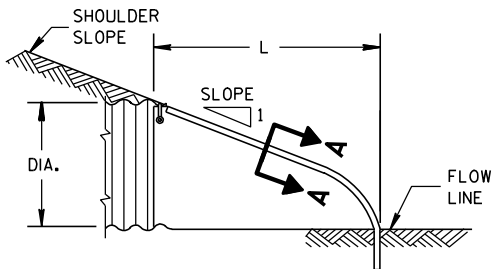
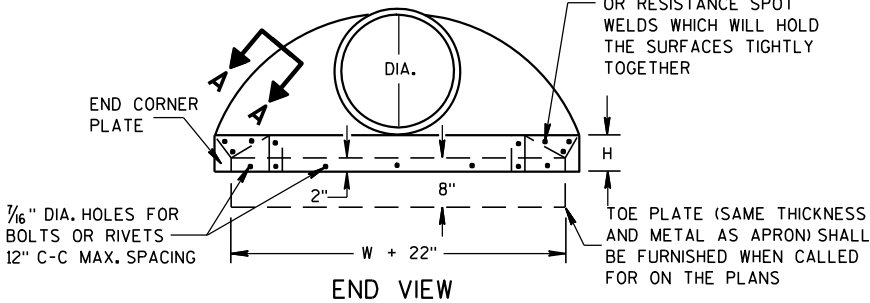
METAL APRON ENDWALLS												
PIPE DIA. (IN.)	MIN. THICK. (Inches)		DIMENSIONS (Inches)							APPROX. SLOPE		BODY
	STEEL	ALUM.	A (±1")	B (MAX.)	H (±1")	L (±1 1/2")	L1 ①	L2 ①	W (±2")			
12	.064	.060	6	6	6	21	12	17 1/2	24	2 1/2 to 1		1 Pc.
15	.064	.060	7	8	6	26	14	21 3/4	30	2 1/2 to 1		1 Pc.
18	.064	.060	8	10	6	31	15	28 1/4	36	2 1/2 to 1		1 Pc.
21	.064	.060	9	12	6	36	18	29 5/8	42	2 1/2 to 1		1 Pc.
24	.064	.075	10	13	6	41	18	37 1/4	48	2 1/2 to 1		1 Pc.
30	.079	.075	12	16	8	51	18	52 1/4	60	2 1/2 to 1		1 Pc.
36	.079	.105	14	19	9	60	24	59 3/4	72	2 1/2 to 1		2 Pc.
42	.109	.105	16	22	11	69	24	75 5/8	84	2 1/2 to 1		2 Pc.
48	.109	.105	18	27	12	78	24	81	90	2 1/4 to 1		3 Pc.
54	.109	.105	18	30	12	84	30	85 1/2	102	2 1/4 to 1		3 Pc.
60	.109x	.105x	18	33	12	87	—	—	114	2 to 1		3 Pc.
66	.109x	.105x	18	36	12	87	—	—	120	2 to 1		3 Pc.
72	.109x	.105x	18	39	12	87	—	—	126	2 to 1		3 Pc.
78	.109x	.105x	18	42	12	87	—	—	132	1 1/2 to 1		3 Pc.
84	.109x	.105x	18	45	12	87	—	—	138	1 1/2 to 1		3 Pc.
90	.109x	.105x	18	37	12	87	—	—	144	1 1/2 to 1		3 Pc.
96	.109x	.105x	18	35	12	87	—	—	150	1 1/2 to 1		3 Pc.

\* EXCEPT CENTER PANEL  
SEE GENERAL NOTES



END CORNER PLATES MAY  
BE FASTENED TO APRON  
PROPER BY BOLTS, RIVETS,  
OR RESISTANCE SPOT  
WELDS WHICH WILL HOLD  
THE SURFACES TIGHTLY  
TOGETHER

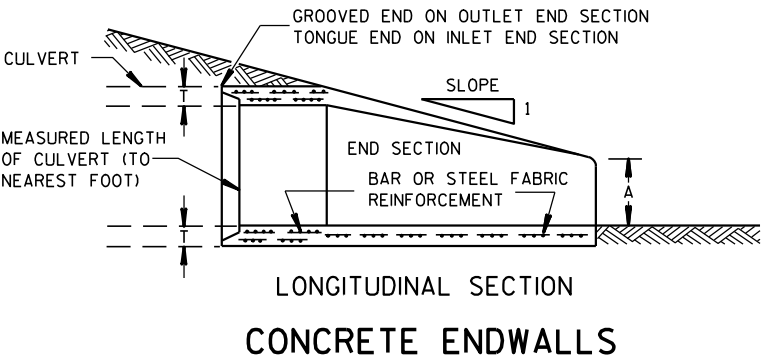
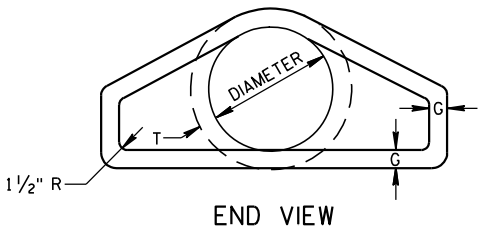
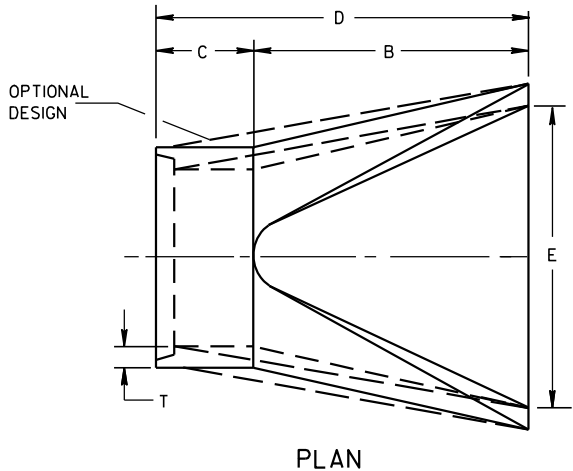
TOE PLATE (SAME THICKNESS  
AND METAL AS APRON) SHALL  
BE FURNISHED WHEN CALLED  
FOR ON THE PLANS



SIDE ELEVATION  
METAL ENDWALLS

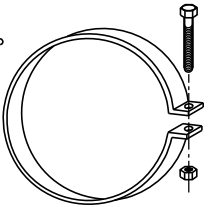
REINFORCED CONCRETE APRON ENDWALLS												
PIPE DIA. (IN.)	DIMENSIONS (Inches)							APPROX. SLOPE				
	T	A	B	C	D	E	G					
12	2	4	24	48 7/8	72 7/8	24	2	3 to 1				
15	2 1/4	6	27	46	73	30	2 1/4	3 to 1				
18	2 1/2	9	27	46	73	36	2 1/2	3 to 1				
21	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	3 to 1				
24	3	9 1/2	43 1/2	30	73 1/2	48	3	3 to 1				
27	3 1/4	10 1/2	49 1/2	24	73 1/2	54	3 1/4	3 to 1				
30	3 1/2	12	54	19 3/4	73 1/2	60	3 1/2	3 to 1				
36	4	15	63	34 3/4	97 3/4	72	4	3 to 1				
42	4 1/2	21	63	35	98	78	4 1/2	3 to 1				
48	5	24	72	26	98	84	5	3 to 1				
54	5 1/2	27	65	33 1/4-35	98 1/4-100	90	5 1/2	2 2/5 to 1				
60	6	30-35	60	39	99	96	5	2 to 1				
66	6 1/2	24-30	72-78	21-27	99	102	5 1/2	2 to 1				
72	7	24-36	78	21	99	108	6	2 to 1				
78	7 1/2	24-36	78	21	99	114	6 1/2	2 to 1				
84	8	36	90 1/2	21	111 1/2	120	6 1/2	1 1/2 to 1				
90	8 1/2	41	87 1/2	24	111 1/2	132	6 1/2	1 1/2 to 1				

\* MINIMUM  
\*\* MAXIMUM

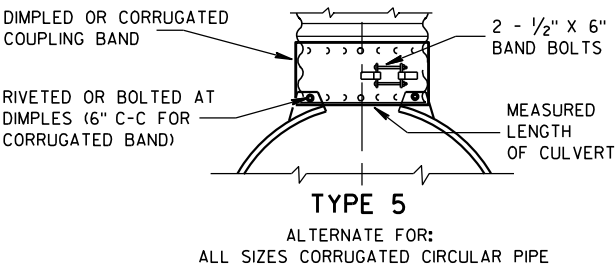
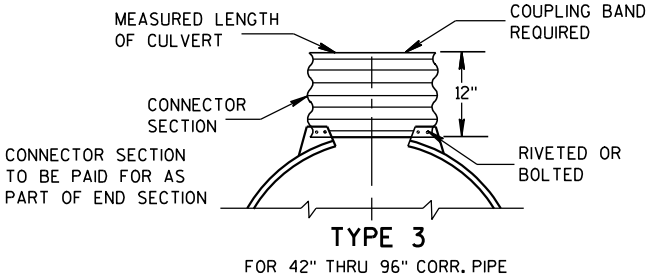
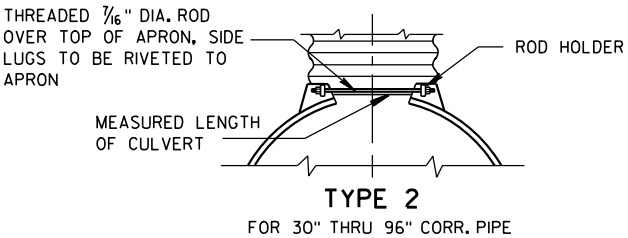
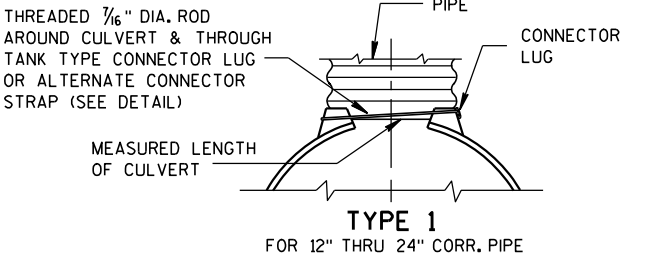


LONGITUDINAL SECTION  
CONCRETE ENDWALLS

1" WIDE, 12 GA. (0.109"  
THICK) GALVANIZED STRAP  
WITH STANDARD 6" X 1/2"  
BAND BOLT AND NUT



ALTERNATE FOR TYPE 1 CONNECTION  
END SECTION CONNECTOR STRAP



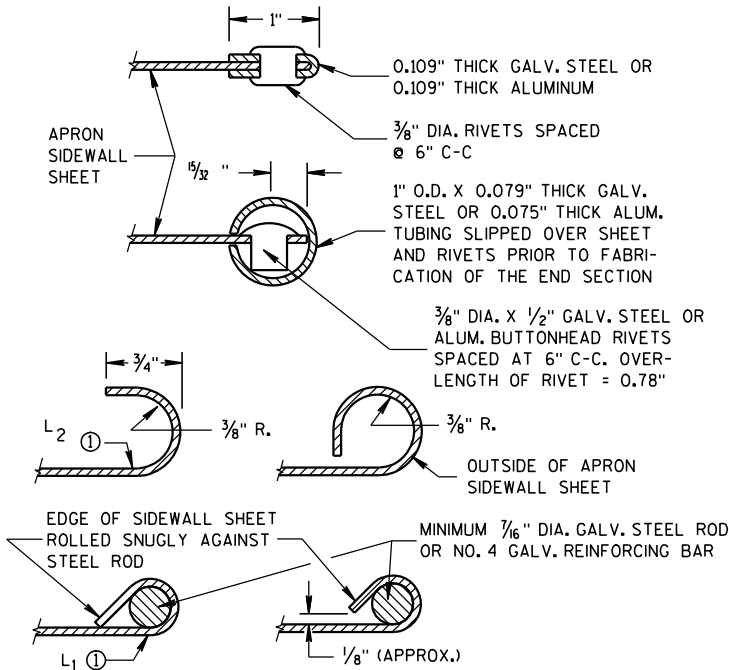
NOTE: DIMPLED BAND FITS OVER OUTSIDE OF ENDWALL,  
AND CORRUGATED BAND FITS INSIDE ENDWALL.  
DIMPLED BAND MAY BE USED WITH HELICALLY  
CORRUGATED PIPE.

FOR CIRCUMFERENTIALLY CORRUGATED PIPE USE  
ENDWALL CONNECTION DETAILS 1, 2, 3 OR 5  
AS APPLICABLE.

FOR HELICALLY CORRUGATED PIPE USE ENDWALL  
CONNECTION DETAILS 1, 2 OR 5.

FOR HELICALLY CORRUGATED PIPES WITH TWO  
CIRCUMFERENTIAL CORRUGATIONS AT EACH END  
USE ENDWALL CONNECTION DETAILS 1, 2 OR 3.

CONNECTION DETAILS



SECTION A-A

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON  
THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE  
STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

CONCRETE CULVERT ENDWALLS MAY NOT BE USED WITH GALVANIZED STEEL  
OR ALUMINUM CULVERT PIPE OR VISE VERSA. GALVANIZED STEEL OR  
ALUMINUM ENDWALLS SHALL NORMALLY BE INSTALLED ON CULVERT PIPE  
OF THE SAME METAL.

ALL THREE PIECE STEEL APRON ENDWALLS FOR 60" DIAMETER PIPE AND  
LARGER SHALL HAVE 0.109" SIDES AND 0.138" CENTER PANELS. ALL  
THREE PIECE ALUMINUM APRON ENDWALLS FOR 60" DIAMETER PIPE AND  
LARGER SHALL HAVE 0.105" SIDES AND 0.134" CENTER PANELS. THE WIDTH  
OF CENTER PANELS SHALL BE GREATER THAN 20 PERCENT OF THE PIPE  
PERIMETER.

LAP SEAMS SHALL BE TIGHTLY JOINED BY GALVANIZED RIVETS OR BOLTS  
FOR STEEL UNITS AND ALUMINUM RIVETS AND BOLTS FOR ALUMINUM UNITS.  
FOR THE 60" THROUGH 96" DIAMETER APRON ENDWALL SIZES, THE REINFORCED  
EDGES AND CENTER PANEL SEAMS SHALL BE FURTHER REINFORCED WITH  
GALVANIZED STEEL OR ALUMINUM STIFFENER ANGLES. THE ANGLES SHALL BE  
ATTACHED BY GALVANIZED NUTS AND BOLTS FOR STEEL UNITS AND ALUMINUM  
NUTS AND BOLTS FOR ALUMINUM UNITS.

WHERE TWO OR MORE PIPES WITH APRON ENDWALLS ARE LAID ADJACENT  
TO EACH OTHER, THEY SHALL BE SEPARATED BY A DISTANCE SUFFICIENT  
TO PROVIDE A MINIMUM CLEARANCE OF 6 INCHES BETWEEN APRON ENDWALLS.

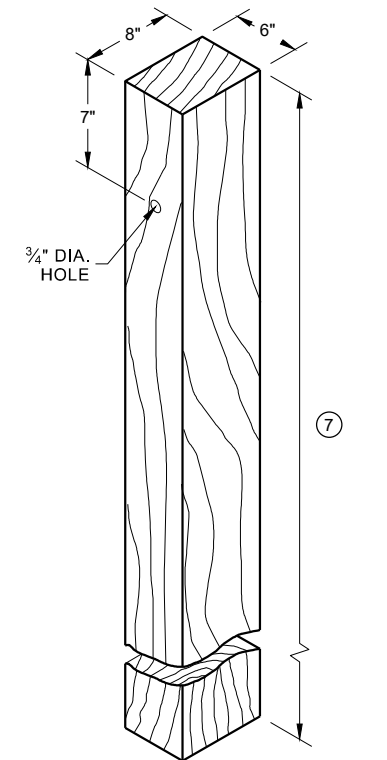
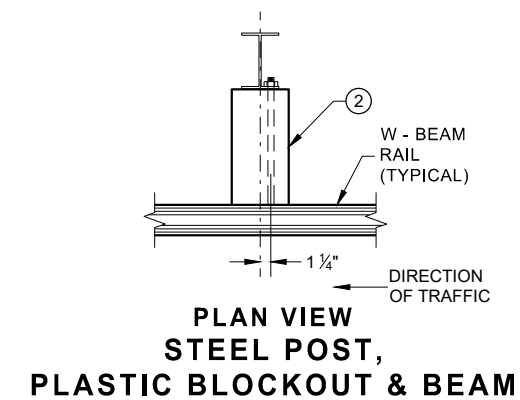
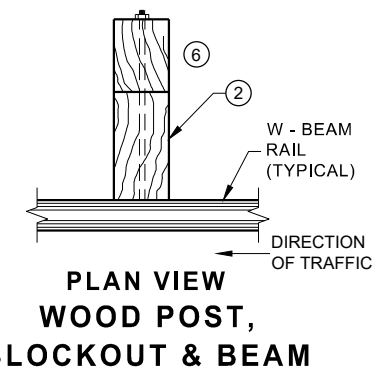
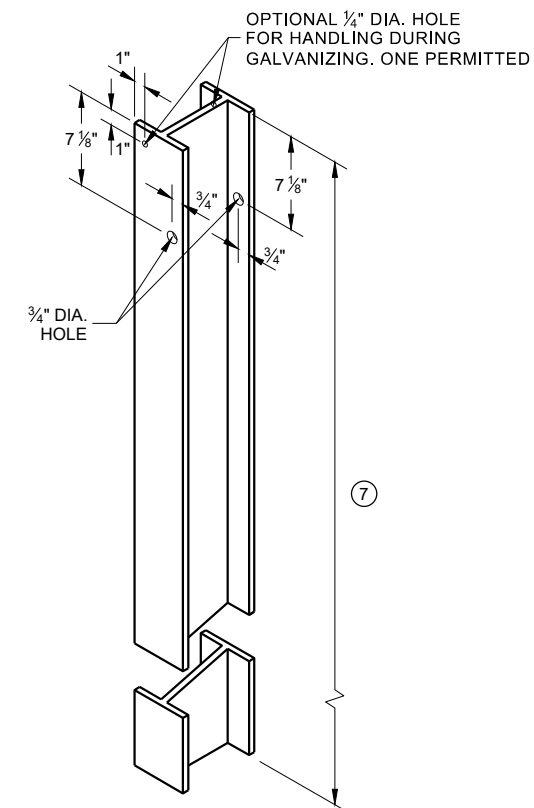
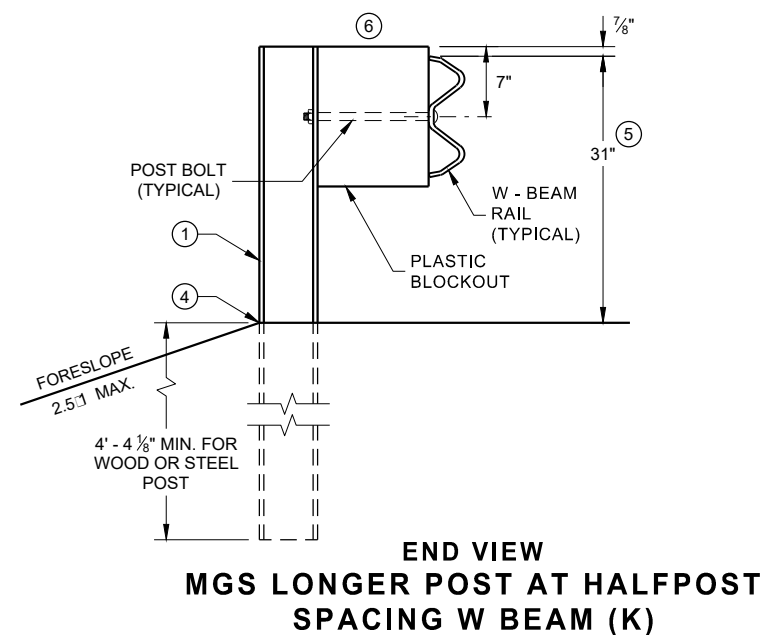
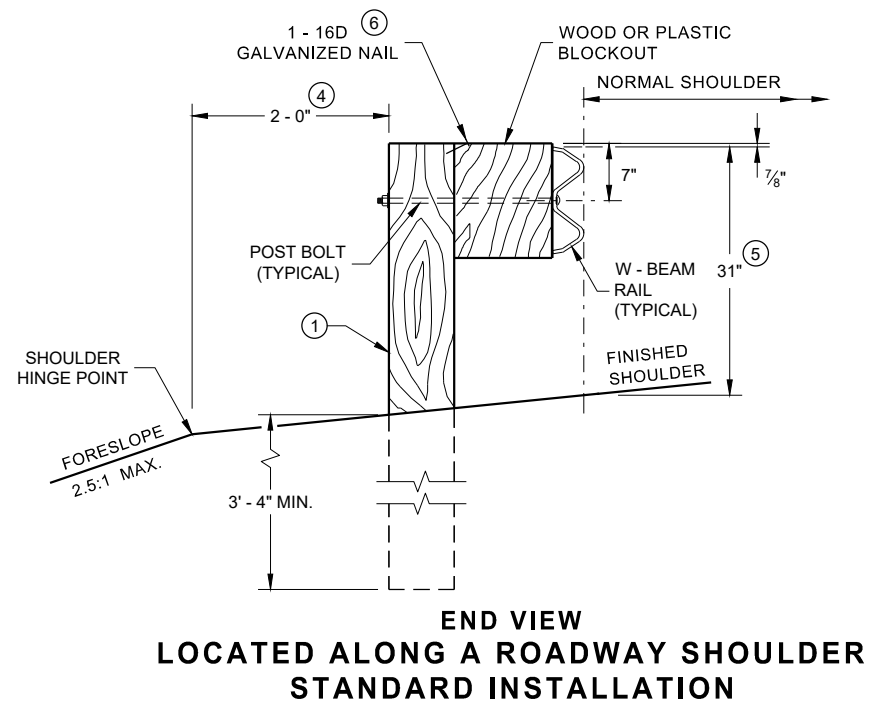
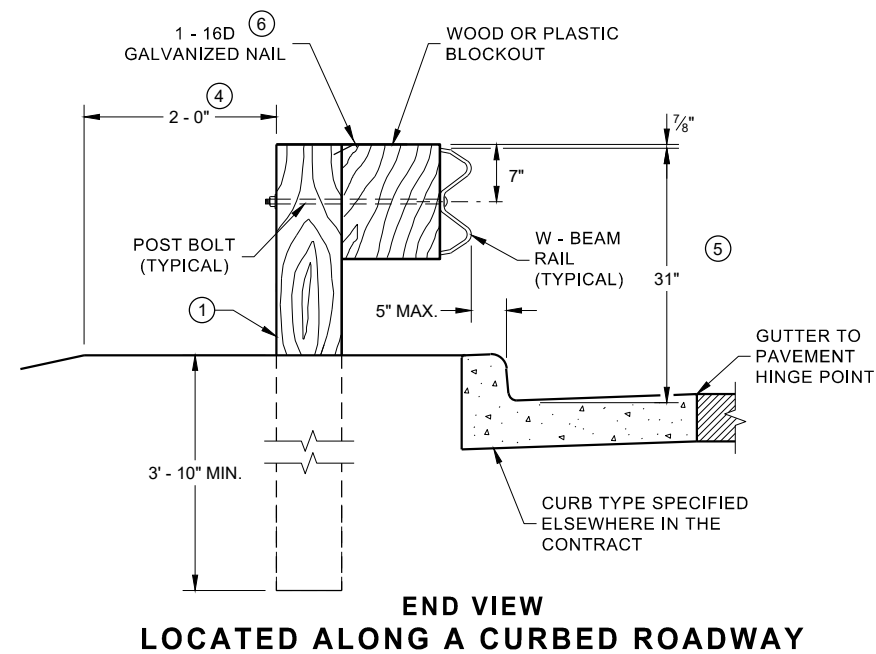
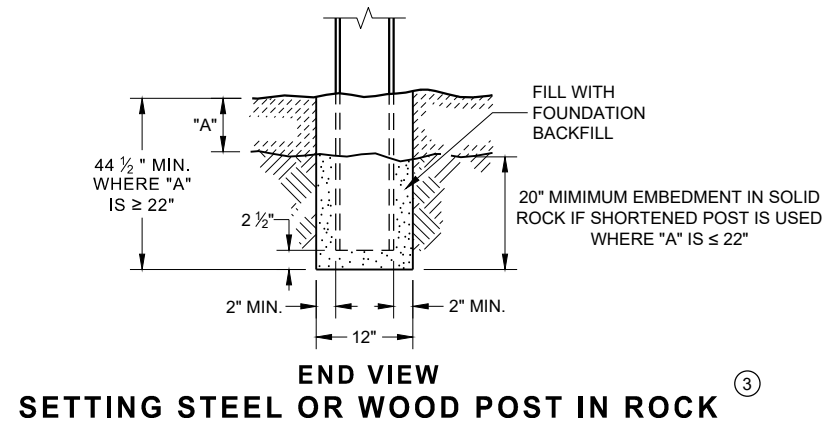
① FOR PIPE SIZES UP TO 60" DIAMETER, A 180° ROLLED EDGE MAY BE USED  
INSTEAD OF STEEL ROD REINFORCEMENT. SEE SECTION A-A.

APRON ENDWALLS FOR  
CULVERT PIPE

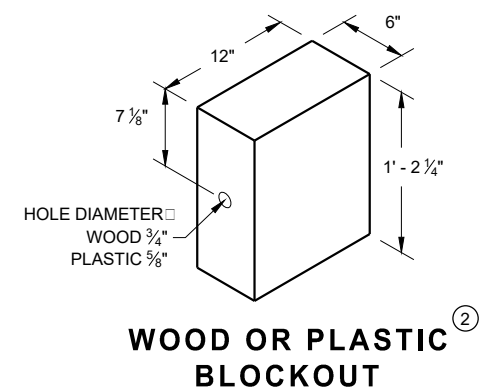
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
11/30/94  
DATE  
/S/ Rory L. Rhinesmith  
CHIEF ROADWAY DEVELOPMENT ENGINEER  
FHWA

- ① WOOD OR STEEL POSTS (w6X9 OR w6X8.5) MAY BE USED. DO NOT INTERMIX WOOD AND STEEL POSTS. INSTALL STEEL POSTS WITH HOLES ON APPROACHING TRAFFIC SIDE.
- ② USE WOOD OR APPROVED PLASTIC BLOCKOUTS. WOOD BLOCKOUTS MAY BE CONSTRUCTED OUT OF TWO OR MORE WOOD BLOCKOUTS. SEE ALTERNATE WOOD BLOCKOUT DETAIL. DIMENSIONS OF APPROVED PLASTIC BLOCKOUTS MAY VARY.
- ③ IF ROCK IS ENCOUNTERED DURING EXCAVATION, PROVIDE A HOLE 12 INCHES IN DIAMETER EXTENDING 20 INCHES DEEP INTO THE ROCK. PLACE APPROXIMATELY 2 1/2" INCHES OF GRANULAR MATERIAL IN THE BOTTOM OF THE HOLE. CUT THE POSTS TO LENGTH AND INSTALL. BACKFILL WITH EXCAVATED MATERIAL AND COMPACT. BACKFILL IS TO BE FREE OF LARGE ROCKS.
- ④ WHEN THE DISTANCE FROM BACK OF POST TO SHOULDER HINGE POINT IS LESS THAN 2 FEET INSTALL LONGER POST AT HALF POST SPACING (K).
- ⑤ FOR NEW MGS INSTALLATION TOP OF W-BEAM RAIL TOLERANCE IS +1". FOR EXISTING MGS INSTALLATION TOP OF W-BEAM IS BETWEEN 27 3/4" TO 32".
- ⑥ WHEN USING STEEL POST AND WOOD BLOCKOUTS INSTALL FOUR 16D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.
- ⑦ TOTAL POST LENGTH FOR TYPE K IS 7' - 0". TOTAL POST LENGTH FOR OTHER MGS TYPES IS 6' - 0".



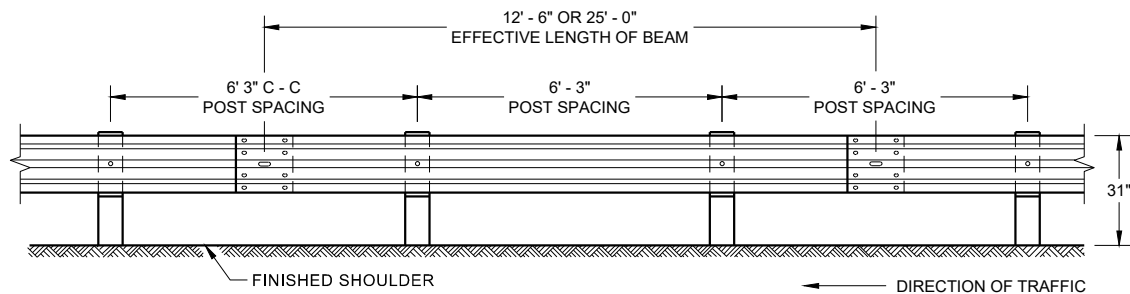
**WOOD POST (6" X 8") NOMINAL** <sup>(1)</sup>



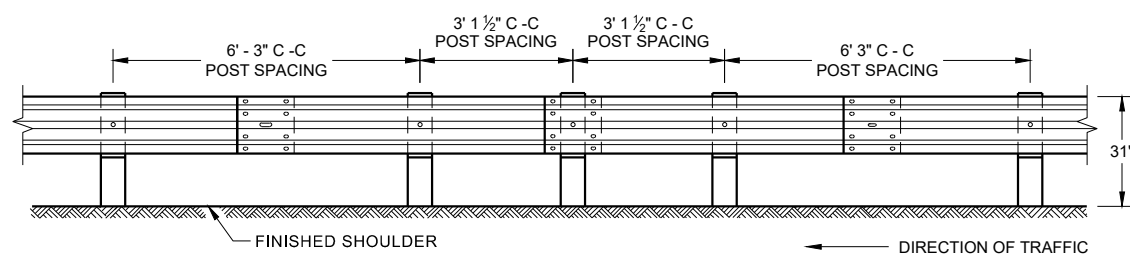
**WOOD OR PLASTIC  
BLOCKOUT**

**MIDWEST GUARDRAIL SYSTEM**  
**□ MGS □ GUARDRAIL**

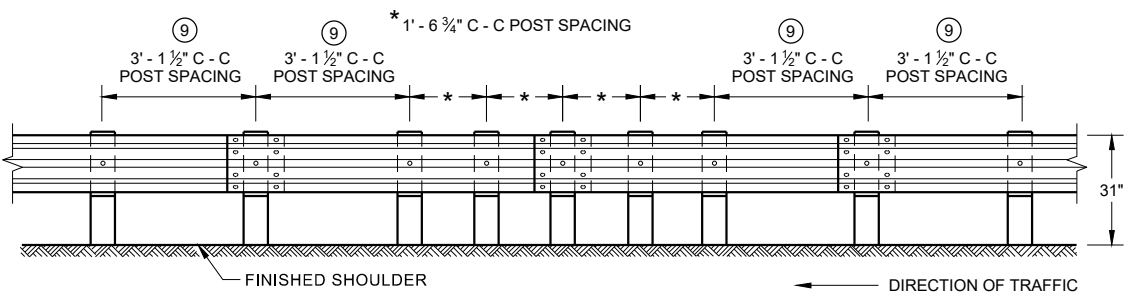
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



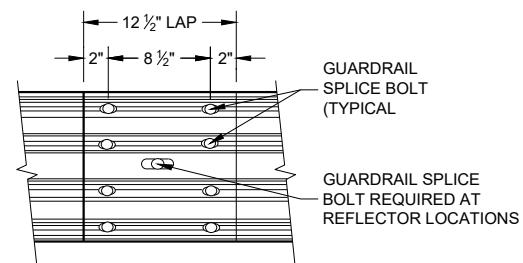
**FRONT VIEW  
POST SPACING STANDARD INSTALLATION**



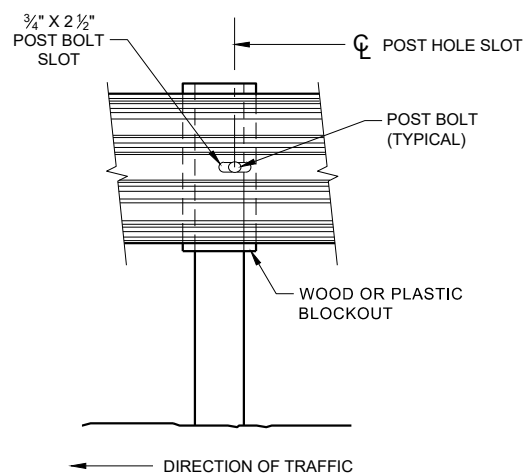
**FRONT VIEW  
HALF POST SPACING (HS) AND  
HALF POST SPACING WITH LONGER POSTS (K)**



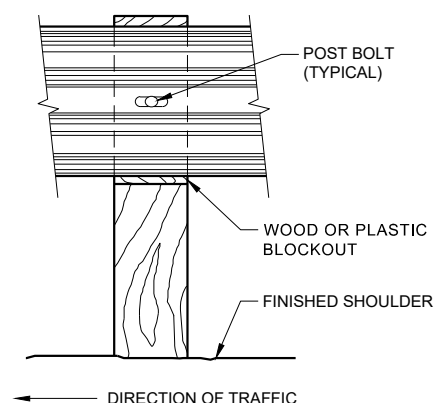
**FRONT VIEW  
QUARTER POST SPACING (QS)**



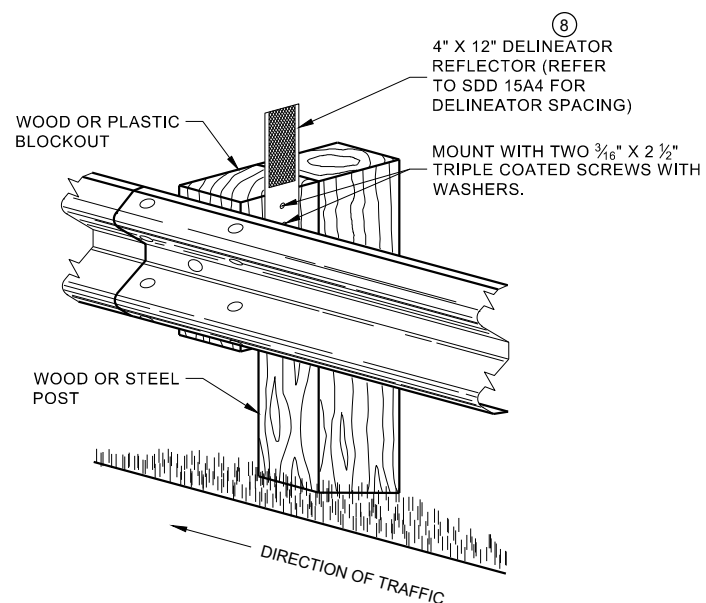
**FRONT VIEW  
MID-SPAN BEAM SPLICE**



**FRONT VIEW AT STEEL POST**



**FRONT VIEW AT WOOD POST**



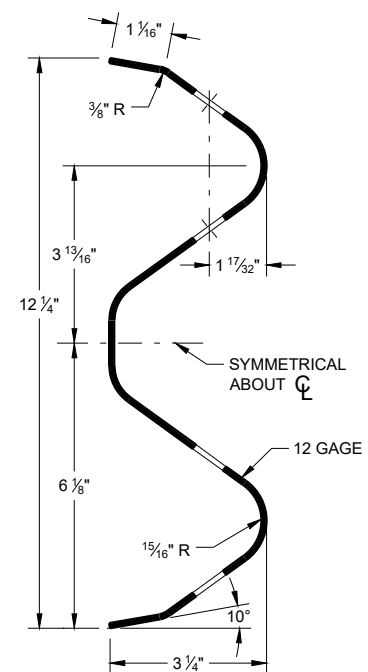
**ONE SIDED REFLECTOR DETAIL  
AND TYPICAL INSTALLATION**

## GENERAL NOTES

- 8 DO NOT INSTALL REFLECTORS ON THE FIRST 50 FEET OF THE APPROACH END OF THE ENERGY ABSORBING TERMINAL.
- 9 25 FEET OF HALF POST SPACING IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF QUARTER POST SPACING.

POST BOLTS ARE A 3/8" DIAMETER ASTM A307 GUARDRAIL BOLT. A POST BOLT REQUIRES 3/4" DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT AND 3/8" DIAMETER F844 FLAT WASHER. POST BOLTS MAY BE LONGER IF MULTIPLE BLOCKOUTS ARE BEING USED.

GUARD RAIL SPLICE BOLTS ARE A 3/8" DIAMETER ASTM A307 GUARDRAIL HEAD BOLT. A GUARDRAIL SPLICE BOLT REQUIRES 3/4" DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT.

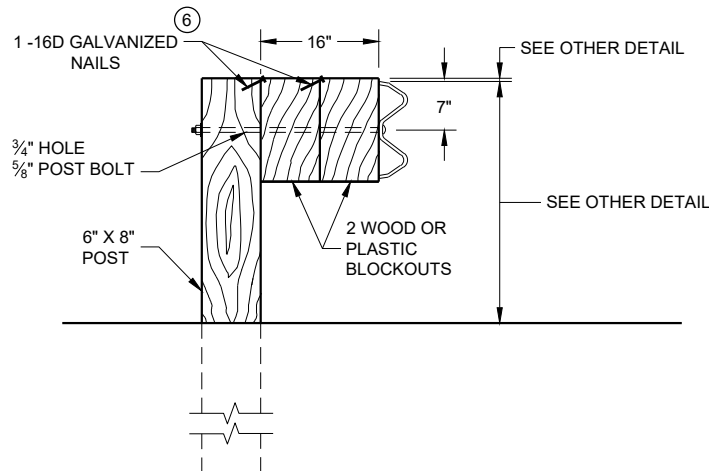


**SECTION THRU W-BEAM RAIL**

**MIDWEST GUARDRAIL SYSTEM  
(MGS) GUARDRAIL**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

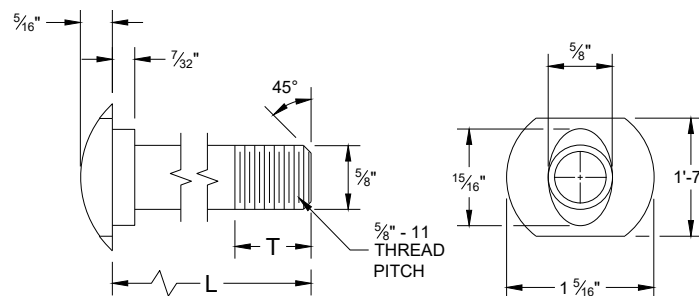




DETAIL FOR 16" BLOCKOUT DEPTH

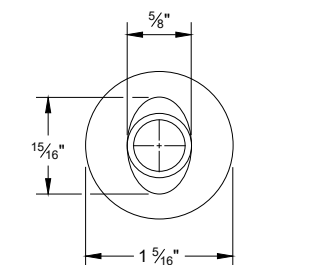
IT IS ACCEPTABLE TO USE BLOCKOUTS UP TO 16" DEEP TO INCREASE THE POST OFFSET TO AVOID UNDERGROUND OBSTACLES. THERE IS NO LIMIT TO THE NUMBER OF POSTS THAT CAN HAVE ADDITIONAL BLOCKOUTS UP TO 16" DEEP.

- NOTE:
1. ALL FILLETS SHALL HAVE A MINIMUM RADIUS OF  $\frac{3}{16}$ ".
  2. IF THE BOLT EXTENDS MORE THAN  $\frac{1}{4}$ " FROM THE NUT THE BOLT SHOULD BE TRIMMED BACK.

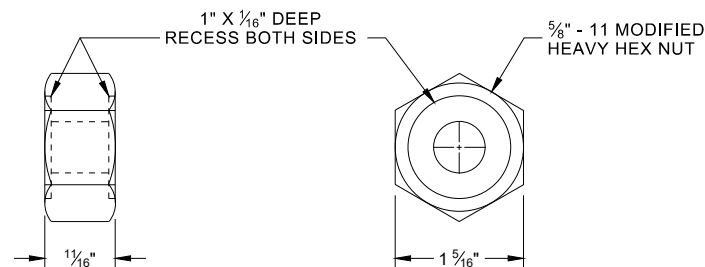


POST BOLT TABLE

L	T (MIN.)
1 1/4"	1 1/8"
2"	1 3/4"
10"	4"
14"	4 1/16"
18"	4"
21"	4 1/16"
25"	4"

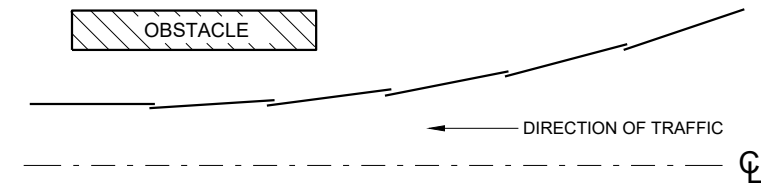


ALTERNATE BOLT HEAD

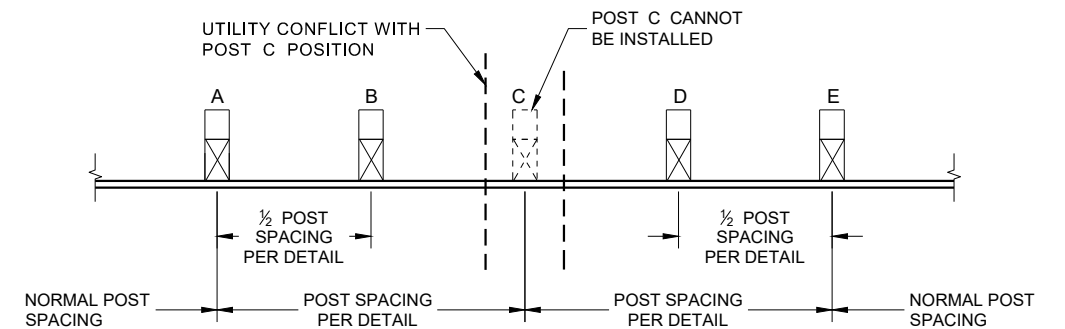


POST BOLT, SPLICE BOLT AND RECESS NUT

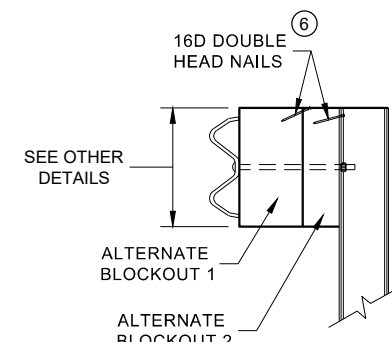
- 6 WHEN USING STEEL POST AD WOOD BLOCKOUTS, INSTALL FOUR 16D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.



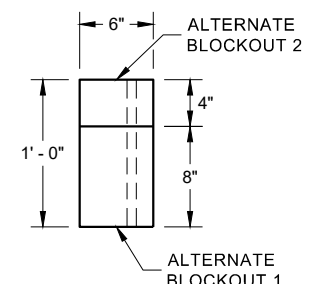
PLAN VIEW  
BEAM LAPPING DETAIL



POST DRIVING FOR CONTINUOUS  
UNDERGROUND OBSTRUCTION



SIDE VIEW



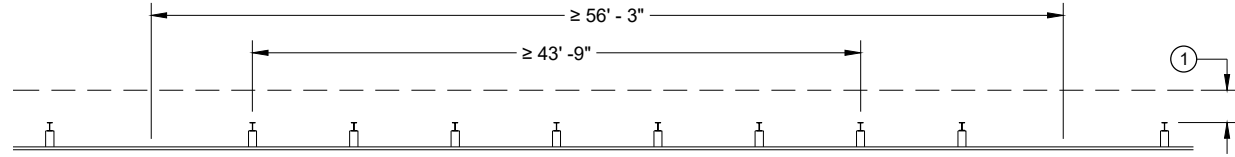
PLAN VIEW

ALTERNATE WOOD  
BLOCKOUT DETAIL

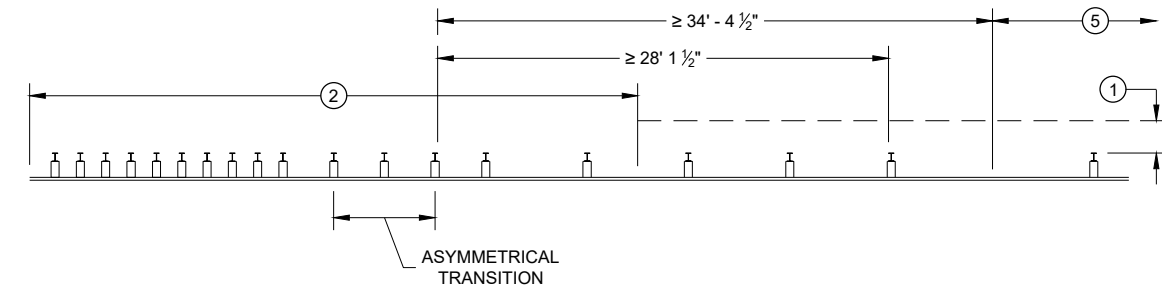
- NOTES: UNDER SPECIAL CIRCUMSTANCES, SUCH AS AVOIDING OBSTACLES THAT ARE NOT RELOCATED, IT IS ACCEPTABLE TO INSTALL ADDITIONAL BLOCKOUTS TO OBTAIN UP TO 36" DEPTH FOR ONE OR TWO POSTS IN A SECTION OF GUARDRAIL.
- DO NOT USE 16" OR 36" BLOCKOUTS IF IT CAUSES THE POST TO BE DRIVEN BEYOND SHOULDER HINGE POINT OR CAUSES A FIXED OBJECT TO BE WITHIN THE DEFLECTION DISTANCE OF THE BARRIER.

MIDWEST GUARDRAIL SYSTEM  
MGS GUARDRAIL

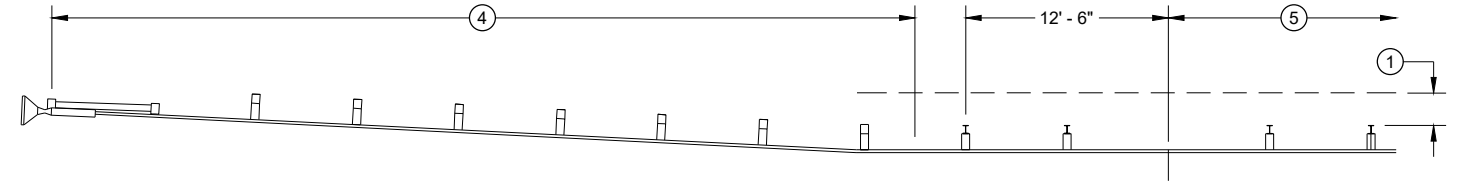
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



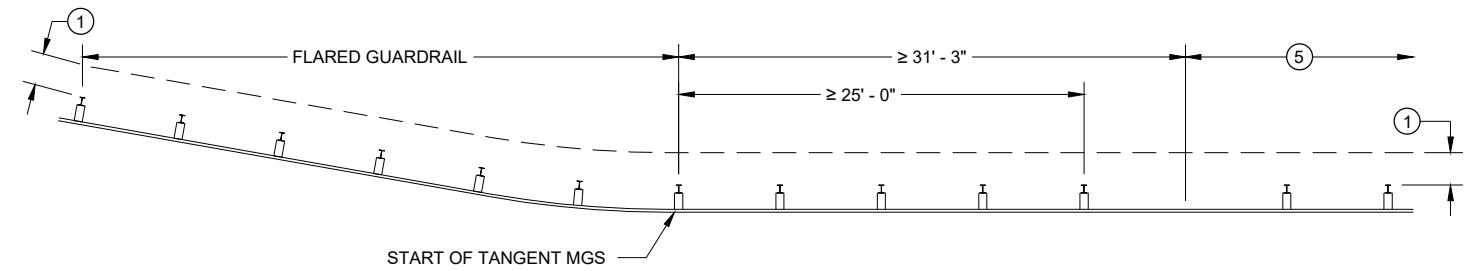
MISSING POST IN NORMAL BEAM GUARD RUN



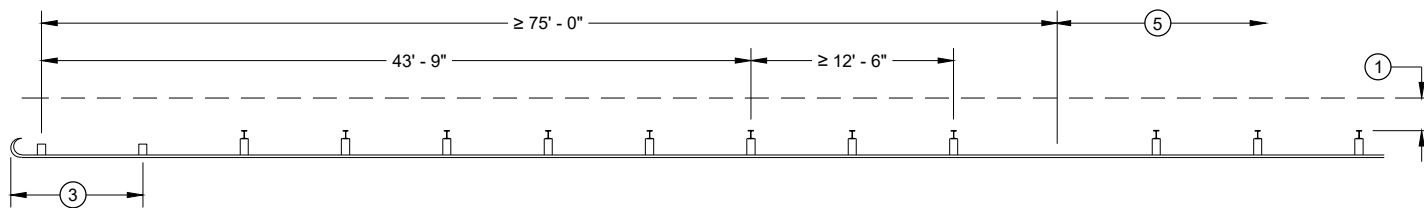
MISSING POST NEAR APPROACH THRIE BEAM TRANSITION



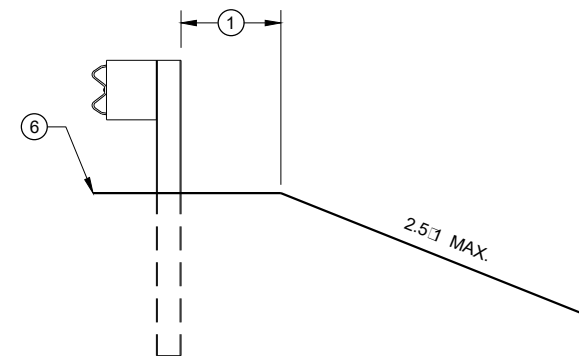
MISSING POST IN NORMAL BEAM GUARD RUN NEAR EAT



MISSING POST IN NORMAL BEAM GUARD RUN  
NEAR FLARED BEAM GUARD



MISSING POST IN NORMAL BEAM GUARD RUN  
NEAR TYPE 2 TERMINAL



CROSS SECTION VIEW

- (1) MINIMUM OF 2 FEET OF GRADING BEHIND POST.
- (2) SEE SDD 14B45 FOR MORE DETAILS.
- (3) SEE SDD 14B47 FOR MORE DETAILS.
- (4) SEE SDD 14B44 FOR MORE DETAILS.
- (5) SEE MISSING POST IN NORMAL BEAM GUARD RUN FOR DISTANCE TO NEXT MISSING POST AND AREA FOR WELL DRAINED, COMPACTED SOILS.
- (6) SEE PLAN FOR SHOULDER DESIGN.

**MIDWEST GUARDRAIL SYSTEM**  
**MGS GUARDRAIL**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
7/2018  
DATE  
/S/ Rodney Taylor  
ROADWAY STANDARDS DEVELOPMENT  
UNIT SUPERVISOR  
FHWA

- (A) THE SLOPE IN THE AREA BOUNDED BY THE GRADELINE, THE HINGE POINT LINE (HPL) AND THE CLEAR ZONE LIMITS (CZL) SHALL BE 4:1 OR FLATTER.
- (B) AFTER FINAL ASSEMBLY, RECHECK CABLE TO BE SURE IT IS TAUT AND HAS NOT RELAXED
- (C) DIFFERENT MANUFACTURERS REQUIRE DIFFERENT PERFORATED W - BEAM RAIL END PANELS. SEE MANUFACTURER'S INFORMATION.
- (D) ATTACH ALUMINUM SHEET TO E.A.T. HEAD USING 4 STAINLESS STEEL SELF - TAPPING SCREWS. ONE SCREW PER CORNER.
- (E) HARDWARE MAY VARY BETWEEN MANUFACTURER. SEE MANUFACTURER'S DRAWING FOR INFORMATION.

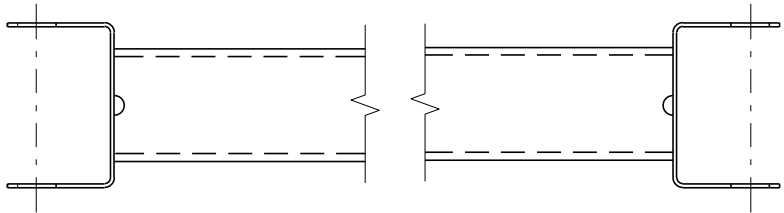
DIMENSIONS MAY VARY, MANUFACTURER'S INFORMATION.

THE CENTER OF THE UPPER 3 1/2" DIAMETER HOLE ON POST NUMBER 3 THROUGH POST 9 IS TO BE FLUSH WITH THE GROUND LINE UP TO A MAXIMUM OF 2" ABOVE GROUND LINE. WOOD BLOCKS ON POSTS NUMBERED 3 THROUGH 9 MAY BE ADJUSTED UP TO 3" ABOVE THE TOP OF POST.



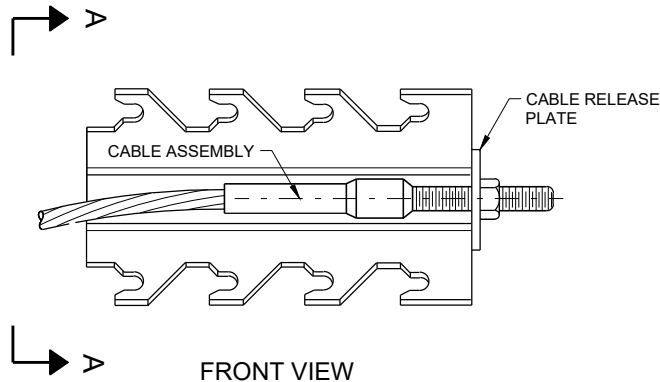
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



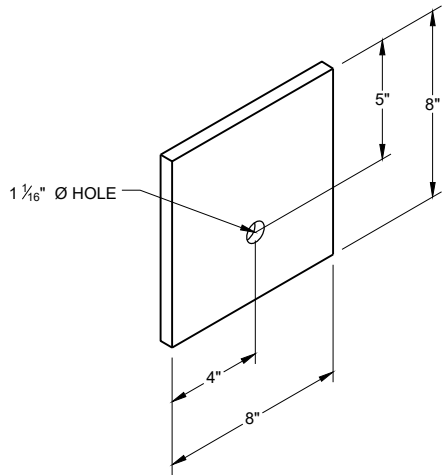
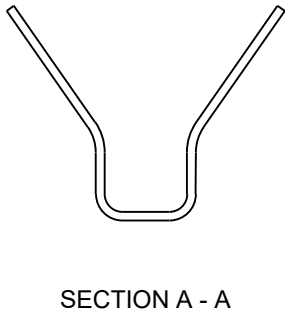


GENERIC GROUND STRUT 9 E

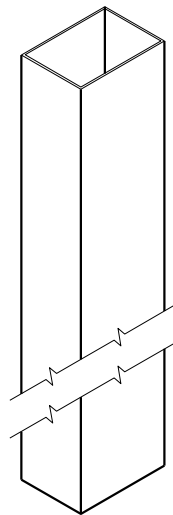
BILL OF MATERIALS	
PART NO.	DESCRIPTION MATERIALS PROVIDED BY MGS EAT MANUFACTURER. SEE MANUFACTURER'S DETAILS FOR MORE INFORMATION.
1	UPPER POST NO. 1 6" X 6" TUBE
2	LOWER POST NO. 1
3	WOOD CRT
4	WOOD BLOCKOUT
5	PIPE SLEEVE
6	BEARING PLATE
7	BCT CABLE ASSEMBLY
8	ANCHOR CABLE BOX
9	GROUND STRUT
10	PERFORATED W-BEAM RAIL END PANEL, 12'-6" LONG.
11	STANDARD W-BEAM RAIL. MULTIPLE SECTIONS REQUIRED. SECTIONS VARY IN LENGTH.
12	IMPACT HEAD
13	EAT MARKER POST - YELLOW (SEE APPROVED PRODUCTS LIST)
14	SOIL PLATE
15	UPPER POST NO. 2
16	LOWER POST NO. 2



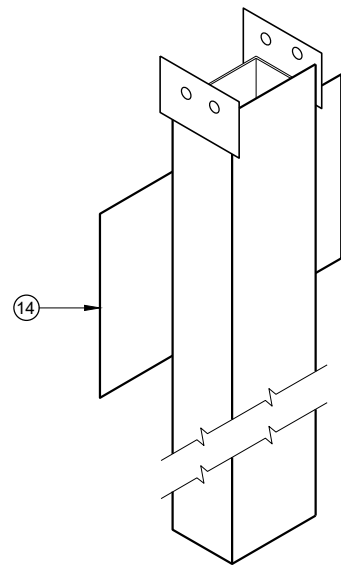
GENERIC ANCHOR CABLE BOX 9 E



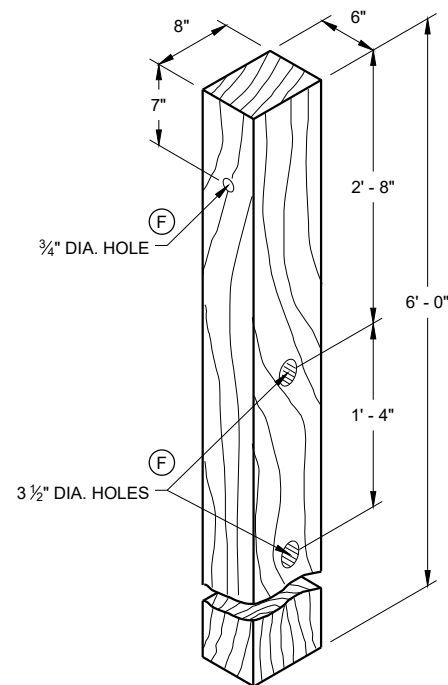
BEARING PLATE 6 E



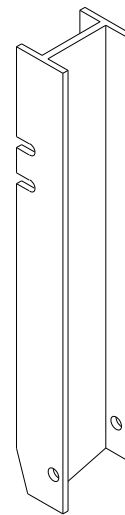
UPPER POST NO. 1 <sup>(1)</sup> (E)



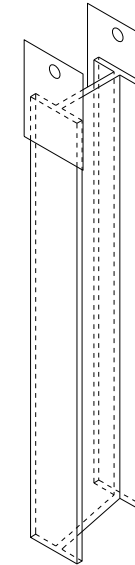
LOWER POST NO. 1 <sup>(2)</sup> (E)



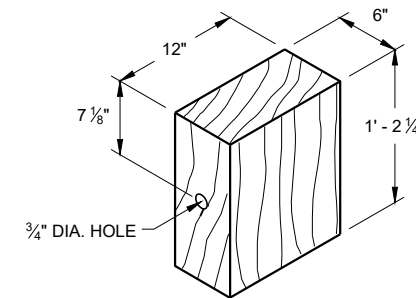
WOOD CRT POST <sup>(3)</sup> (E)  
POSTS NUMBER 3-9



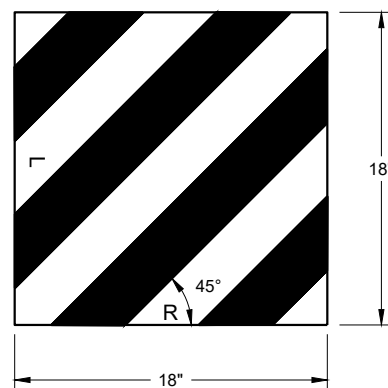
UPPER POST NO. 2 <sup>(15)</sup> (E)



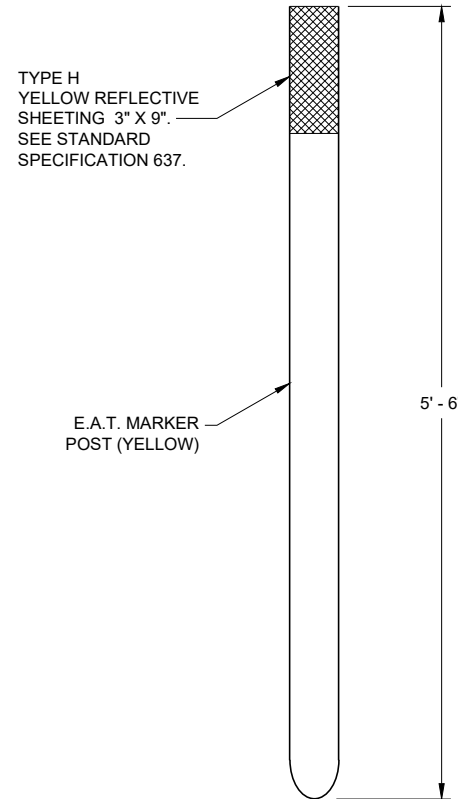
LOWER POST NO. 2 <sup>(16)</sup> (E)



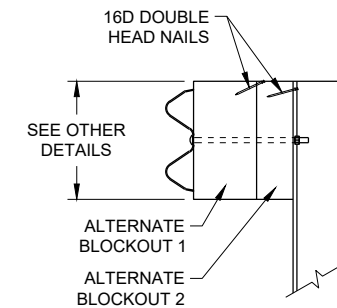
WOOD BLOCKOUT <sup>(4)</sup>  
REQ'D. AT ALL POSTS EXCEPT POST NO'S 1 □ 2



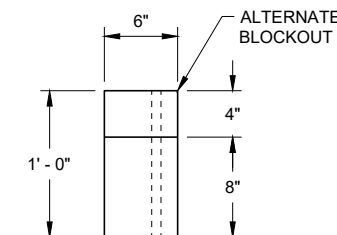
W5 - 59  
REFLECTIVE SHEETING DETAIL <sup>(E)</sup>



FRONT VIEW  
SIDE VIEW  
E.A.T. MARKER POST <sup>(13)</sup>



SIDE VIEW



TOP VIEW

ALTERNATE WOOD  
BLOCKOUT DETAIL

MIDWEST GUARDRAIL SYSTEM ENERGY ABSORBING TERMINAL MGS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED 7/2018 DATE	/S/ Rodney Taylor ROADWAY STANDARDS DEVELOPMENT UNIT SUPERVISOR
FHWA	

GENERAL NOTES

THE EXACT NUMBER, LOCATION, AND SPACING OF ALL SIGNS AND DEVICES SHALL BE ADJUSTED TO FIT FIELD CONDITIONS.

THE SPACING BETWEEN TRAFFIC CONTROL SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND SHOULD PROVIDE A MINIMUM OF 200 FEET (500 FEET DESIRABLE) CLEARANCE TO EXISTING SIGNS THAT WILL REMAIN IN PLACE.




ALL SIGNS ARE 48" X 48" UNLESS OTHERWISE NOTED. IF NECESSARY DUE TO SPACE CONSTRAINTS, 36"X36" SIGNS MAY BE USED INSTEAD OF 48" X 48" SIGNS.

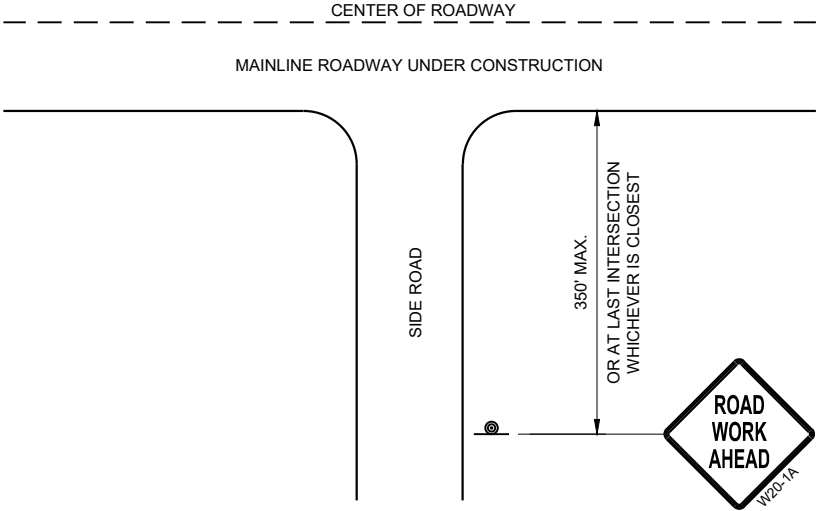
SIGNS THAT WILL BE IN PLACE LESS THAN SEVEN CONTINUOUS DAYS AND NIGHTS MAY BE MOUNTED ON PORTABLE SUPPORTS.

IF A "STOP" SIGN MUST BE REMOVED FOR A WORK OPERATION, A TEMPORARY "STOP" SIGN SHALL BE PLACED PRIOR TO THE SIGN REMOVAL, OR A FLAGGER SHALL BE PROVIDED UNTIL THE SIGN IS REESTABLISHED.

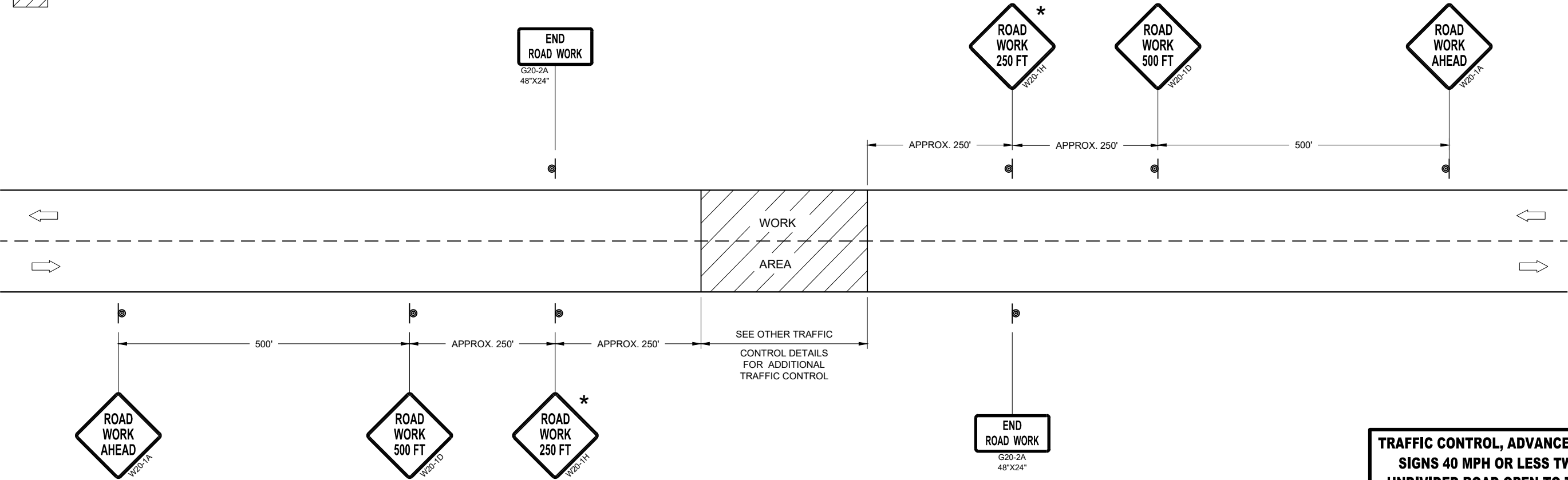
\* THE THIRD W20-1 SIGN IS REQUIRED ONLY IF THERE IS AN INTERSECTION BETWEEN THE "ROAD WORK 500 FEET" SIGN AND THE WORK ZONE. ADJUST THE PLACEMENT OF THIS SIGN BASED ON INTERSECTION LOCATION AND OTHER FIELD CONDITIONS.

LEGEND

-  SIGN ON PERMANENT SUPPORT
-  DIRECTION OF TRAFFIC
-  WORK AREA



TYPICAL SIDE ROAD APPROACH  
WARNING SIGN DETAIL



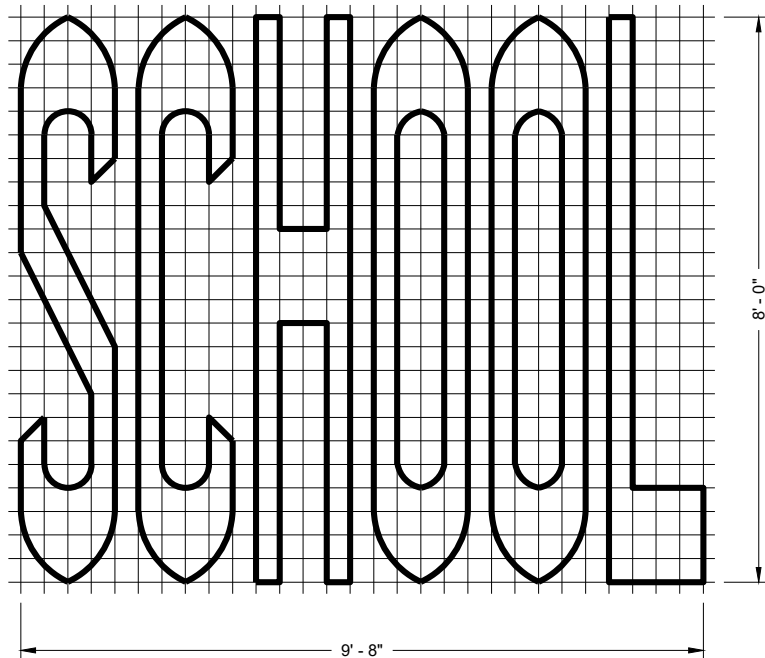
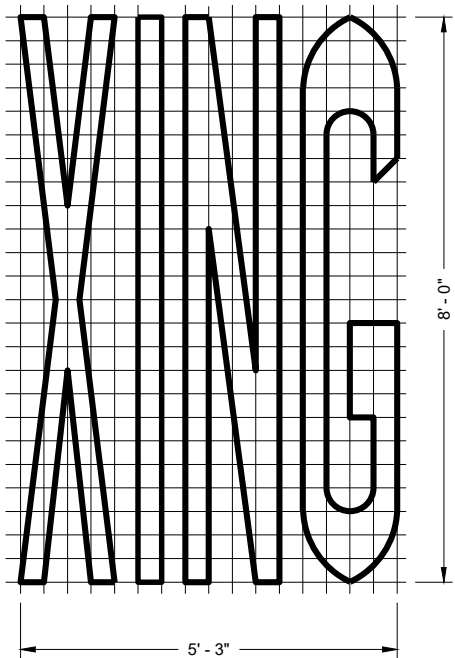
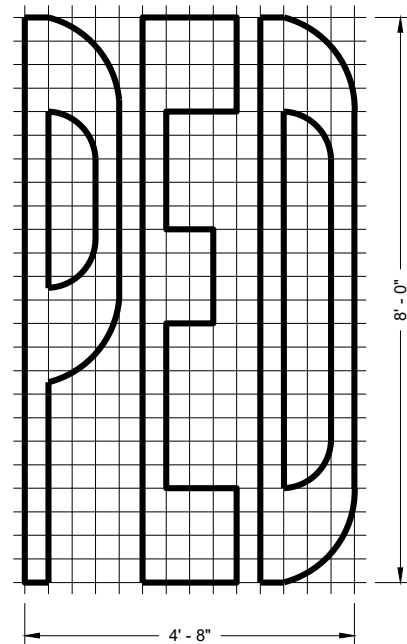
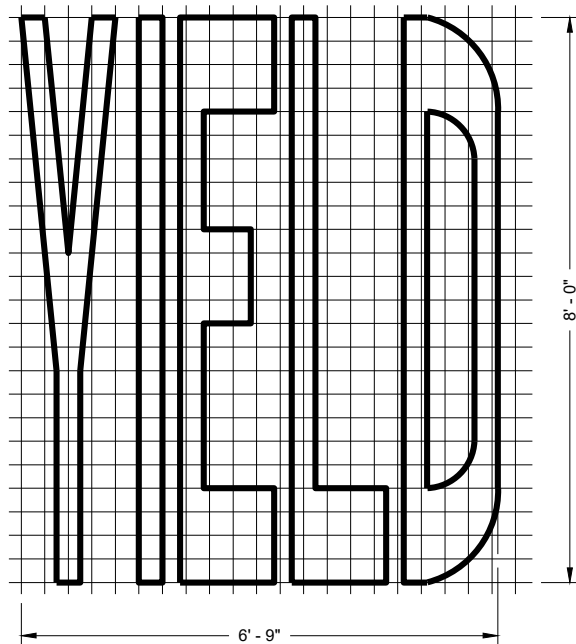
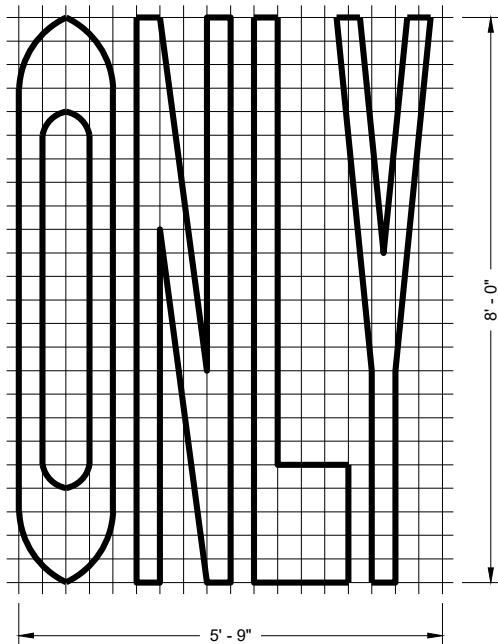
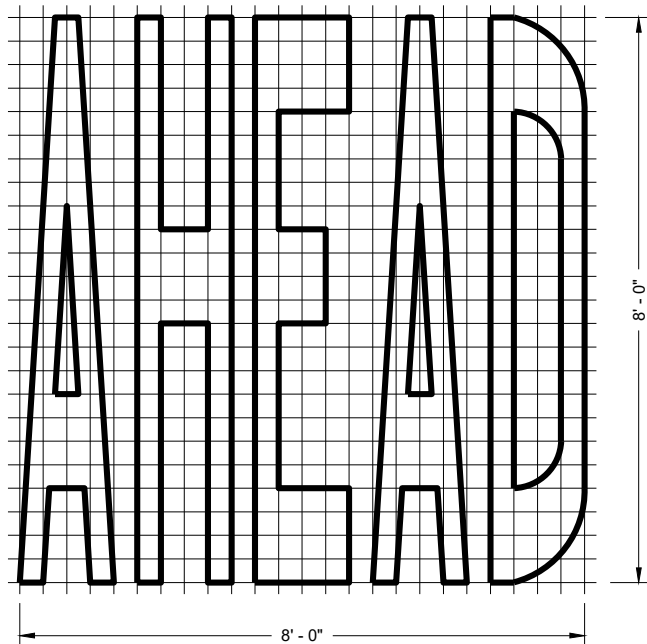
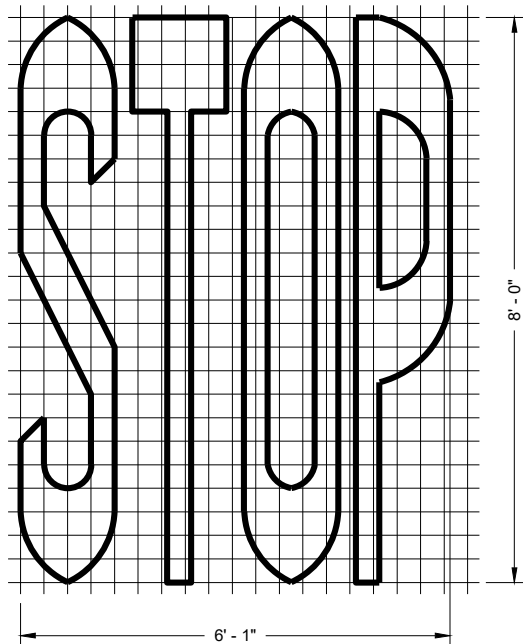
TRAFFIC CONTROL, ADVANCE WARNING SIGNS 40MPH OR LESS

TRAFFIC CONTROL, ADVANCE WARNING  
SIGNS 40 MPH OR LESS TWO-WAY  
UNDIVIDED ROAD OPEN TO TRAFFICE

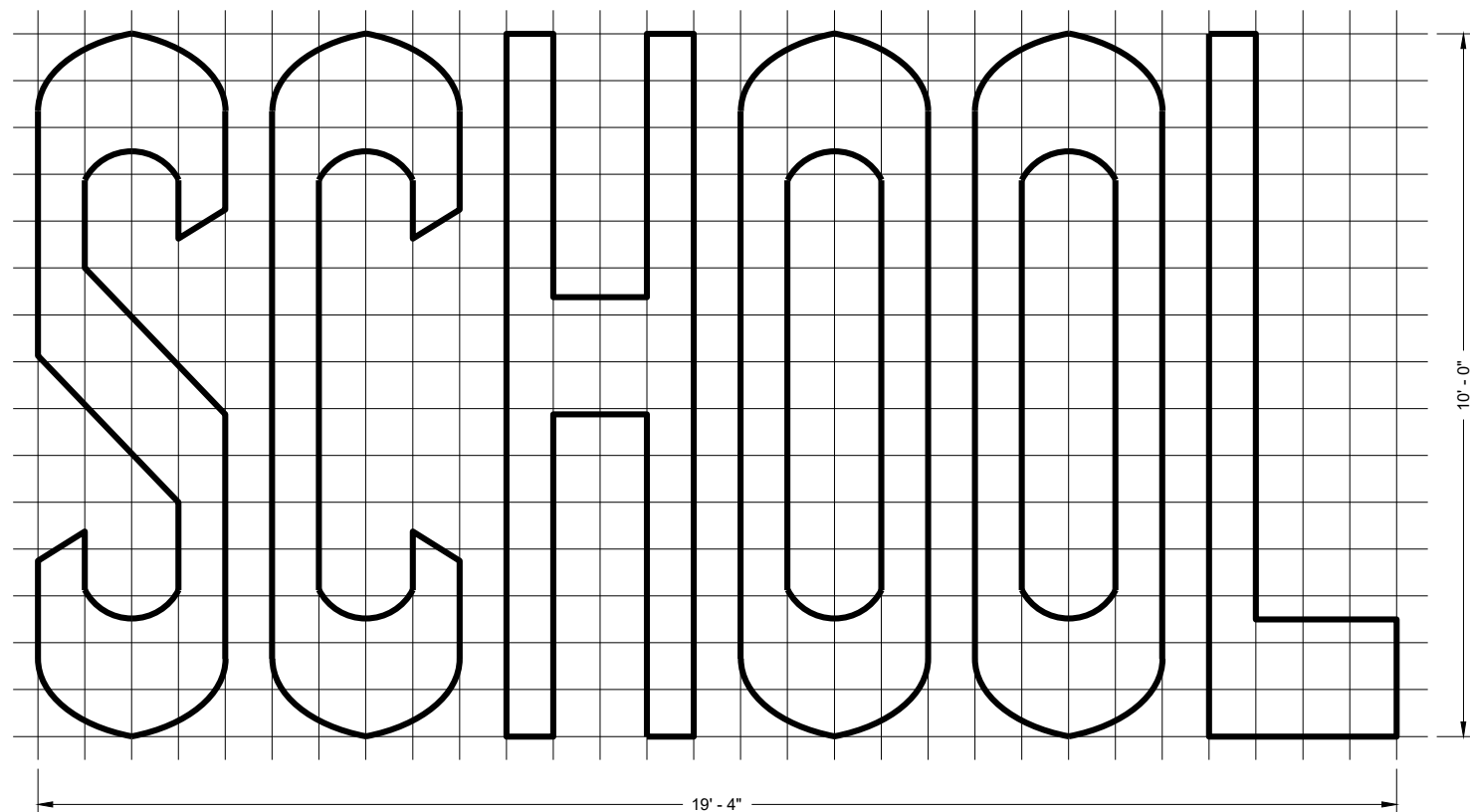
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
July 2018 /S/ Andrew Heidtke  
DATE WORK ZONE ENGINEER  
FHWA





SINGLE LANE



TWO - LANE

**GENERAL NOTES**

DETAILS OF INSTALLATION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.

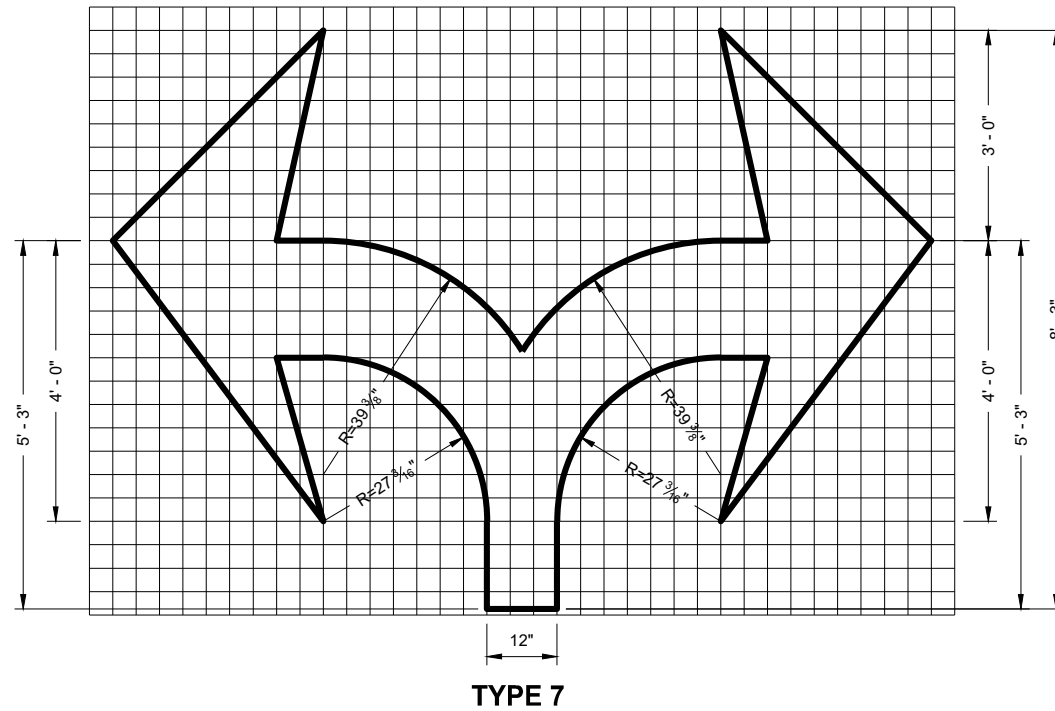
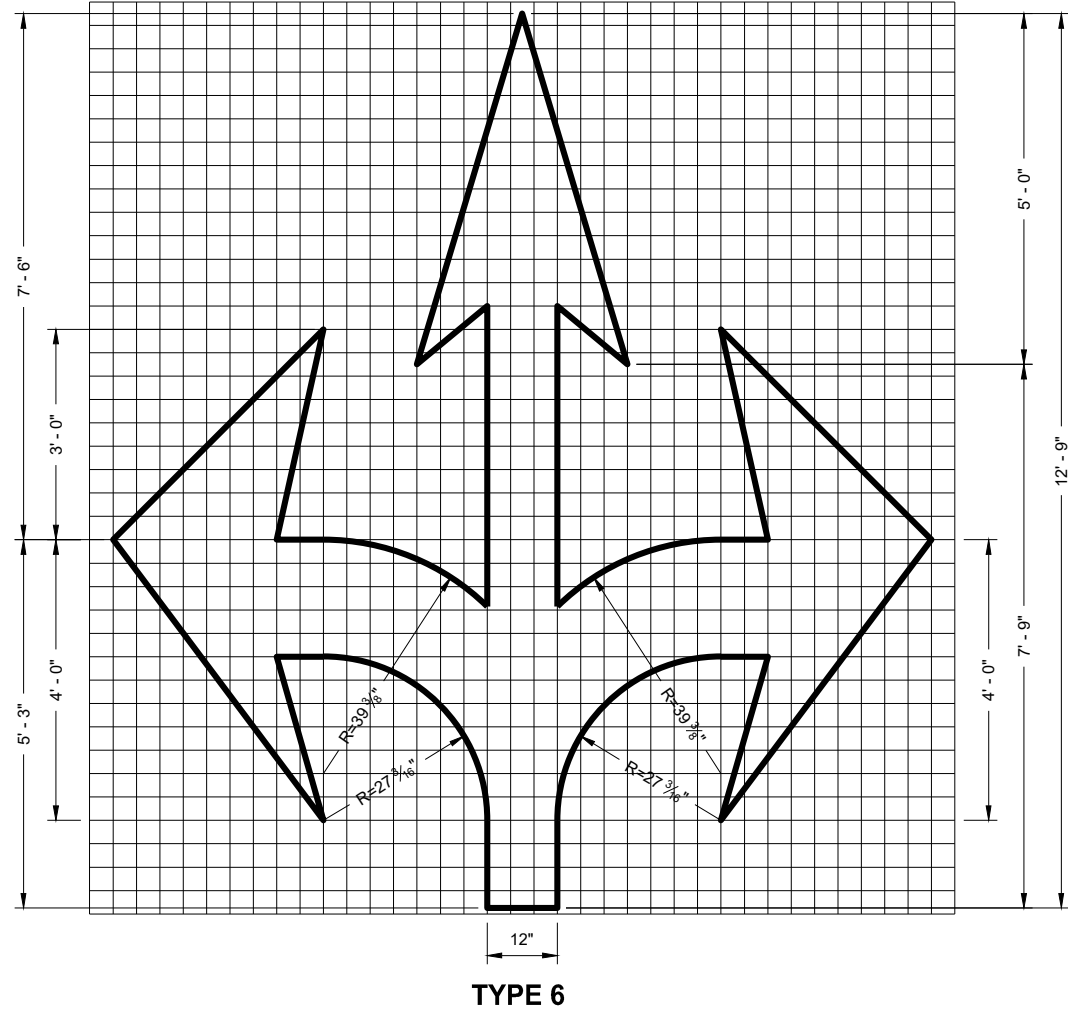
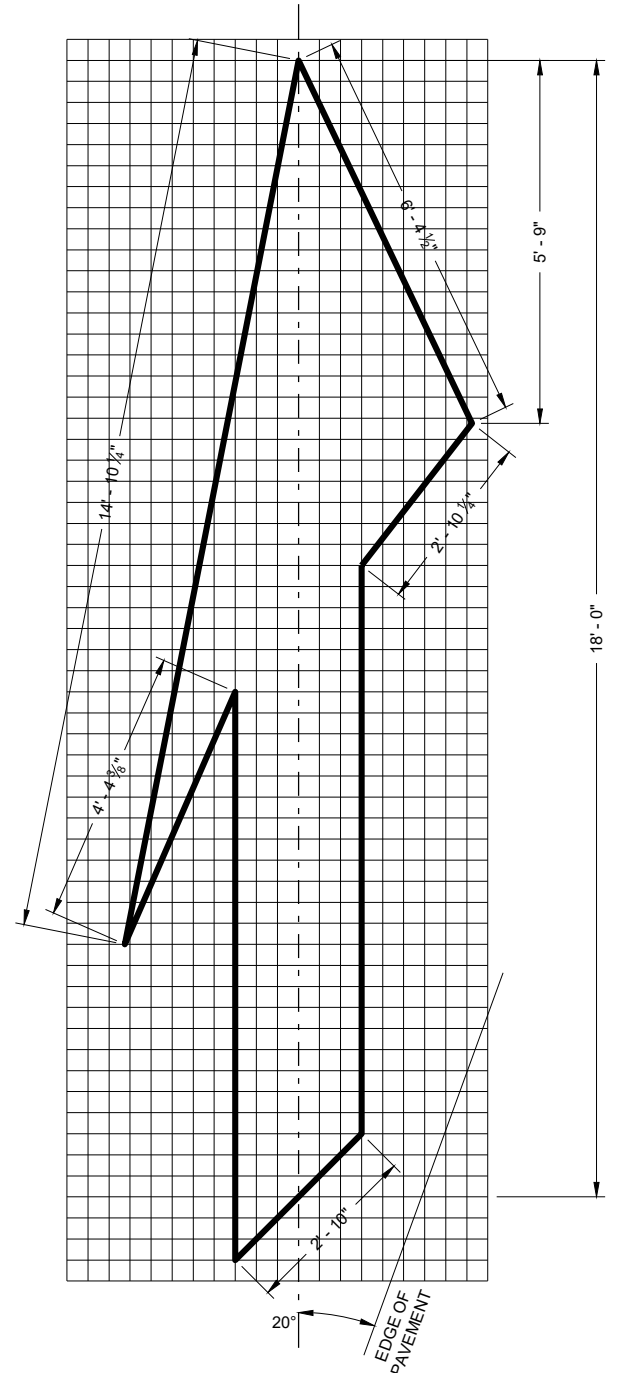
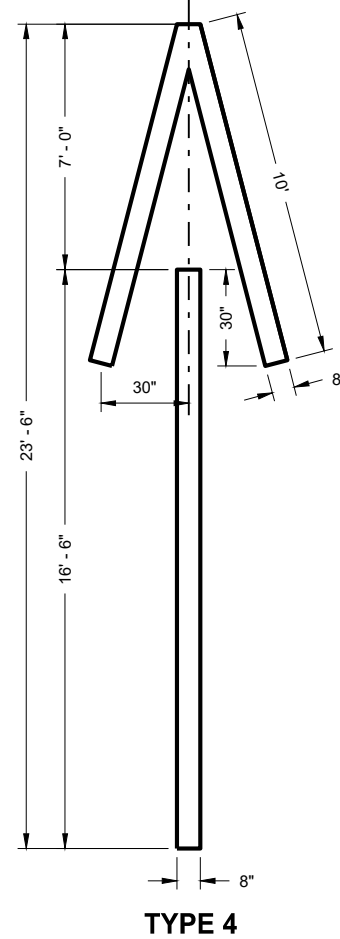
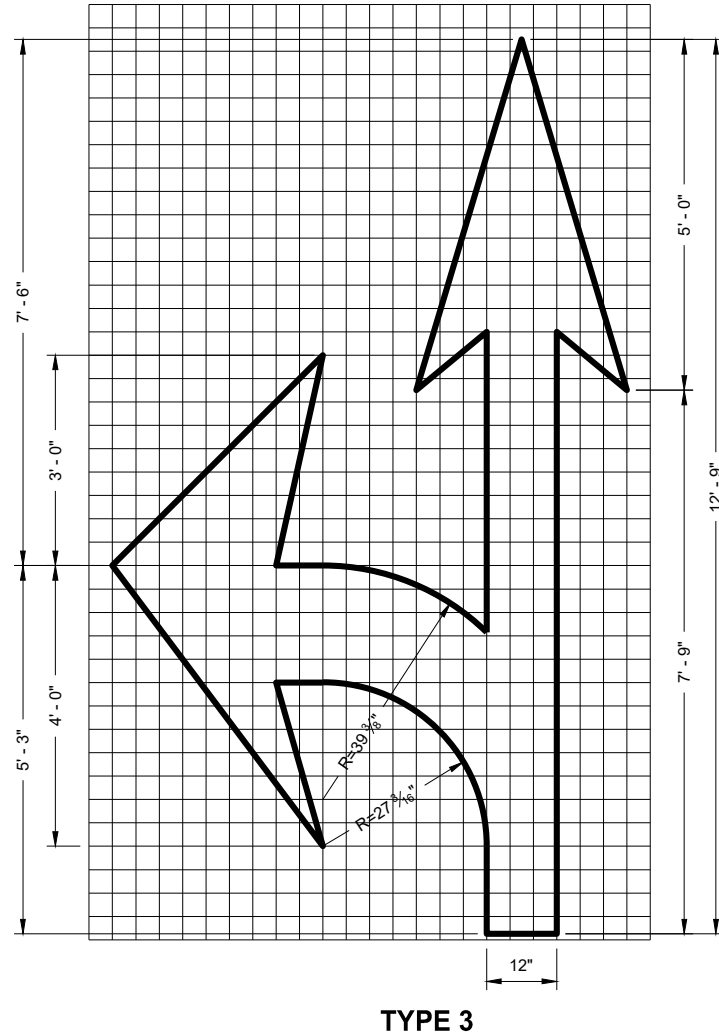
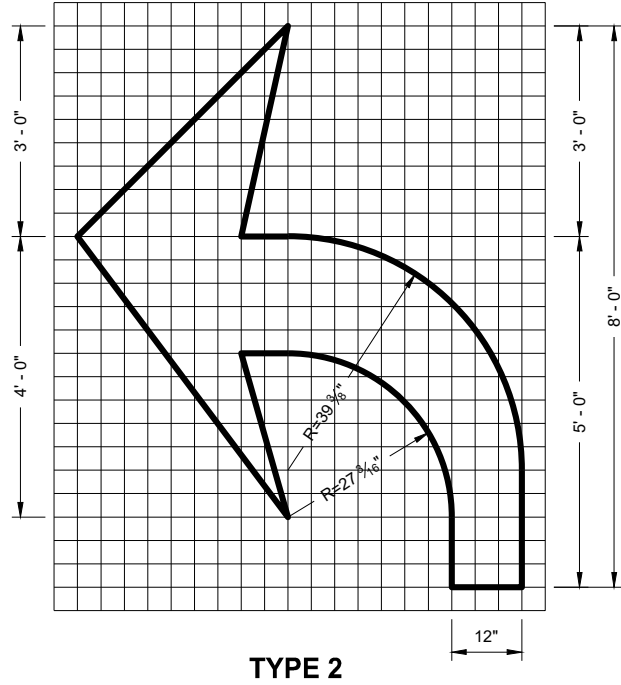
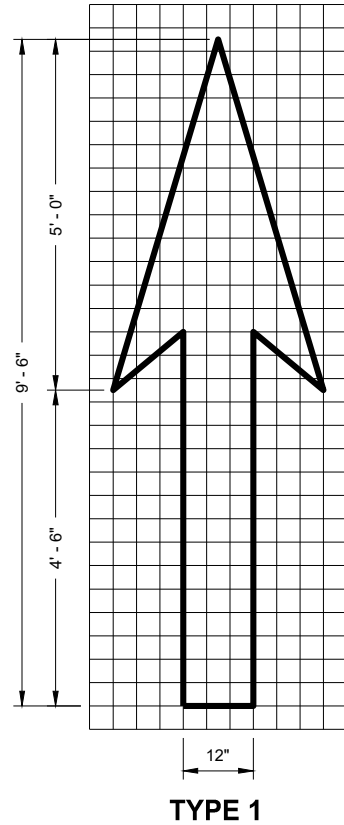
**PAVEMENT MARKING WORDS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
November 2019  
DATE

/S/ Matthew Rauch  
STATE SIGNING AND MARKING  
ENGINEER

FHWA



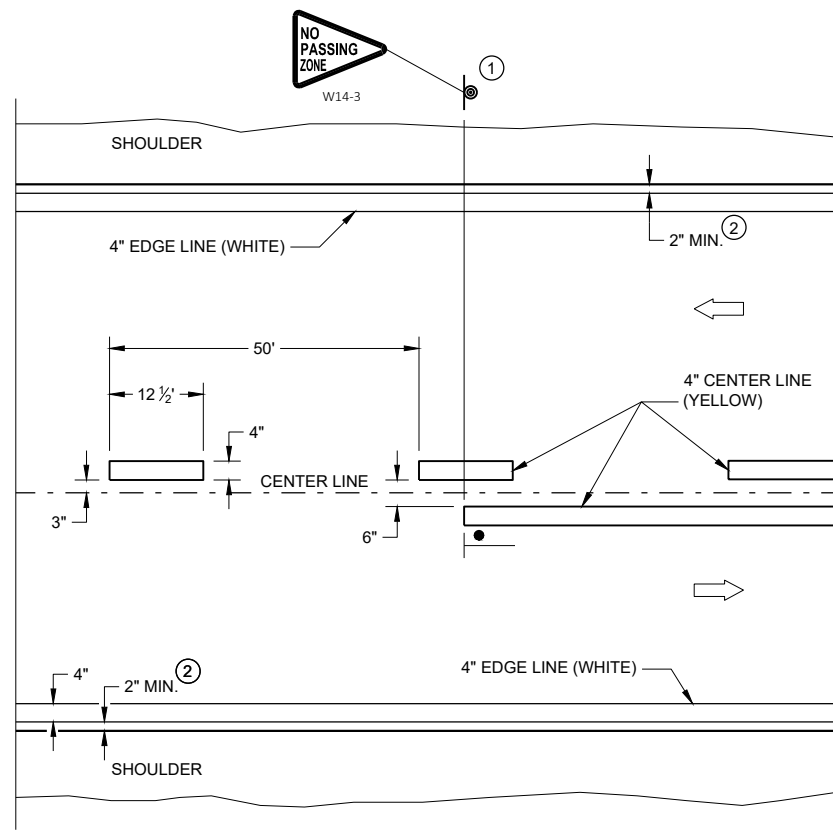
### GENERAL NOTES

DETAILS OF INSTALLATION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.

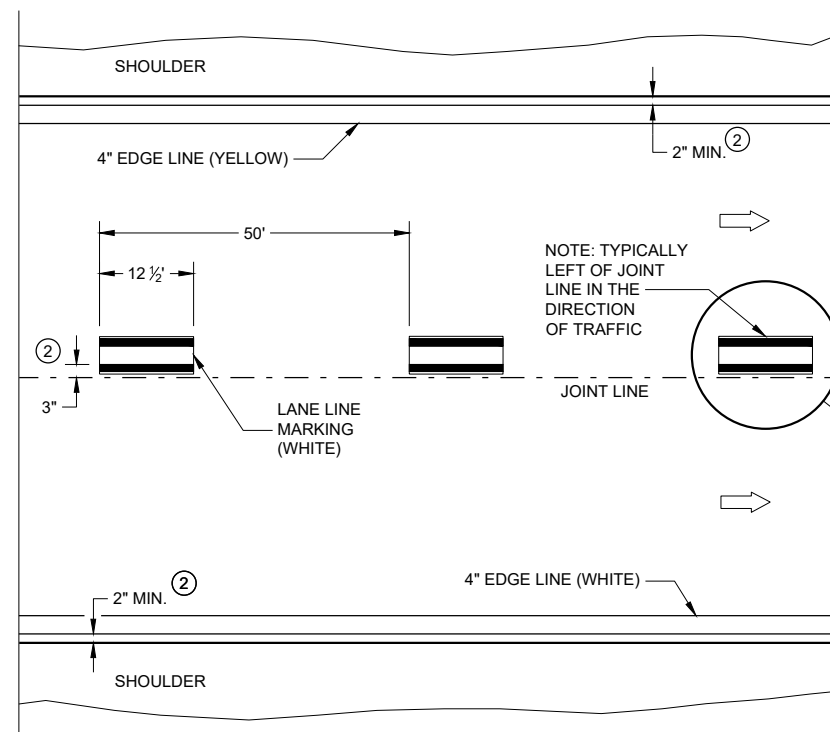
### PAVEMENT MARKING ARROWS

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
November 2019  
DATE  
/S/ Matthew Rauch  
STATE SIGNING AND MARKING  
ENGINEER  
FHWA

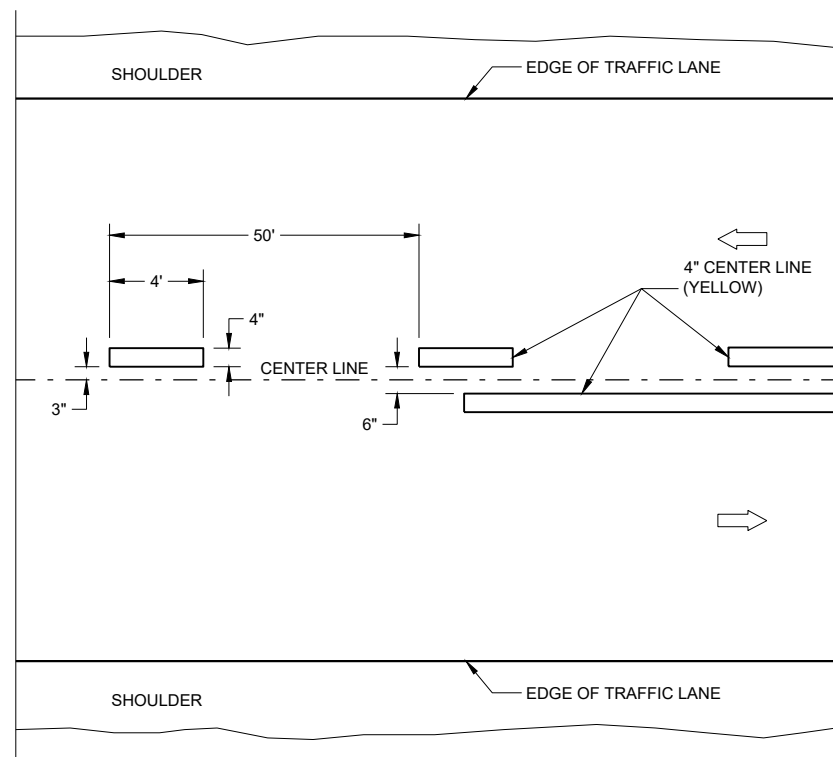


## TWO WAY TRAFFIC

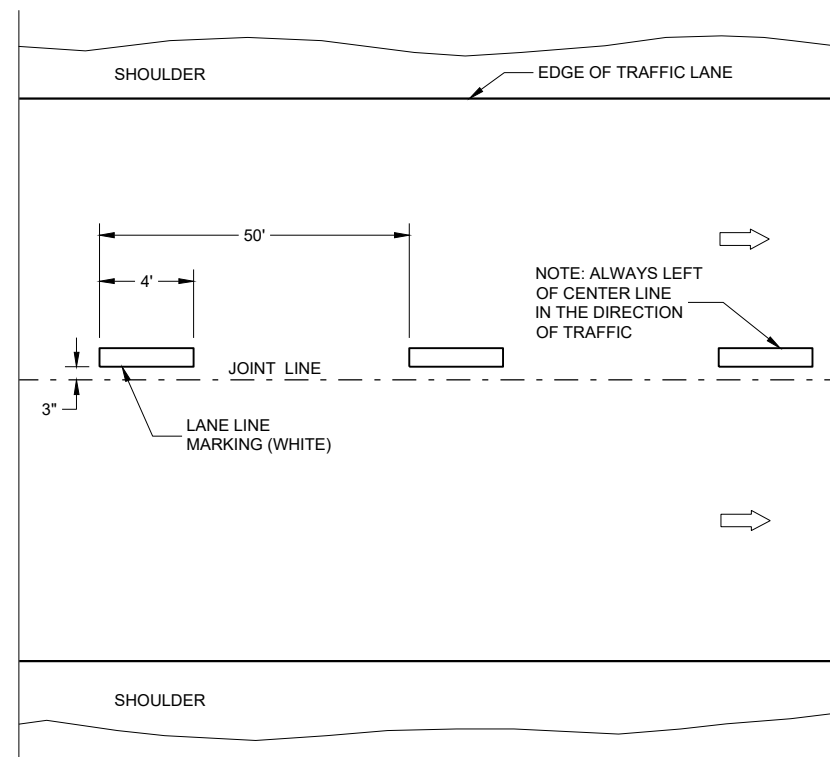


## ONE WAY TRAFFIC

## PERMANENT PAVEMENT MARKING



## TWO WAY TRAFFIC



## ONE WAY TRAFFIC




## TEMPORARY PAVEMENT MARKING

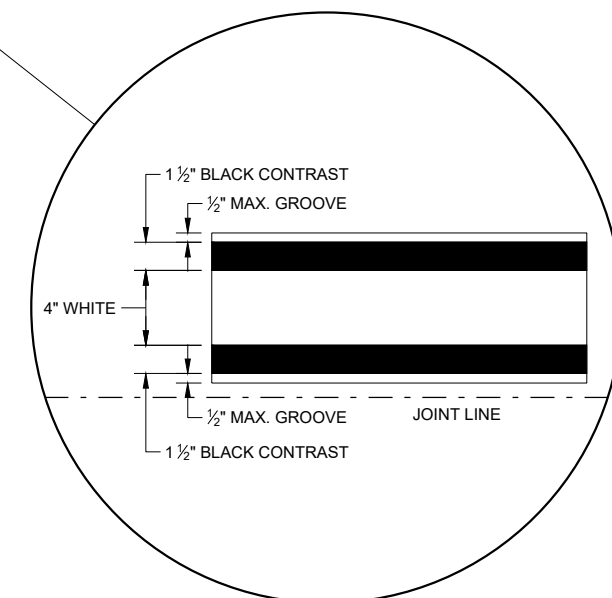
## GENERAL NOTES

DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.

- ① LOCATE THE NO PASSING ZONE W14-3 SIGN WITH 50 FEET OF THE "T" MARKING
- ② MEASURE FROM EDGE OF MARKING TO JOINT LINE. THIS DOES NOT INCLUDE SPACE NEEDED FOR GROOVING OPERATIONS.

## LEGEND

-  "T" MARKING  
 SIGN ON PERMANENT SUPPORT  
 DIRECTION OF TRAFFIC



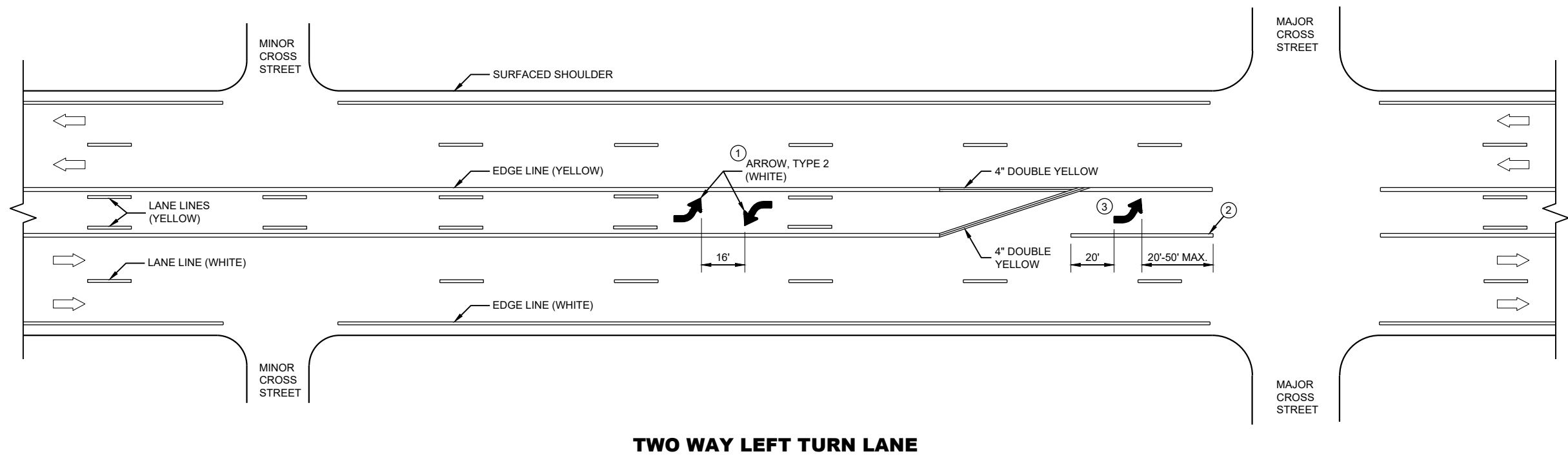
## LONGITUDINAL MARKING (MAINLINE)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
February 2020  
DATE

/S/ Matthew Rauch  
STATEWIDE SIGNING AND MARKING  
ENGINEER





GENERAL NOTES

- ① A SET OF ARROWS IS REQUIRED EVERY 400 FEET OR NEAR INTERSECTIONS OR DRIVEWAYS WITH TURNING TRAFFIC.
- ② 8" WHITE
- ③ TURN BAY LENGTH OF LESS THAN 48' DOES NOT REQUIRE PAVEMENT ARROWS OR TEXT.

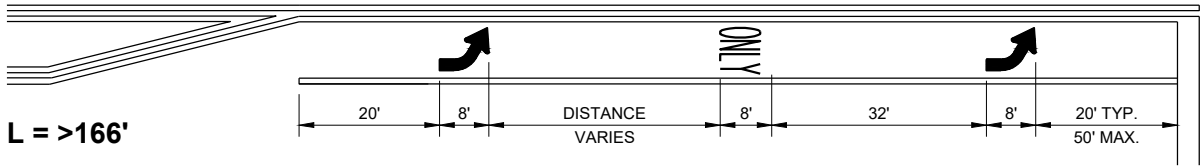
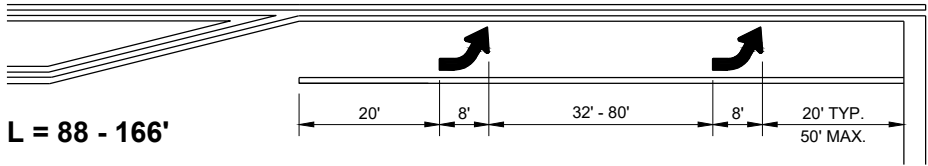
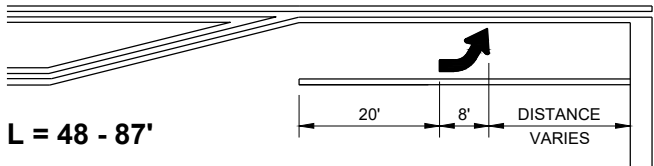
➡ DIRECTION OF TRAFFIC

PAVEMENT MARKING  
(TURN LANES)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

TURN LANE OPTIONS

LENGTH OF TURN BAY ( **L** ) OF 0 - 47' DOES NOT REQUIRE PAVEMENT MARKING ARROWS OR WORDS



\*(SEE TURN LANE OPTIONS FOR PLACEMENT OF PAVEMENT MARKING ARROWS AND WORDS)

GENERAL NOTES

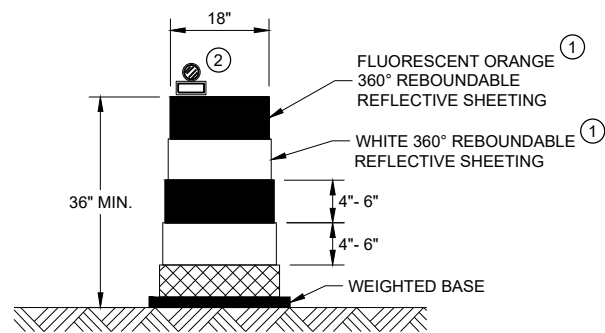
- ① 8" WHITE
- ② QUANTITY AND LOCATION OF TYPE 3 ARROWS ARE THE SAME AS THE TYPE II ARROWS IN THE ADJACENT TURN LANE. FOR TURN LANES WITH A PHYSICAL SEPARATION IN THE SAME DIRECTION OF TRAVEL, THE ARROWS AND "ONLY" MARKING MAY BE ELIMINATED.

➡ DIRECTION OF TRAFFIC

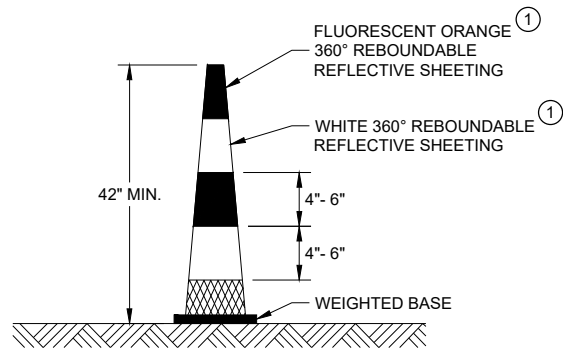
**L** = LENGTH OF TURN BAY

PAVEMENT MARKING  
(TURN LANES)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

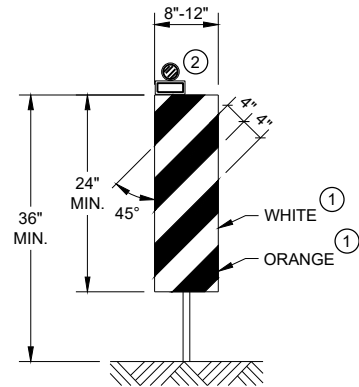


DRUM



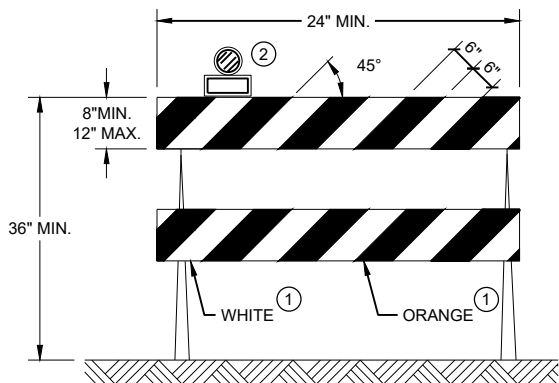
42" CONE

DO NOT USE IN TAPERS  
½ SPACING OF DRUMS



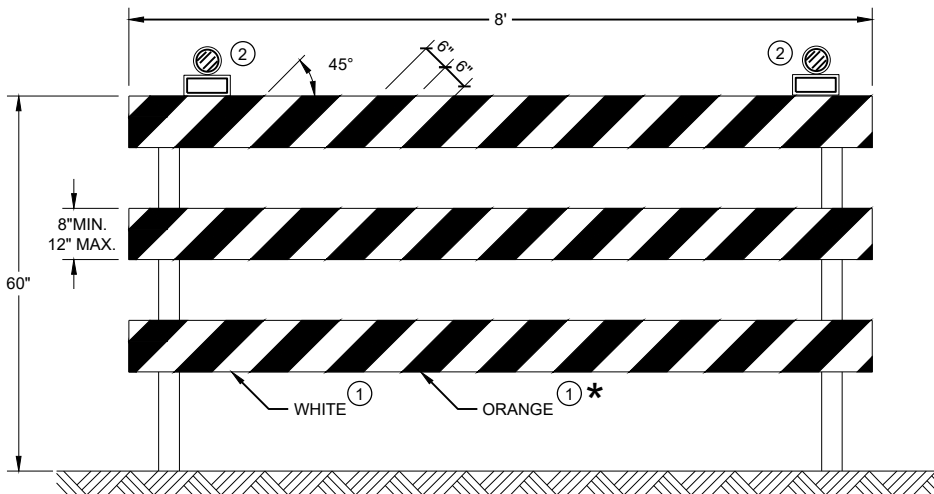
VERTICAL PANEL

THE STRIPES SHALL SLOPE DOWNWARD TO  
THE TRAFFIC SIDE FOR CHANNELIZATION.



TYPE II BARRICADE

FOR RAILS LESS THAN 36" LONG, 4" WIDE STRIPES  
MAY BE USED. ALL STRIPES SHALL SLOPE DOWNWARD  
TO THE TRAFFIC SIDE FOR CHANNELIZATION.



TYPE III BARRICADE

IF SIGN MOUNTED, DO NOT COVER MORE THAN 50% OF THE TOP  
TWO RAILS OR 33% OF THE TOTAL AREA OF THE THREE RAILS.

\* IF USED FOR A PERMANENT APPLICATION USE RED SHEETING.

GENERAL NOTES

- ① REFLECTIVE SHEETING SHALL FOLLOW THE REQUIREMENTS IN THE APPROVED PRODUCTS LISTING FOR SIGN SHEETING.
- ② LOCATION OF WARNING LIGHTS WHEN SHOWN ON THE PLAN.

CHANNELIZING DEVICES  
DRUMS, CONES, BARRICADES  
AND VERTICAL PANELS






STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
November 2020 /S/ Andrew Heidtke  
DATE WORK ZONE ENGINEER

FHWA



LEGEND

-  SIGN ON PORTABLE OR PERMANENT SUPPORT
-  TEMPORARY PORTABLE RUMBLE STRIP ARRAY
-  DIRECTION OF TRAFFIC
-  WORK AREA
-  FLAGGER, EQUIPPED WITH STOP/SLOW PADDLE FASTENED ON SUPPORT STAFF

GENERAL NOTES

DETAILS OF TRAFFIC CONTROL DEVICES AND INSTALLATION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS, THE SPECIAL PROVISIONS, AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

ALL SIGNS ARE 48" X 48" UNLESS OTHERWISE NOTED.

"WO" SIGNS ARE THE SAME AS "W" SIGNS EXCEPT THE BACKGROUND IS ORANGE.

THE EXACT NUMBER, LOCATION AND SPACING OF ALL SIGNS, DEVICES, AND LOCATION OF ALL FLAGGERS SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

THE FIRST ADVANCE WARNING SIGN SHOULD TYPICALLY BE LOCATED IN ADVANCE OF THE ANTICIPATED TRAFFIC BACKUP OR QUEUE.

WHEN A SIDE ROAD OR RAMP INTERSECTS THE FACILITY ON WHICH THE WORK IS BEING PERFORMED, ADDITIONAL TRAFFIC CONTROLS SHALL BE PROVIDED AS SPECIFIED IN THE PLANS AND/OR THE SPECIAL PROVISIONS OR AS APPROVED BY THE ENGINEER.

FLAGGING

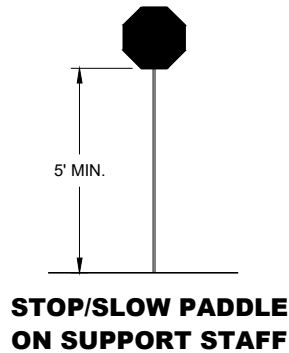
FLAGGERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES. THEY SHALL BE EQUIPPED WITH STOP/SLOW PADDLES FASTENED ON SUPPORT STAFFS. WHEN THE FLAGGING OPERATION IS NOT IN EFFECT REMOVE TEMPORARY PORTABLE RUMBLE STRIPS PRIOR TO COVERING OR REMOVING ALL ADVANCE SIGNING.

- ① FOR MOVING WORK OPERATIONS, POST ADDITIONAL W20-7A FLAGGER SIGNS AT APPROXIMATELY 3,500' INTERVALS IN THE MOVING WORK OPERATION OR AS APPROVED BY THE ENGINEER.
- ② SIGN NOT REQUIRED IF FLAGGING OPERATION OCCURS WITHIN A SIGNED ROAD WORK ZONE AREA.

WHEN THE DISTANCE BETWEEN FLAGGERS EXCEEDS 2 MILES, A PILOT CAR IS REQUIRED. WHEN CURVES REDUCE SIGHT DISTANCE BELOW 400', A PILOT CAR IS REQUIRED.

TEMPORARY PORTABLE RUMBLE STRIPS

- UTILIZE TEMPORARY PORTABLE RUMBLE STRIPS ON ALL FLAGGING OPERATIONS.
- ③ EACH TEMPORARY PORTABLE RUMBLE STRIP ARRAY CONSISTS OF THREE RUMBLE STRIPS SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATION, PLACED TRANSVERSE ACROSS THE LANE AT LOCATIONS SHOWN.
- ONLY USE TEMPORARY PORTABLE RUMBLE STRIPS FOR THE APPROVED PRODUCTS LIST.
- INSTALL TEMPORARY RUMBLE STRIPS PER MANUFACTURER'S RECOMMENDATIONS.
- PLACE ADVANCE SIGNING PRIOR TO INSTALLING TEMPORARY RUMBLE STRIPS.
- DO NOT INSTALL TEMPORARY PORTABLE RUMBLE STRIPS ON GRAVEL, MILLED SURFACES, OR ASPHALT THAT HAS BEEN PAVED LESS THAN 12 HOURS.

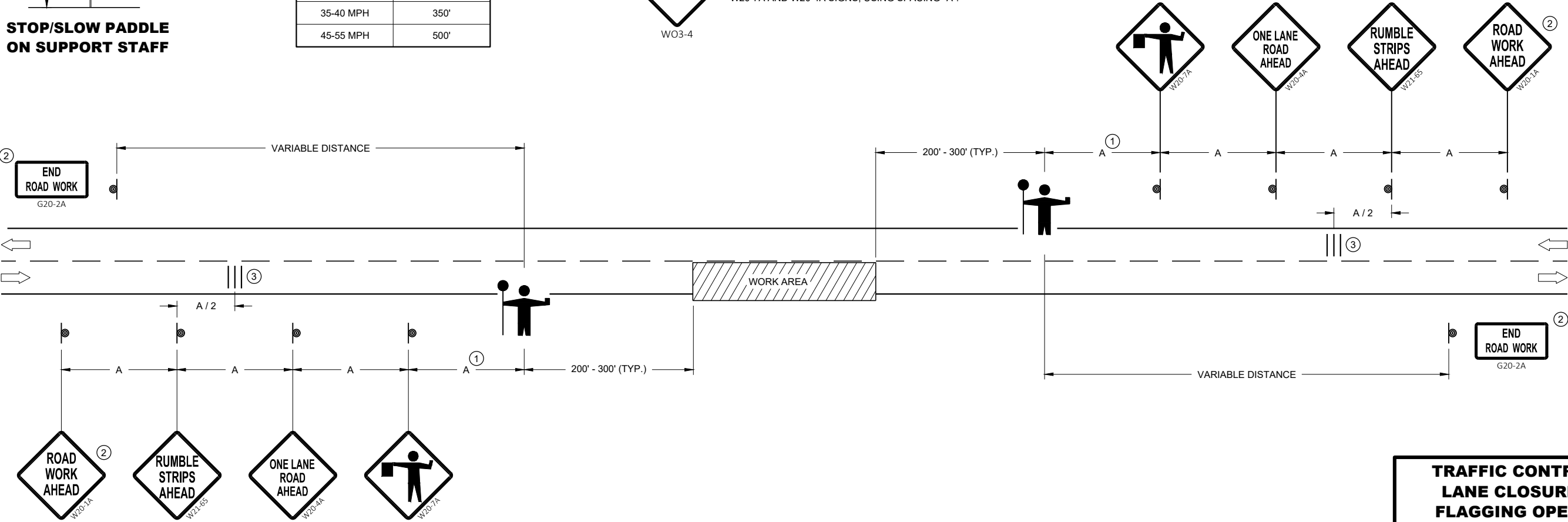


SIGN AND TEMPORARY RUMBLE STRIP ARRAY SPACING TABLE

SPEED LIMIT	SPACING "A"
25-30 MPH	200'
35-40 MPH	350'
45-55 MPH	500'

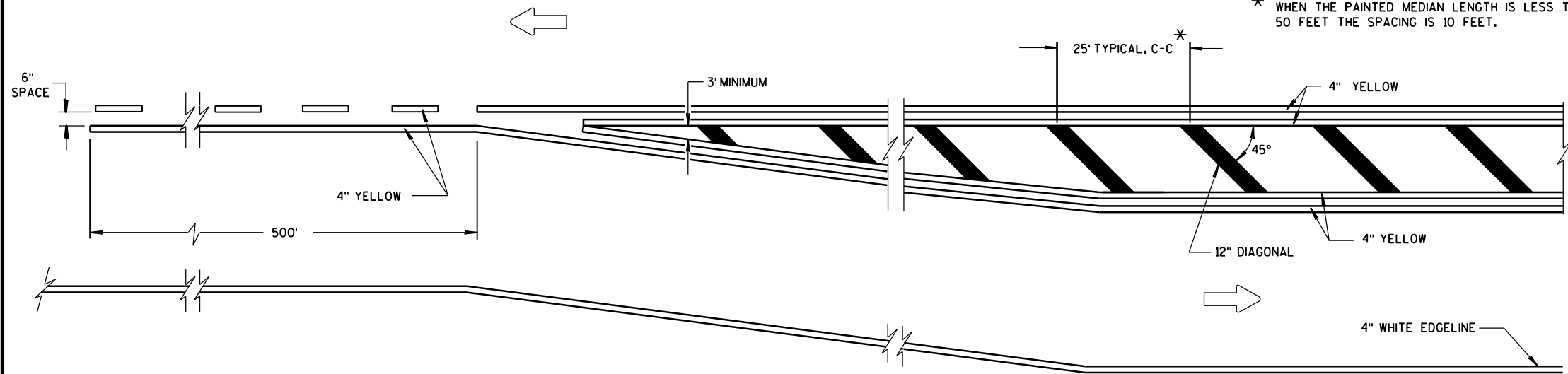


USE OF W03-4 SIGN IS OPTIONAL. WHEN USED, THIS SIGN SHALL BE LOCATED BETWEEN THE W20-7A AND W20-4A SIGNS, USING SPACING "A".



TRAFFIC CONTROL FOR LANE CLOSURE WITH FLAGGING OPERATION

<b>TRAFFIC CONTROL FOR LANE CLOSURE WITH FLAGGING OPERATION</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED May 2019 DATE	/S/ Andrew Heidtke WORK ZONE ENGINEER
FHWA	

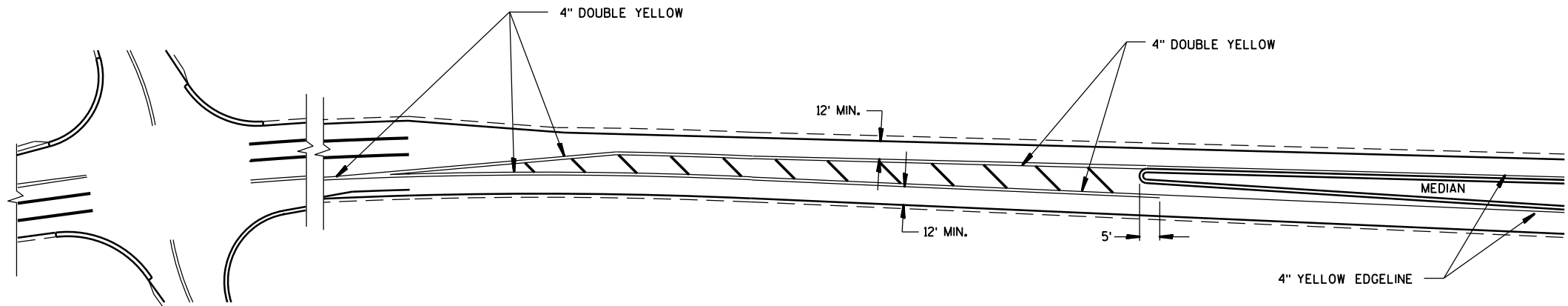


MEDIAN ISLAND DETAIL

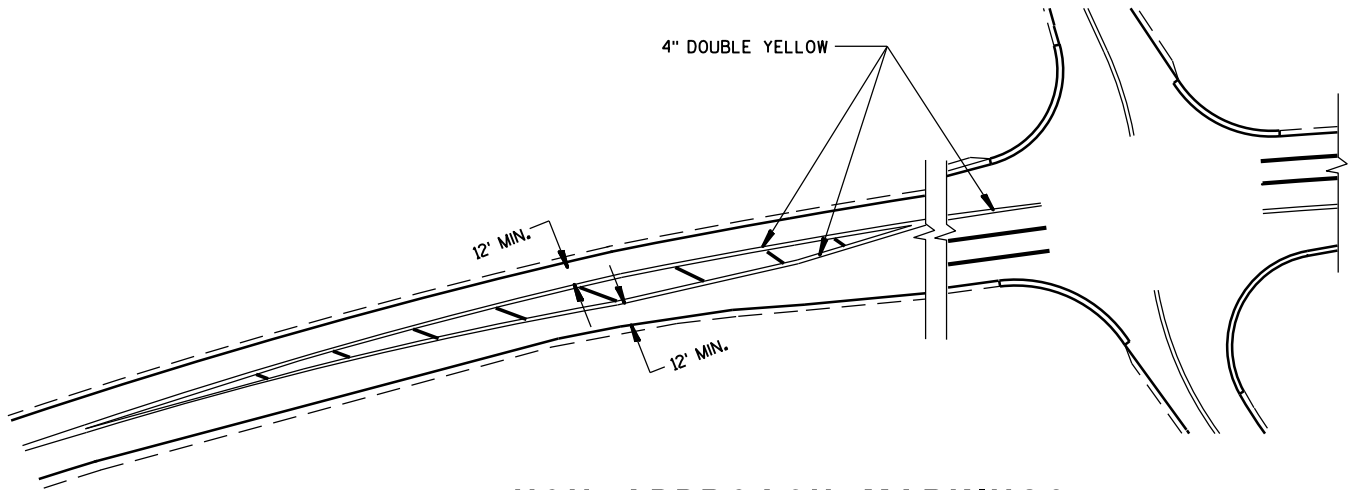
GENERAL NOTE

DIAGONALS ARE OPTIONAL WHEN PAINTED ISLAND IS LESS THAN 6 FEET AT WIDEST POINT.

➡ DIRECTION OF TRAVEL

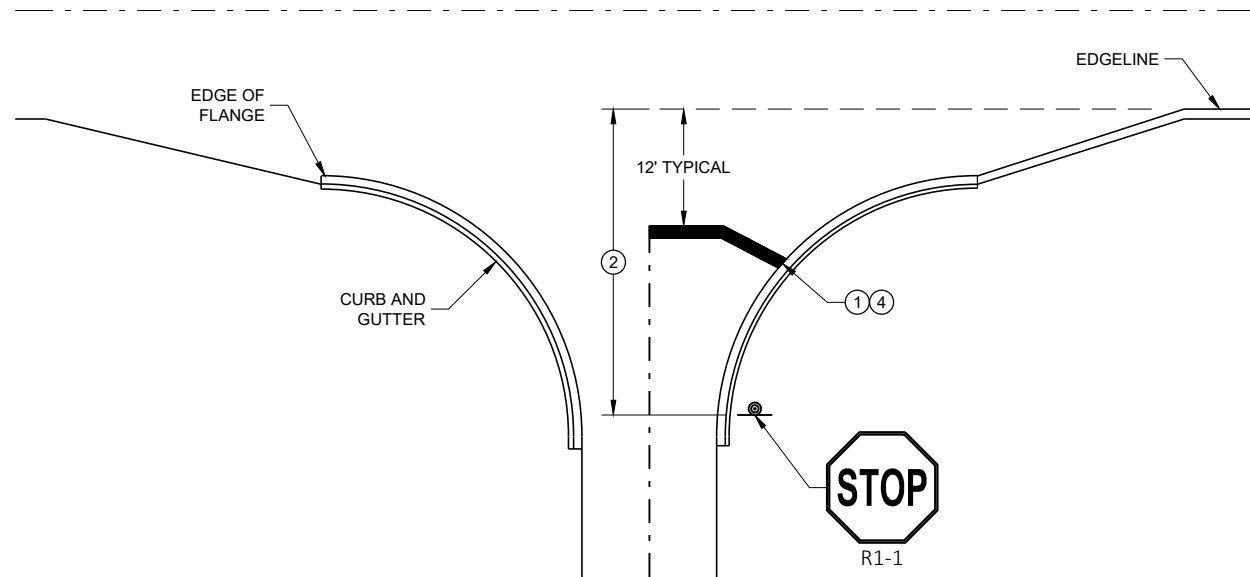


APPROACH MARKINGS FOR OTHER MEDIAN TYPES

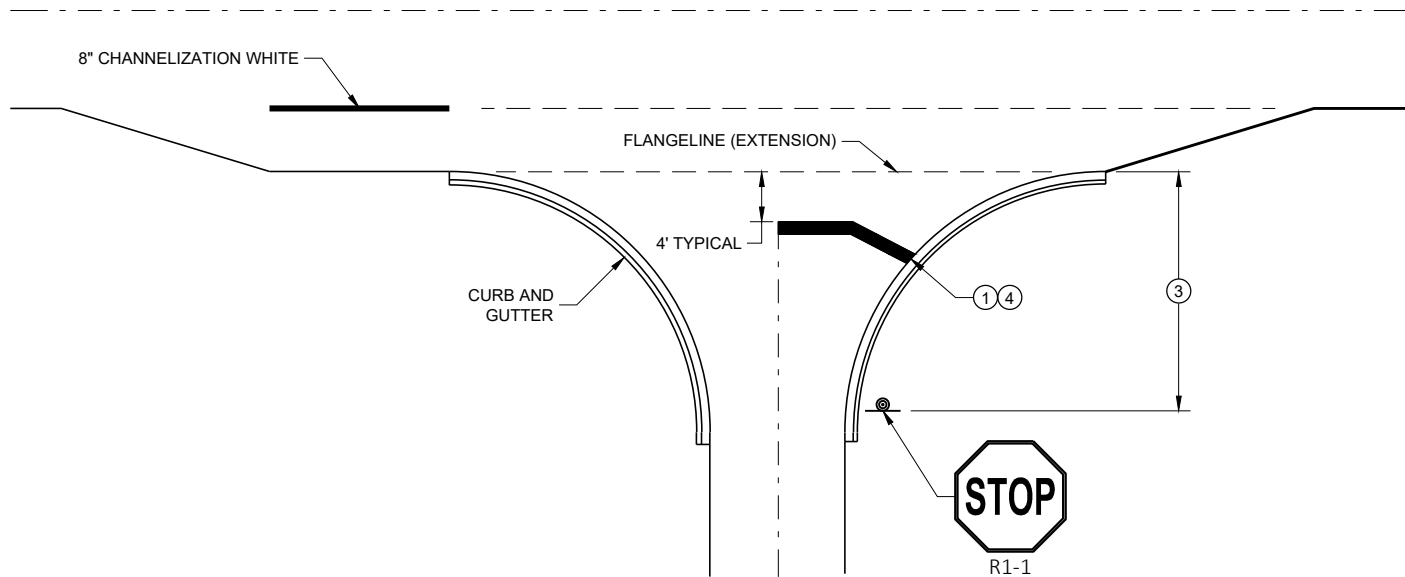


NON APPROACH MARKINGS

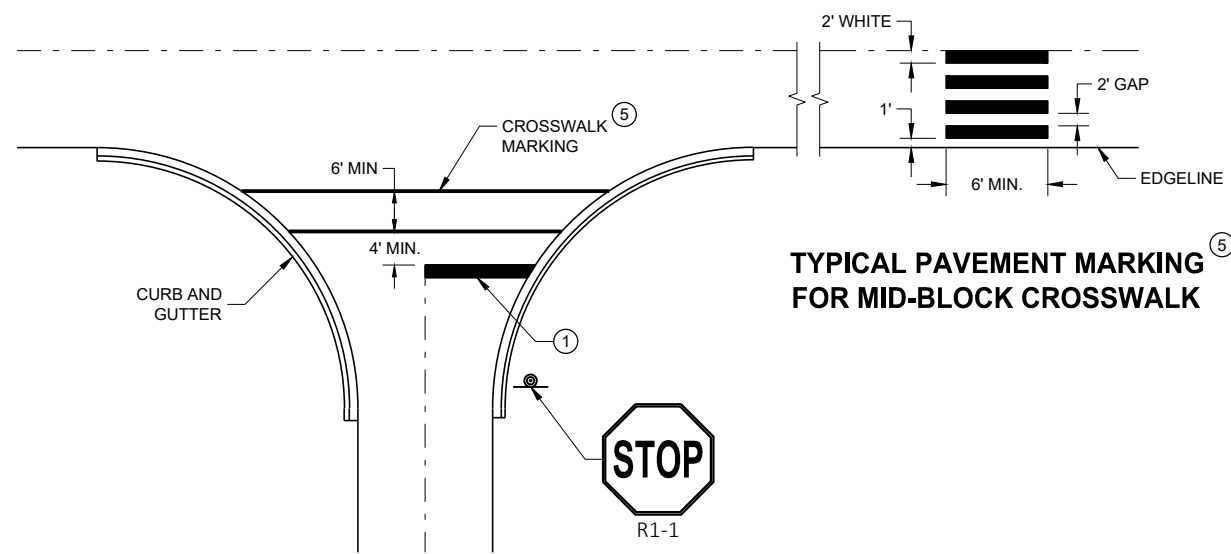
MEDIAN ISLAND MARKING	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED June 2017 DATE	/S/ Matthew Rauch STATE SIGNING AND MARKING ENGINEER FHWA



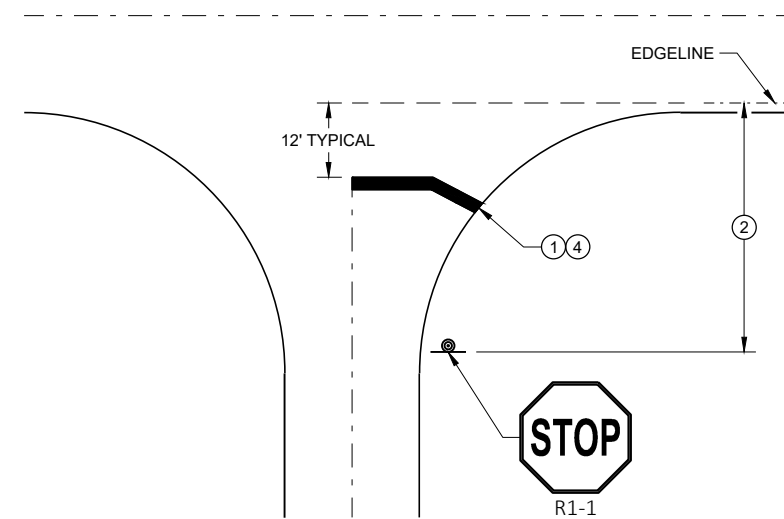
TYPICAL STOP LINE PAVEMENT MARKING WITH CURB AND GUTTER



TYPICAL STOP LINE PAVEMENT MARKING FOR SIDEROADS WITH RIGHT TURN LANE



TYPICAL STOP LINE PAVEMENT MARKING FOR SIDEROADS WITH CROSSWALK MARKING



TYPICAL STOP LINE PAVEMENT MARKING WITHOUT CURB AND GUTTER

GENERAL NOTES

STOP SIGN SHALL BE PLACED A MINIMUM OF 6 FEET TO A MAXIMUM OF 50 FEET FROM THE EDGE LINE LOCATION.

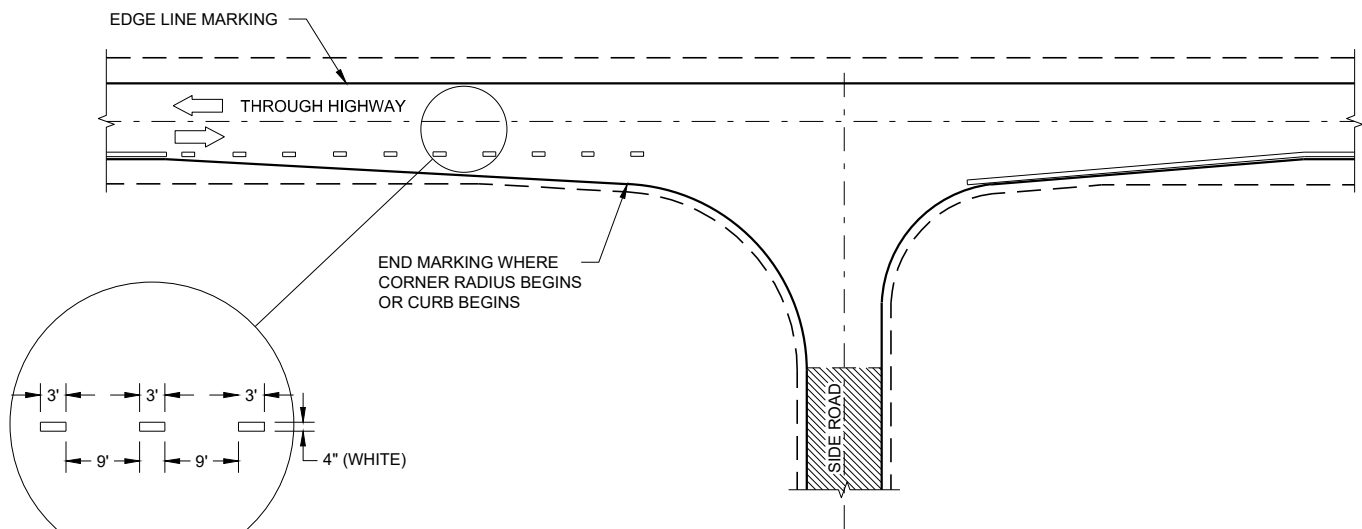
- 1 18-INCH STOP LINES MAY BE DELETED OR ADDED BY THE REGION MARKING ENGINEER BASED ON VISIBILITY AND SIGHT LINES.
- 2 NO STOP LINE IS REQUIRED IF STOP SIGN IS LESS THAN OR EQUAL TO 40 FEET FROM THE EDGE LINE.
- 3 NO STOP LINE IS REQUIRED IF STOP SIGN IS LESS THAN OR EQUAL TO 30 FEET FROM THE FLANGELINE EXTENSION.
- 4 MOVE CLOSER TO THE EDGE OF TRAVEL LINE AS NEEDED FOR VISIBILITY AND SIGHT LINES (NO CLOSER THAN 4 FEET).
- 5 LADDER BAR CROSSWALKS SHOULD ONLY BE USED FOR MID BLOCK CROSSINGS. USE 2 - 6" TRANSVERSE LINES INSTEAD.

STOP LINE AND CROSSWALK PAVEMENT MARKING

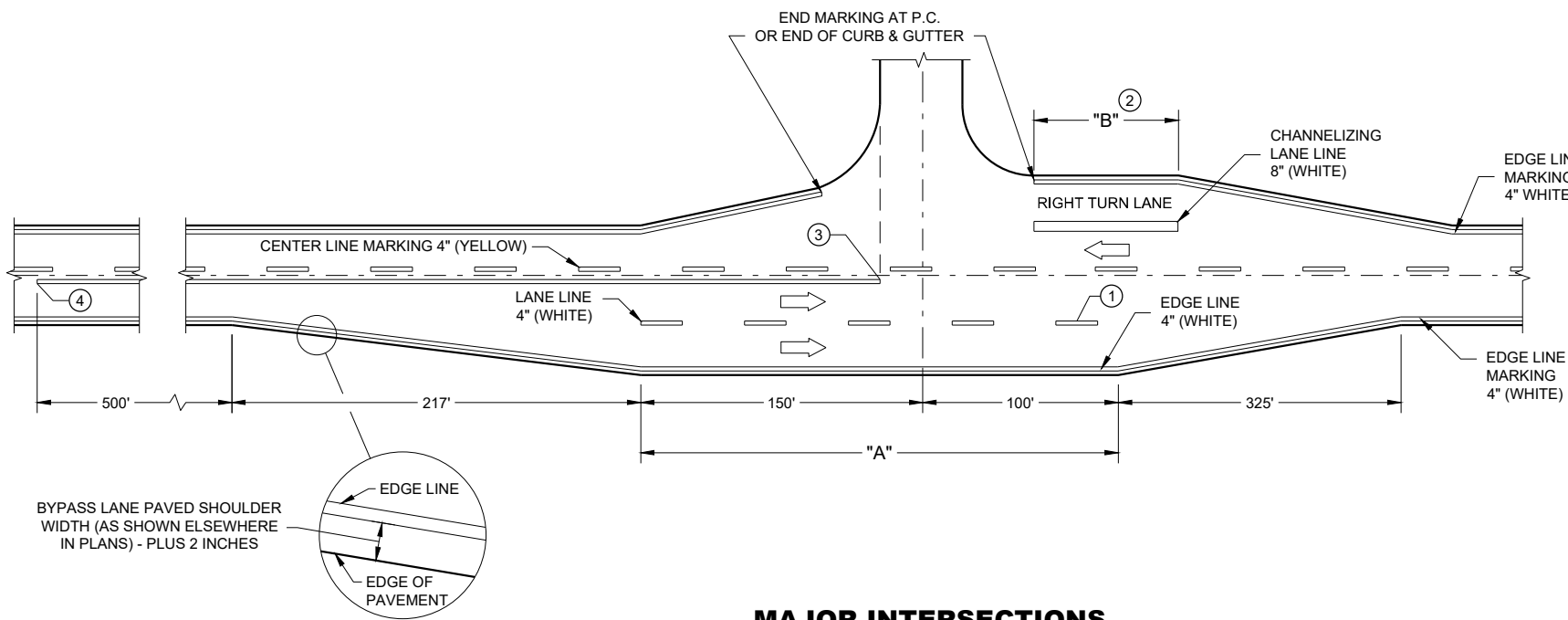
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
November 2019 /S/ Matthew Rauch  
DATE STATE SIGNING AND MARKING  
ENGINEER  
FHWA





MINOR INTERSECTION



MAJOR INTERSECTIONS  
(INTERSECTION WITH FULL RIGHT TURN LANE OR BYPASS LANE)

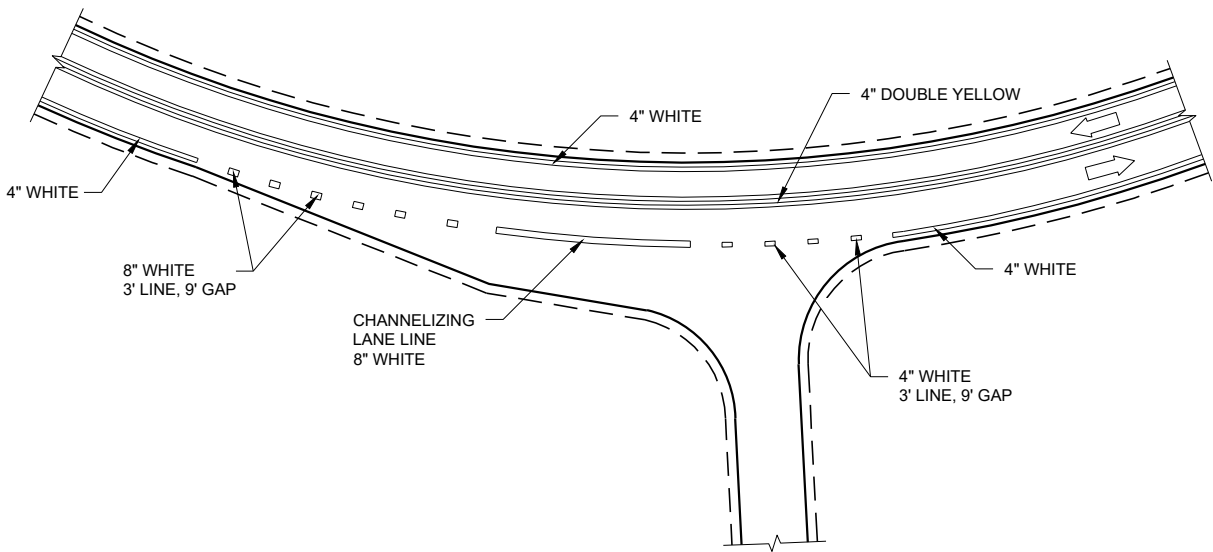
GENERAL NOTES

OMIT EDGE LINES THROUGH INTERSECTIONS. CONTINUE EDGE LINES THROUGH DRIVEWAYS.

- ① WHEN DISTANCE "A" IS LESS THAN 250 FEET, OMIT LANE LINE.
- ② WHEN DISTANCE "B" IS LESS THAN 100 FEET, OMIT CHANNELIZING LANE LINE.
- ③ BARRIER LINE ENDS AT SIDE ROAD PAVEMENT / SURFACE EDGE EXTENSION.
- ④ BARRIER LINE STARTS 500 FEET PRIOR TO THE BYPASS TAPER.

LEGEND

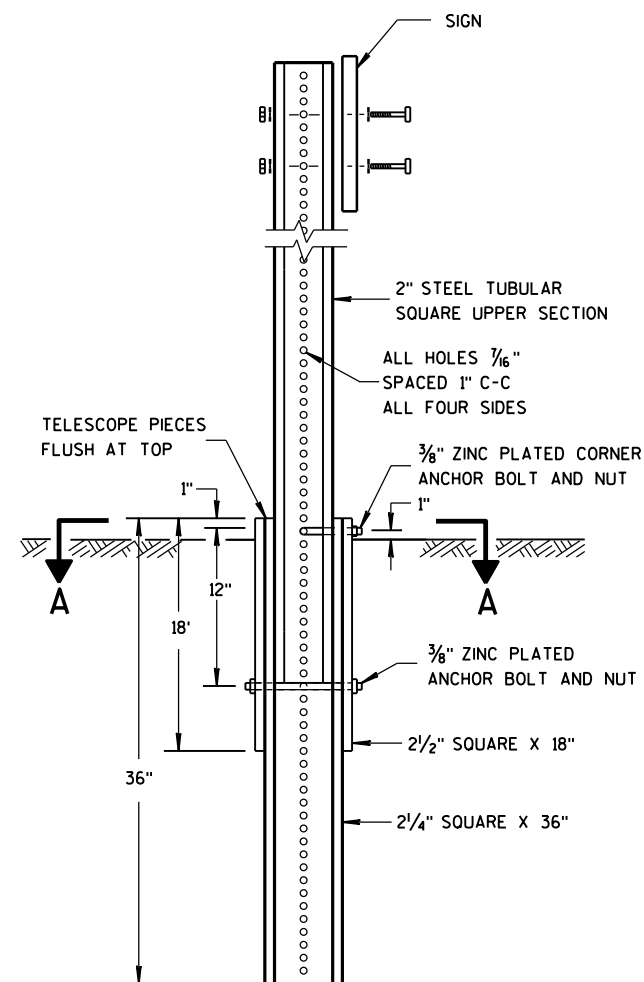
➡ DIRECTION OF TRAVEL



INTERSECTION ON OUTSIDE OF CURVE

PAVEMENT MARKING  
(INTERSECTIONS)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



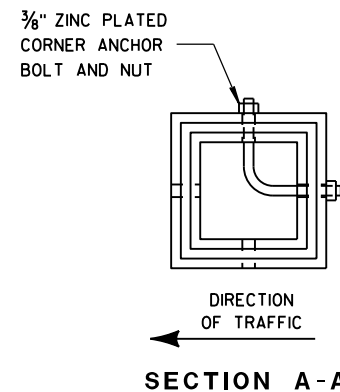
DETAIL OF TUBULAR  
STEEL SIGN POST

TUBULAR STEEL POSTS

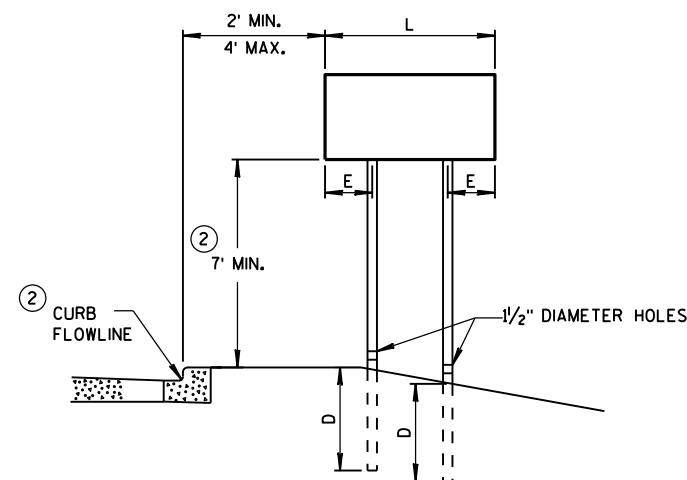
AREA OF SIGN INSTALLATION (SQ. FT.)	NUMBER OF REQUIRED TUBULAR STEEL POSTS
9 OR LESS	1
GREATER THAN 9 LESS THAN OR EQUAL TO 18	2
GREATER THAN 18 LESS THAN OR EQUAL TO 27	3

SIGNS WIDER THAN 3 FEET OR LARGER THAN 9 SQ. FT. SHALL  
BE MOUNTED ON MULTIPLE POSTS (SEE ABOVE TABLE).

SIGNS LARGER THAN 27 SQ. FT. SHALL NOT BE MOUNTED  
ON TUBULAR STEEL POSTS.



SECTION A-A

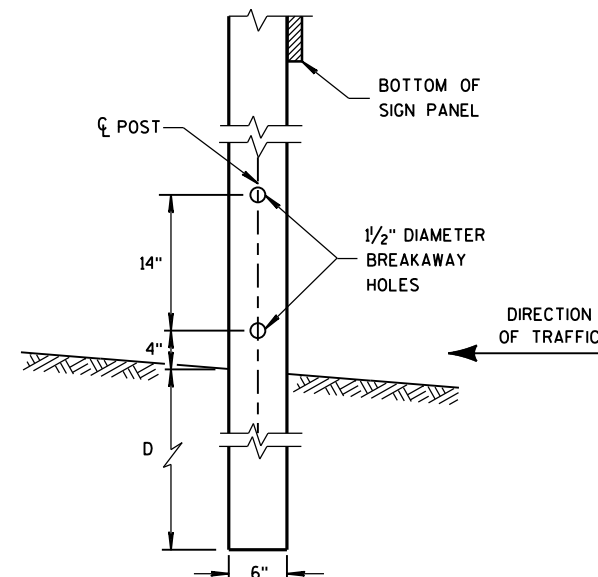


URBAN AREA

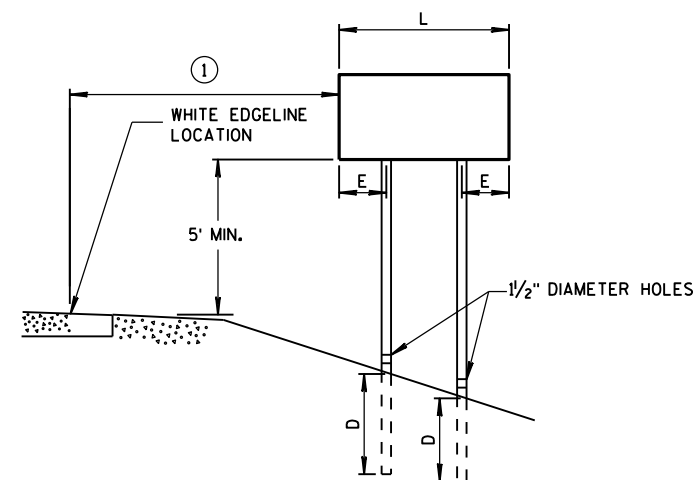
POST MOUNTING DETAIL FOR TEMPORARY TRAFFIC CONTROL FIXED MESSAGE SIGNS

WOOD POST  
EMBEDMENT DEPTH

AREA OF SIGN INSTALLATION (SQ. FT.)	D (MIN)
20 OR LESS	4'
GREATER THAN 20	5'



4 "x6 " WOOD POST  
MODIFICATION



RURAL AREA

4 " X 6 " WOOD POST

POST SPACING REQUIREMENTS		NUMBER OF WOOD POSTS REQUIRED
L	E	
48" OR LESS AND LESS THAN 20 SQ. FT.	-	1
LESS THAN 60"	12"	2
60" TO 120"	L/5	2
GREATER THAN 120" LESS THAN 168"	12"	3
168" AND GREATER	12"	4

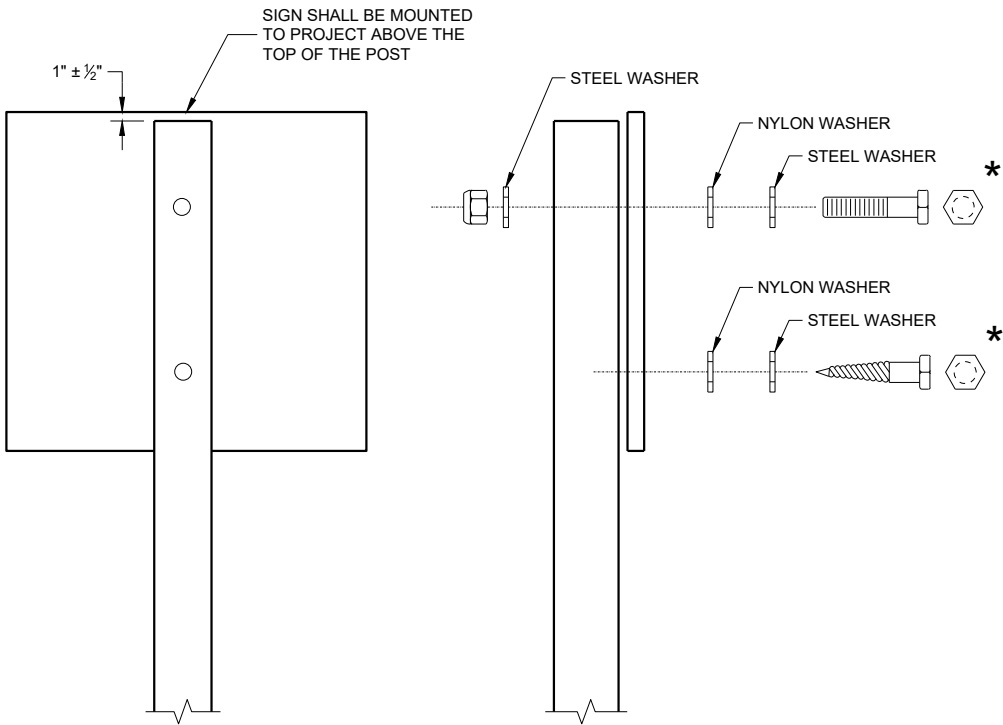
SEE NOTE ③

GENERAL NOTES

- ① 6 FEET FROM THE EDGE OF PAVEMENT (EDGE LINE LOCATION) UNLESS  
OTHERWISE DIRECTED BY THE PROJECT ENGINEER. LATERAL OFFSET SHOULD  
BE ADJUSTED TO AVOID THE DITCH FLOWLINE.
- ② THE EXISTENCE OF CURB AND GUTTER DOES NOT IN ITSELF  
MANDATE THE VERTICAL CLEARANCE ILLUSTRATED. THAT  
HEIGHT IS TYPICALLY MEASURED WHERE THERE IS SIDEWALK  
ADJACENT TO THE ROADWAY OR PARKING IS PERMITTED. IN  
THE ABSENCE OF SIDEWALK, VERTICAL CLEARANCE IS MEASURED  
FROM THE TOP OF THE CURB. IF NO SIDEWALK AND NO PARKING,  
VERTICAL CLEARANCE MAY BE REDUCED TO 5 FOOT MINIMUM. OFFSET  
OF SIGNS IS MEASURED FROM THE CURB FLOWLINE.
- ③ FOR SIGNS REQUIRING 4 POSTS, SPACE INTERMEDIATE POSTS EVENLY.

TEMPORARY TRAFFIC CONTROL  
SIGN MOUNTING

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION



NUTS, BOLTS AND LAGS USED FOR MOUNTING SIGNS  
SHALL HAVE HEXAGONAL HEADS AND SHALL BE EITHER:

- A. HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM  
DESIGNATION: A 153, CLASS D, OR SC 3
- B. ELECTRO-GALVANIZED IN ACCORDANCE WITH ASTM  
DESIGNATION: B 633, TYPE III, SC 3

THREADS ON BOLTS AND NUTS SHALL BE MANUFACTURED WITH  
SUFFICIENT ALLOWANCE FOR THE CADMIUM PLATE OR GALVANIZED  
COATING TO PERMIT THE NUTS TO RUN FREELY ON THE BOLTS.

WOOD POST (4" x 6")  
LAG SCREWS - 3/8" x 3"  
MACHINE BOLTS - 5/16" x 6 1/2" OR 7" LENGTH W/NUTS

SQUARE STEEL POST (2" x 2")  
MACHINE BOLTS - 3/8" x 3 1/4" LENGTH W/NUTS  
RIVETS - 3/32" (6605-9-6) BULB-TITE, TRI-FOLD, ALUMINUM  
BODY/MANDREL O.D. FLANGE 0.720 - 0.765 INCH,  
GRIP RANGE 0.042 - 0.375 INCH

WASHERS (ALL POSTS) -  
1 1/4" O.D. x 3/8" I.D. x 1/16" STEEL  
1 1/4" O.D. x 3/8" I.D. x 0.080 NYLON

\* TWO DIFFERENT FASTENING SYSTEMS ARE SHOWN FOR ILLUSTRATION  
PURPOSES. ON ANY INDIVIDUAL SIGN, EITHER ONE OR THE OTHER SYSTEM  
SHALL BE USED. ACTUAL NUMBER OF FASTENERS PER SIGN VARIES WITH  
THE SIGN AREA. FOR A SINGLE POST INSTALLATION, ALL SIGNS GREATER  
THAN 9 SQ. FT. REQUIRE THE USE OF 3 FASTENERS.

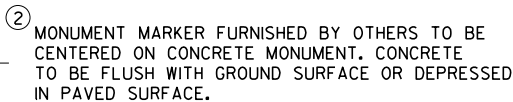
ATTACHMENT OF SIGNS  
TO POSTS

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION

APPROVED  
June 2017 /S/ Andrew Heidtke  
DATE WORK ZONE ENGINEER

FHWA

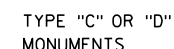




## PRECAST



(INCLUDES MARKER)



(APPROXIMATE WEIGHT 2 LBS)  
(FOR CONCRETE PAVEMENT ONLY)



(APPROXIMATE WEIGHT 95 LBS)

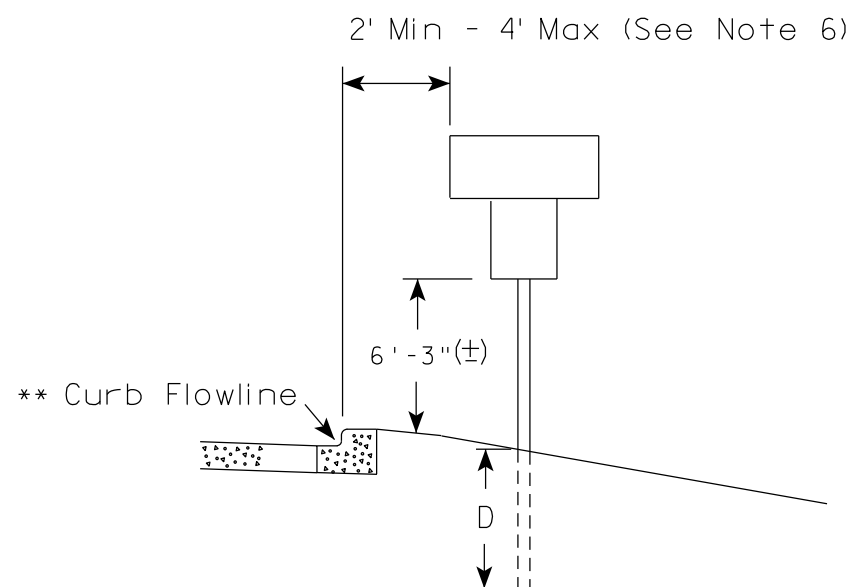
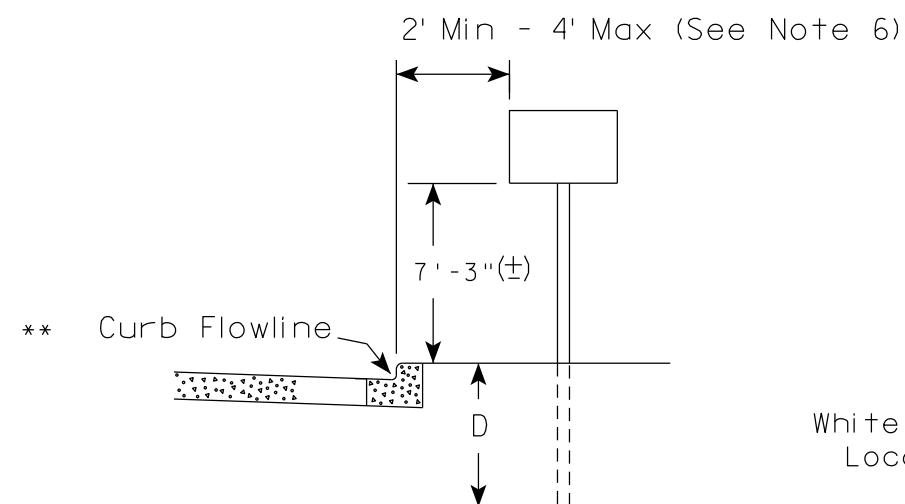
**LANDMARK REFERENCE  
MONUMENTS AND COVERS**

**STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION**

**APPROVED**  
March 2018 /s/ Raymond A. Kumapayi  
DATE CHIEF SURVEYING AND MAPPING ENGINEER

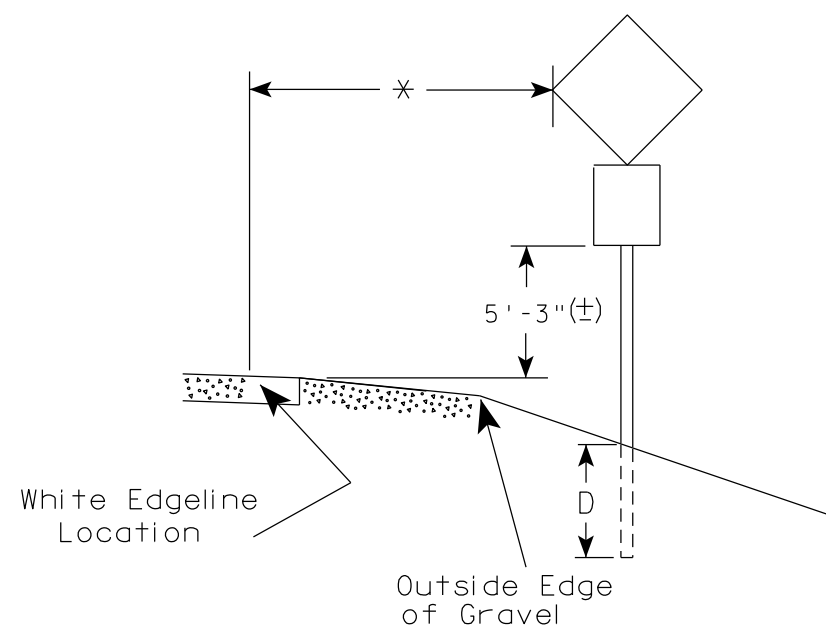
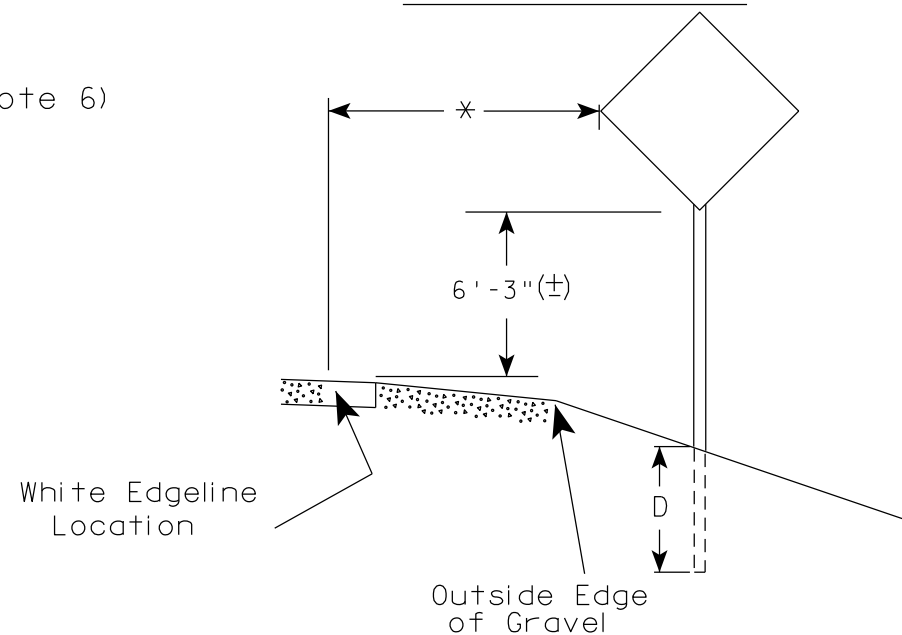
**FHWA**

# URBAN AREA



\*\* The existence of curb and gutter does not in itself mandate the vertical clearance illustrated. That height is typically measured where there is sidewalk adjacent to the roadway or parking is permitted. In the absence of sidewalk vertical clearance is measured from the top of the curb. Offset of signs is measured from the flow line.

# RURAL AREA (See Note 2)



\* 6 feet from edge of a paved shoulder or 12 feet from the edge of pavement (edge line location) or 2 feet from outside edge of gravel, whichever is greater unless directed by project engineer.

## POST EMBEDMENT DEPTH

Area of Sign Installation ( Sq. Ft. )	D ( Min )
20 or Less	4'
Greater than 20	5'

## GENERAL NOTES

1. Signs wider than 4 feet or 20 sq.ft or larger, shall be mounted on multiple posts. Refer to plate A4-4.
2. If signs are mounted on or behind barrier wall, see A4-10 sign plate.  
The Double Arrow sign (W12-1D) shall be mounted at a height of 2'-3" (±). The Chevron sign (W1-8), Roundabout Chevron panel (R6-4B), Enhanced Reference Markers, Clearance Markers (W5-52), Mile Markers (D10 series), In Road Object Markers (W5-54) & End of Road Markers (W5-56) shall be mounted at a height of 4'-3" (±).
3. For expressways and freeways, mounting height is 7'- 3" (±) or 6'-3" (±) depending upon existence of a sub-sign.
4. Minimum mounting height for signs mounted on traffic signal poles is 5'- 3" (±).
5. Offset distance shall be consistent with existing signs or consistent throughout length of project.
6. The (±) tolerance for mounting height is 3 inches.
7. Folding signs shall be mounted at a height of 5'-3" (±) or as directed by the Engineer.

TYPICAL INSTALLATION  
OF PERMANENT TYPE II  
SIGNS ON SINGLE POSTS

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 5/13/2020 PLATE NO. A4-3.22

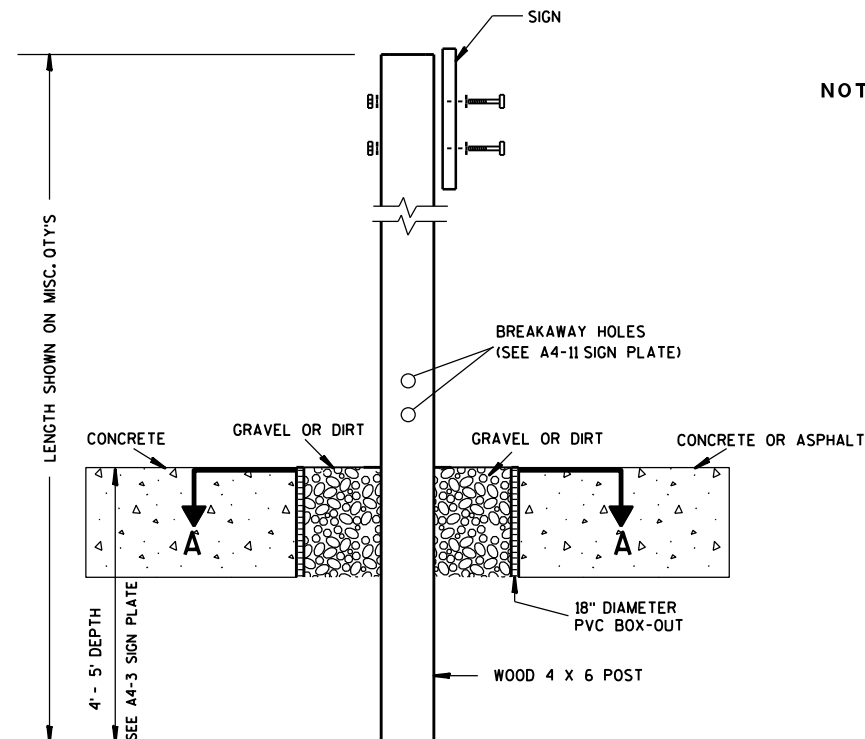
PROJECT NO:

HWY:

COUNTY:

SHEET NO:

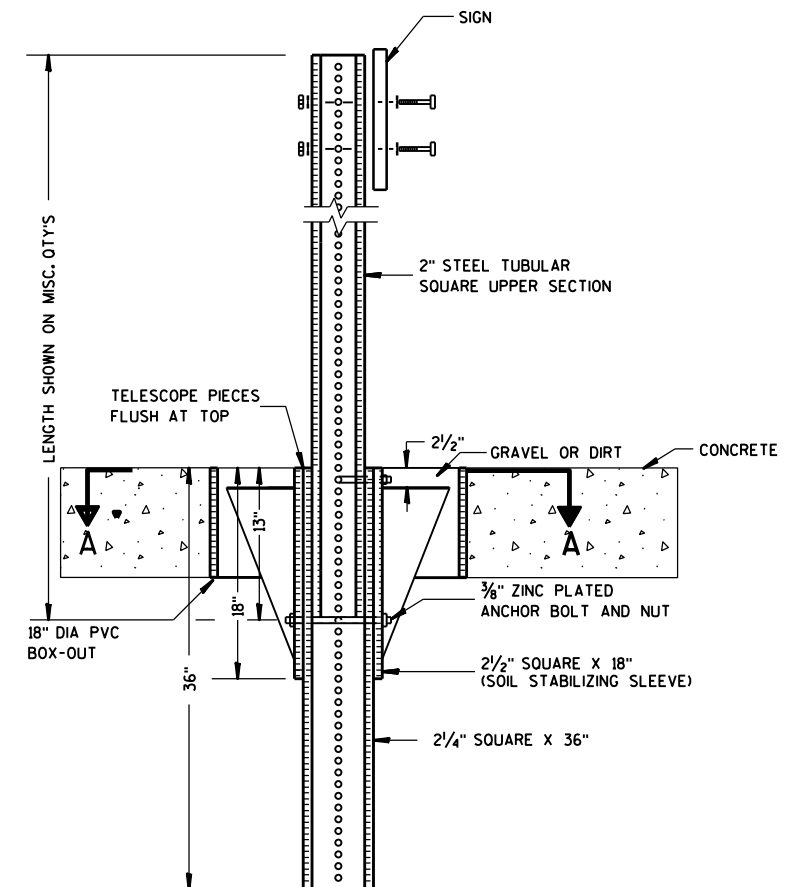
E



**ELEVATION VIEW**

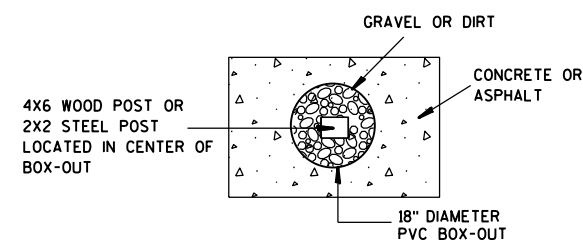
**DETAIL OF WOOD 4 X 6 SIGN POST IN BOX-OUT**

- NOTES:**
1. ALL MATERIAL TO BE APPROVED BY ENGINEER PRIOR TO INSTALLATION
  2. SEE SIGN PLATE A4-8 FOR SIGN HARDWARE REQUIREMENTS
  3. 18 INCH X 18 INCH SQUARE BOX-OUTS MAY BE USED FOR INSTALLATIONS IN EXISTING CONCRETE OR ASPHALT LOCATIONS.



**ELEVATION VIEW**

**DETAIL OF STEEL 2 X 2 SIGN POST IN BOX-OUT**



**PLAN VIEW**

**FOR NEW CONCRETE/ASPHALT INSTALLATIONS**

**SIGN POST  
BOX-OUTS  
A4-3B**

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 1/27/14 PLATE NO. A4-3B.1

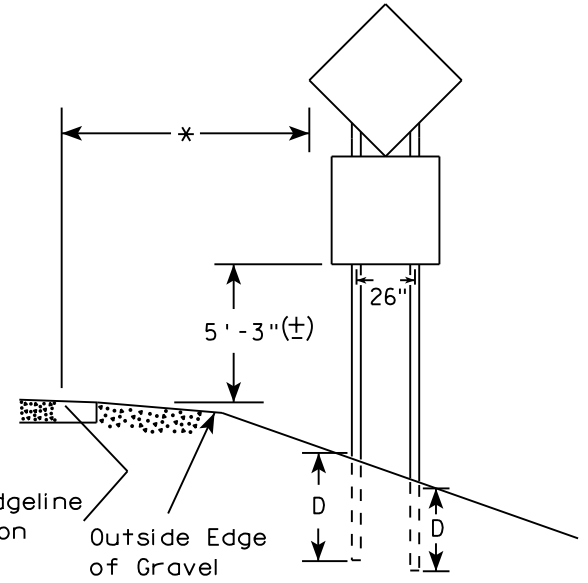
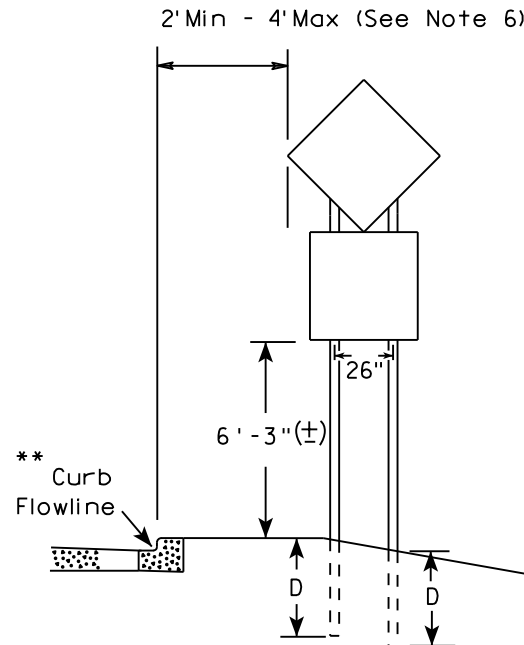
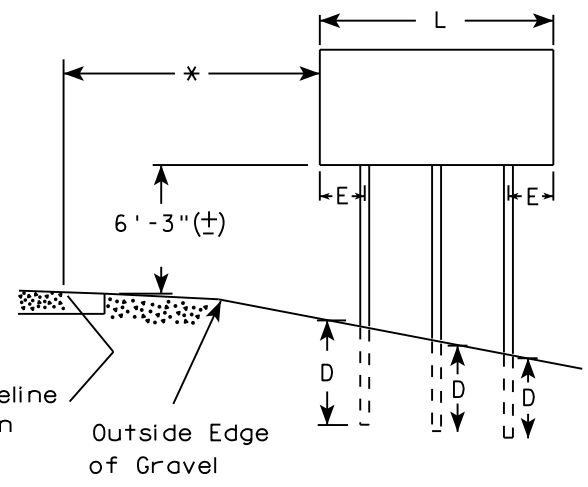
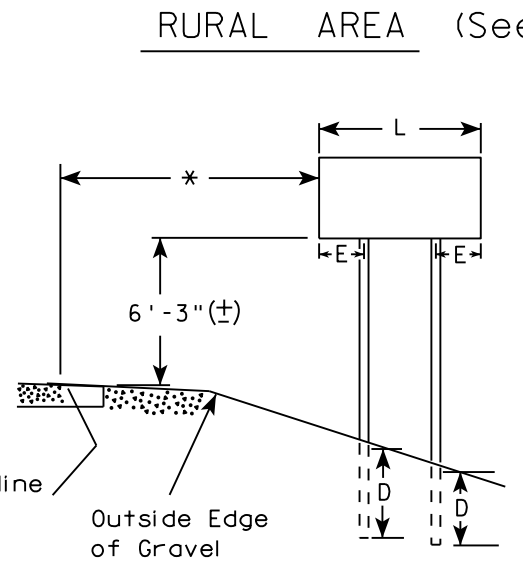
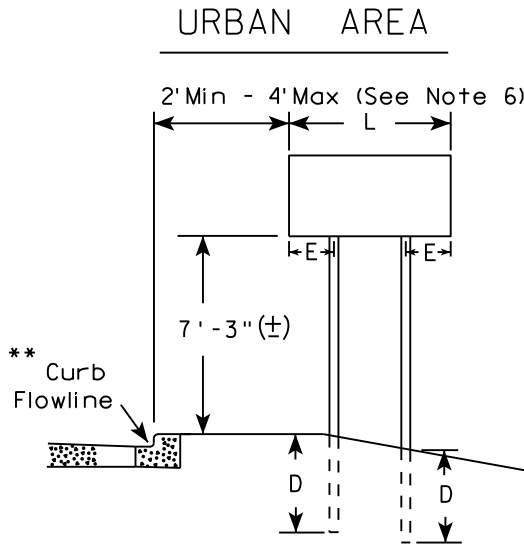
PROJECT NO:

HWY:

COUNTY:

SHEET NO:

E



- GENERAL NOTES
1. For 3 or 4 post installations, individual post spacing shall be greater than 3'-6".
  2. See tables below for required number of posts.
  3. For expressways and freeways, mounting height is 7'-3" (±) or 6'-3" (±) depending upon existence of sub-sign.
  4. The (±) tolerance for mounting height is 3 inches.
  5. J-Assemblies are considered to be one sign for mounting height.
  6. Offset distance shall be consistent with existing signs or consistent throughout length of project.
  7. Folding signs shall be mounted at a height of 5'-3" (±) or as directed by the engineer.
  8. The Double Arrow sign (W12-1) shall be mounted at a height of 2'-3" (±). The Chevron sign (W1-8), Roundabout Chevron panel (R6-4B), Clearance Markers (W5-52), Mile Markers (D10 series), In Road Object Markers (W5-54) & End of Road Markers (W5-56) shall be mounted at a height of 4"-3" (±).

\* 6 feet from edge of a paved shoulder or 12 feet from the edge of pavement (edge line location) or 2 feet from outside edge of gravel, whichever is greater unless directed by project engineer.

\*\* The existence of curb and gutter does not in itself mandate the vertical clearance illustrated. That height is typically measured where there is sidewalk adjacent to the roadway or parking is permitted. In the absence of sidewalk vertical clearance is measured from the top of the curb. Offset of signs is measured from the flow line.

\*\*\* See A4-3 sign plate for signs 4' or less in width and less than 20 S.F. in area.

\*\*\*

SIGN SHAPE OTHER THAN DIAMOND (TWO POSTS REQUIRED)	
L	E
Greater than 48" Less than 60"	12"
60" to 108"	L/5

SIGN SHAPE OTHER THAN DIAMOND (THREE POSTS REQUIRED)	
L	E
Greater than 108" to 144"	12"

POST EMBEDMENT DEPTH

Area of Sign Installation ( Sq. Ft. )	D ( Min )
20 or Less	4'
Greater than 20	5'

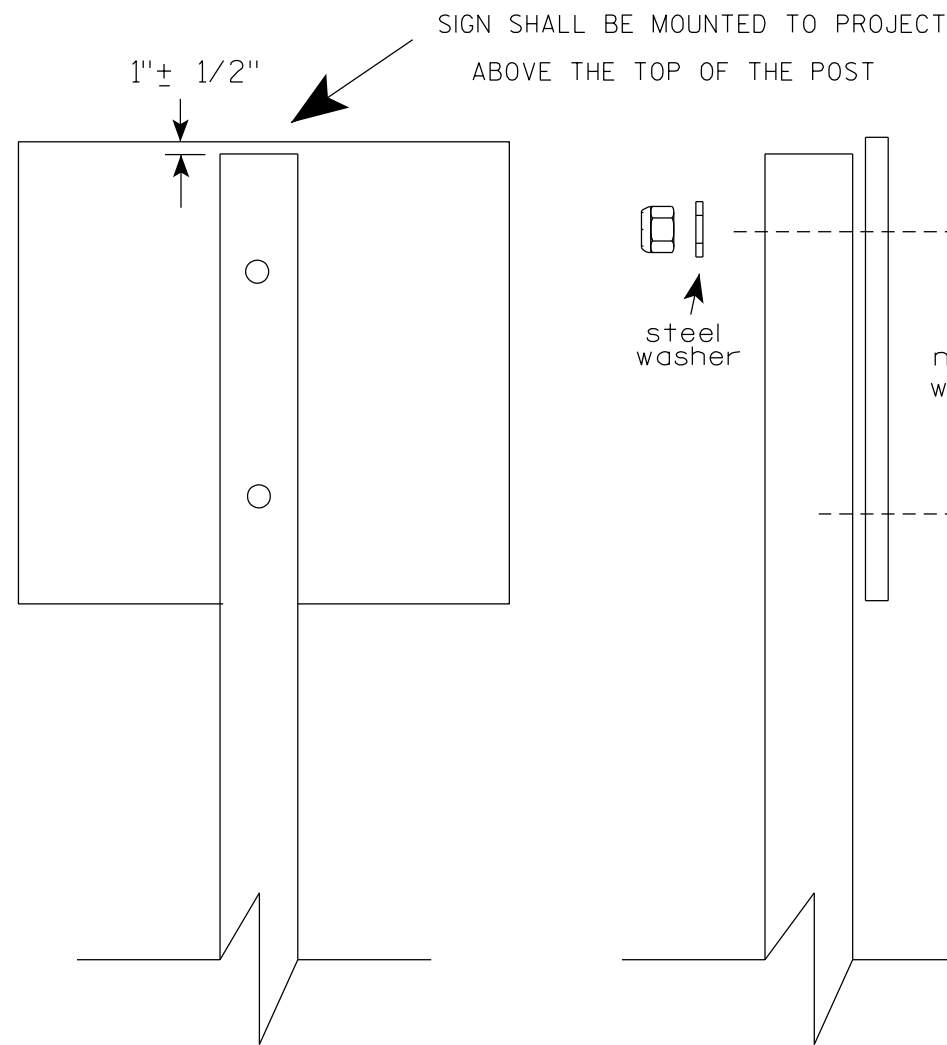
TYPICAL INSTALLATION  
OF TYPE II SIGNS  
ON MULTIPLE POSTS

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 8/21/17 PLATE NO. A4-4.15





Nuts, bolts and lags used for mounting signs shall have hexagonal heads and shall be either :

- a. Hot dip galvanized in accordance with ASTM Designation: A 153, Class D, or SC 3
- b. Electro-galvanized in accordance with ASTM Designation : B 633, TYPE III, SC 3.

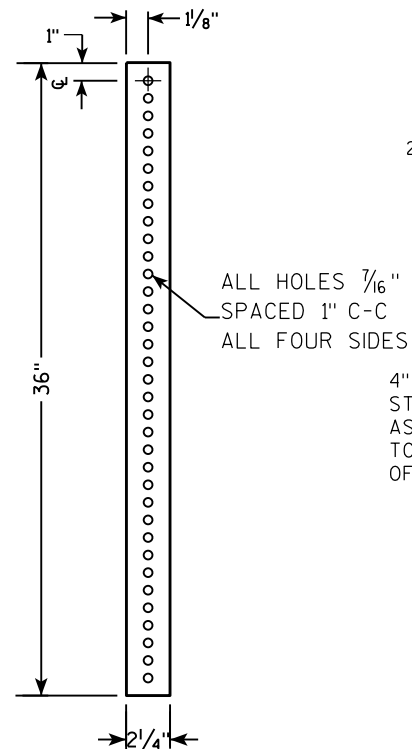
Threads on bolts and nuts shall be manufactured with sufficient allowance for the cadmium plate or galvanized coating to permit the nuts to run freely on the bolts.

- STRINGER BOLTING TO ALUMINUM SIGNS (SEE SIGN PLATE A4-18)
- MACHINE BOLTS -  $\frac{5}{16}$ " X 1-3/4" Length w/ lock nuts
- WOOD POSTS (4" x 6")
- LAG SCREWS -  $\frac{3}{8}$ " X 3" (NO STRINGERS ON BACK OF SIGN)  
 $\frac{3}{8}$ " X 4" (STRINGERS ON BACK OF SIGN)
- SQUARE STEEL POSTS (2" x 2")
- MACHINE BOLTS -  $\frac{3}{8}$ " X 3-1/4" Length w/ nuts (NO STRINGER ON BACK OF SIGN)  
 $\frac{3}{8}$ " X 5" Length w/ nuts (STRINGERS ON BACK OF SIGN)
- RIVETS -  $\frac{9}{32}$ " (6605-9-6) BULB-TITE, TRI-FOLD, ALUMINUM BODY/MANDREL  
O.D. FLANGE .720-.765 INCH, GRIP RANGE .042-.375 INCH
- WASHERS (ALL POSTS) -
- 1-1/4" O.D. X  $\frac{3}{8}$ " I.D. X  $\frac{1}{16}$ " STEEL
  - 1-1/4" O.D. X  $\frac{3}{8}$ " I.D. X .080 NYLON

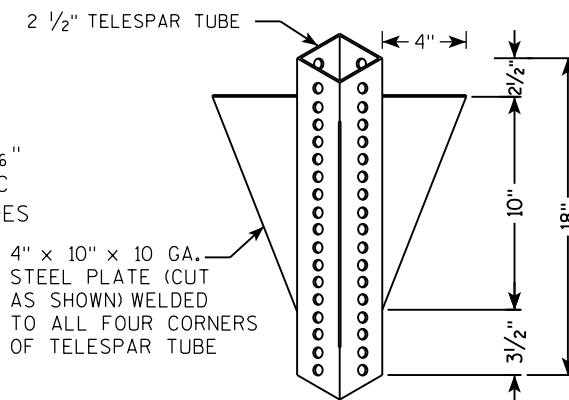
\* Two different fastening systems are shown for illustration purposes. On any individual sign, either one or the other system shall be used. Actual number of fasteners per sign varies with the sign area, but normally there are two. For a single post installation, all signs greater than 9 sq. ft. require the use of 3 fasteners.

ATTACHMENT OF SIGNS TO POSTS	
WISCONSIN DEPT OF TRANSPORTATION	
APPROVED	<i>Matthew R. Rauch</i> For State Traffic Engineer
DATE 4/1/2020	PLATE NO. A4-8.9

**2 1/4 " SQUARE  
12 GAUGE  
PERFORATED  
GALVANIZED FINISH**



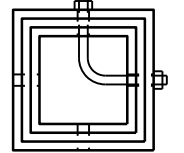
**2 1/2" SQUARE  
12 GAUGE  
OMNI-DIRECTIONAL  
PERFORATED  
SOIL STABILIZING SLEEVE  
GALVANIZED FINISH**



LENGTH SHOWN ON MISC. QTY'S  
 18" DIA SCHEDULE 40 PVC BOX-OUT  
 TELESCOPE PIECES FLUSH AT TOP  
 2" STEEL TUBULAR SQUARE UPPER SECTION  
 ALL HOLES  $\frac{7}{16}$ " SPACED 1" C-C ALL FOUR SIDES  
 $\frac{3}{8}$ " ZINC PLATED CORNER ANCHOR BOLT AND NUT  
 2" GRAVEL OR DIRT  
 $\frac{3}{8}$ " ZINC PLATED ANCHOR BOLT AND NUT  
 2" SQUARE X 18" (SOIL STABILIZING SLEEVE)  
 2" SQUARE X 36"  
 SEE SIGN PLATE A4-8 FOR BOLT WASHER, & NUT MATERIAL  
 SIGN

[illegible]

3/8" ZINC PLATED CORNER  
ANCHOR BOLT AND NUT



DIRECTION  
OF TRAFFIC

SECTION A-A

Area of Sign Installation (Sq. Ft.)	Number of Required Posts
9 or less	1
Greater than 9 less than or equal to 18	2
Greater than 18 less than or equal to 27	3

TUBULAR STEEL  
SIGN POST  
A4-9

WISCONSIN DEPT OF TRANSPORTATION

APPROVED Matthieu R. Rauch

for State Traffic Engineer

DATE 2/05/15 PLATE NO. A4-9.9

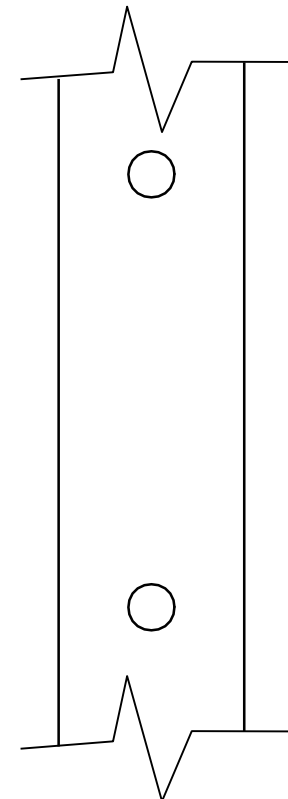
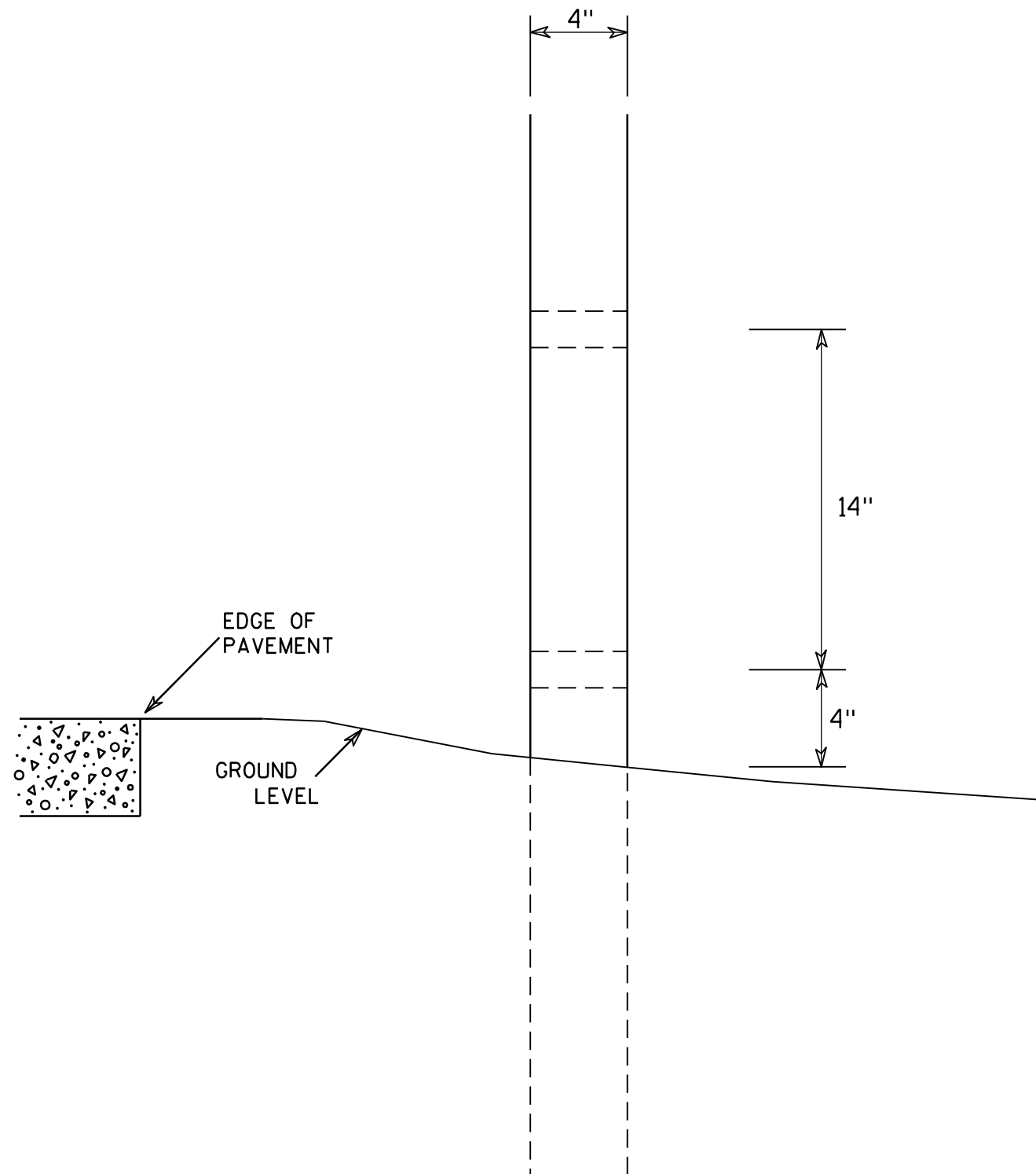
PROJECT NO:

HWY:

COUNTY:

SHEET NO:

11



SIDE VIEW

# GENERAL NOTES

1. All 4 x 6 Wood Posts shall be modified by having two 1 1/2" diameter holes drilled perpendicular to the roadway centerline.

## 4 X 6 WOOD POST MODIFICATIONS

WISCONSIN DEPT OF TRANSPORTATION

APPROVED

*Chester J. Spang*  
for State Traffic Engineer

DATE 3/27/97

PLATE NO. A4-11.2

PROJECT NO:

HWY:

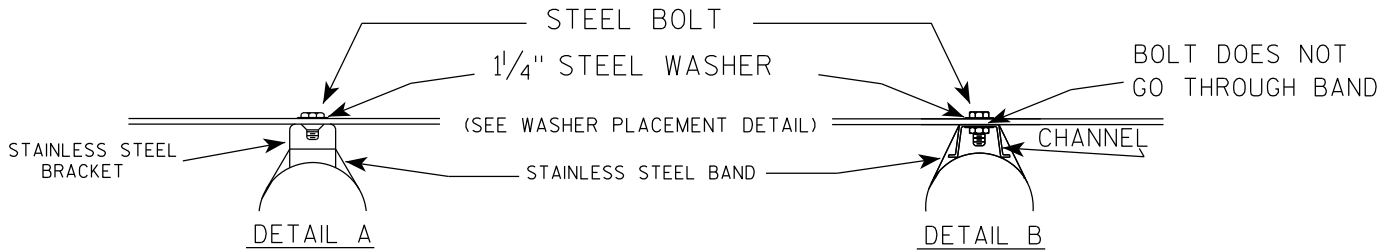
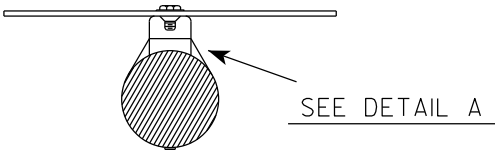
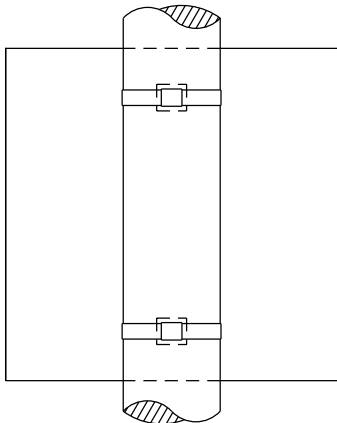
COUNTY:

SHEET NO:

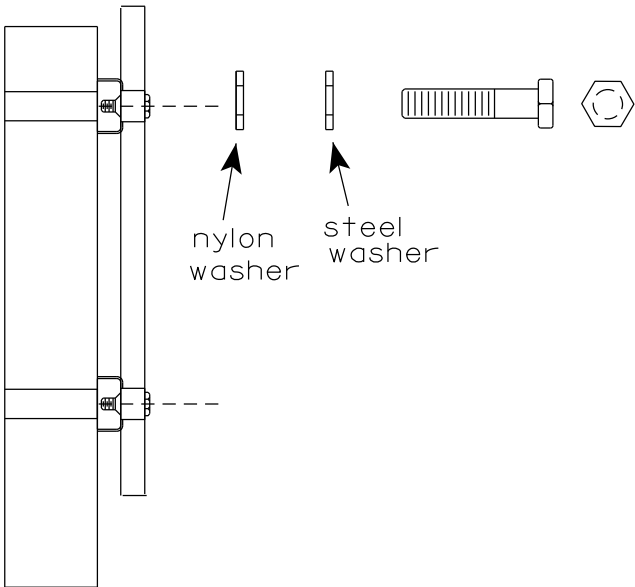
E

BANDING

SINGLE SIGN



WASHER PLACEMENT

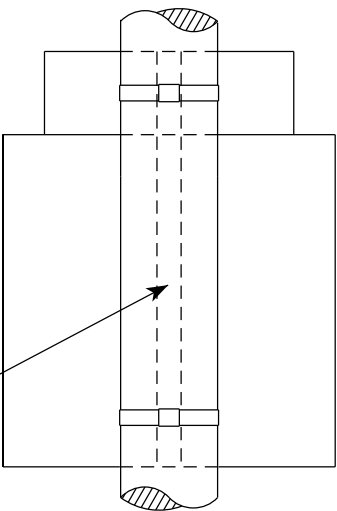


WASHERS (ALL POSTS) -  
1-1/4" O.D. X 3/8" I.D. X 1/16" STEEL  
1-1/4" O.D. X 3/8" I.D. X .080 NYLON  
FOR ALL TYPE H SIGNS

GENERAL NOTES

1. Any sign over 3 feet in width shall use the V-Block banding method. See A5-10 standard plate.
2. Signs 3 feet or greater in height shall have three bracket bands installed. Signs less than 3 feet in height shall have two bracket bands installed.
3. Banding and assembly bracket shall be stainless steel. All bands shall be 3/4" in width and 0.025" thickness.
4. ALL SIGN MOUNTING BOLTS AND WASHERS SHALL BE EITHER:
  - a. Hot dip or mechanically galvanized in accordance with ASTM Designation: A 153, Class D
  - b. Electro-galvanized in accordance with ASTM designation: B 633, Type III, SC 3

"J" ASSEMBLY



CHANNEL  
SEE TYPICAL PANEL  
INSTALLATION SHEET

SEE DETAIL B

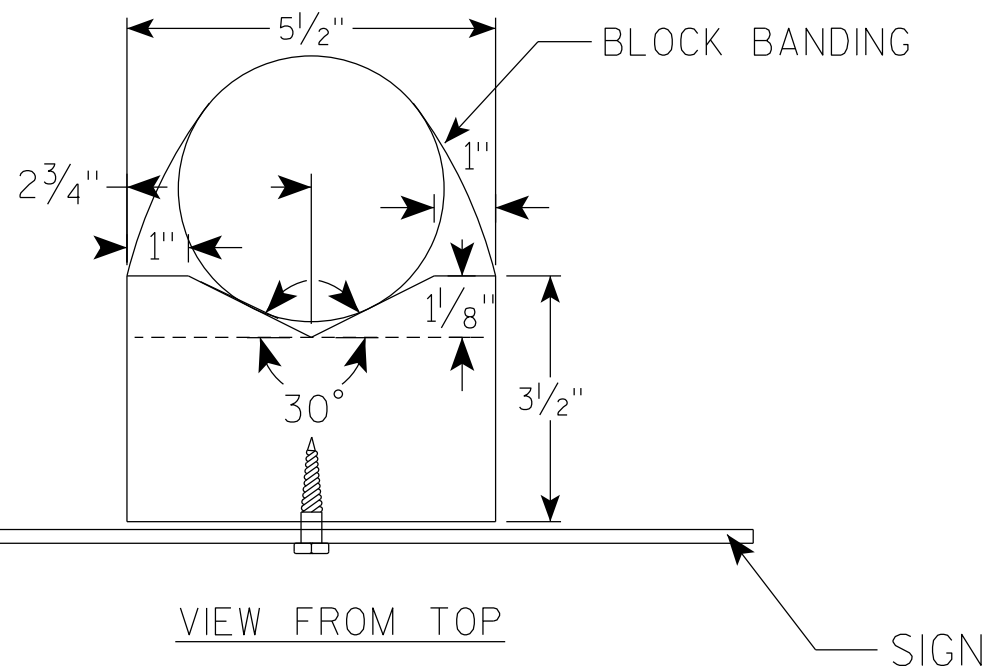
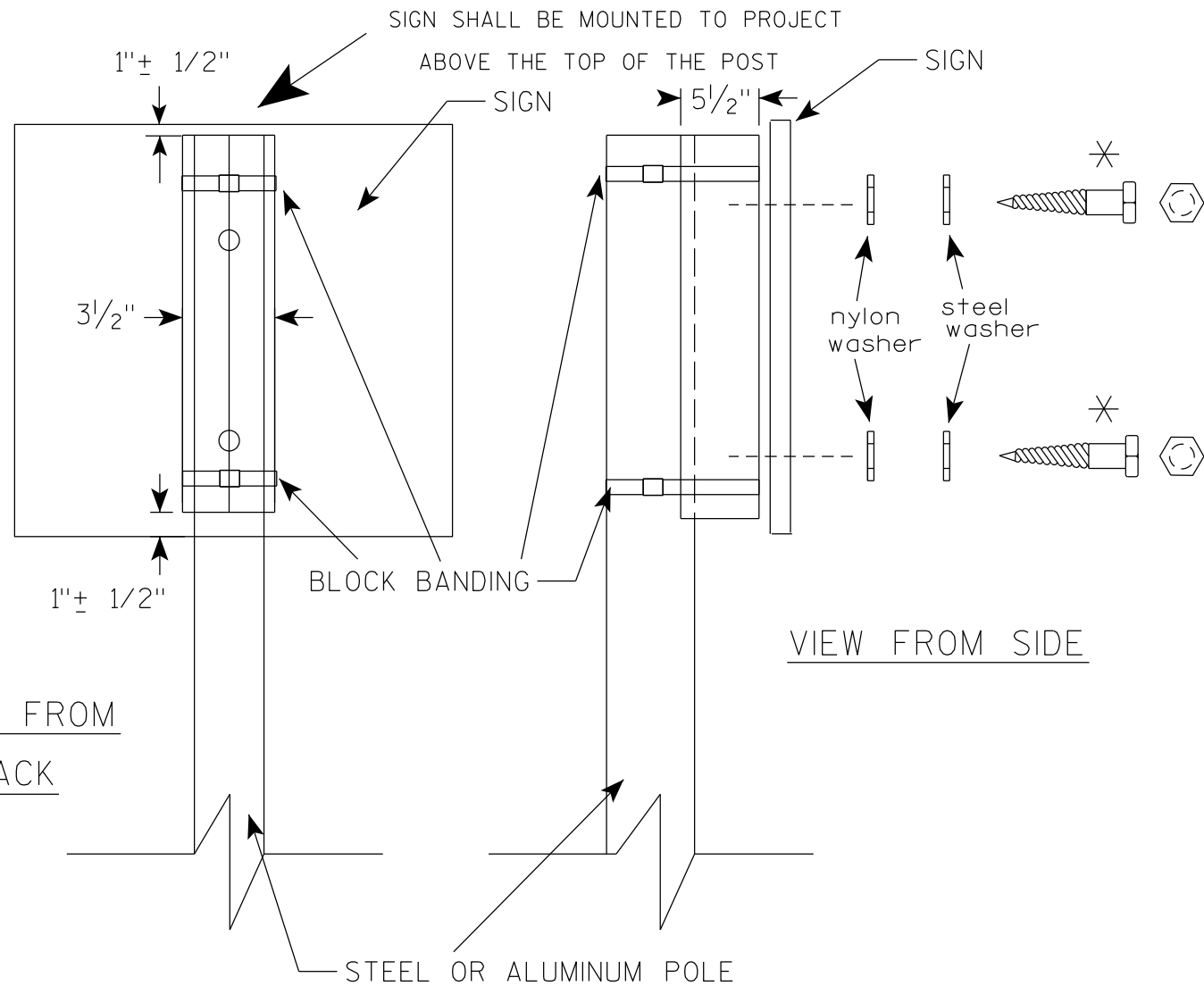
STANDARD SIGN  
SIGN BANDING DETAILS

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer  
DATE 6/10/19 PLATE NO. A5-9.4



VIEW FROM  
BACK



## GENERAL NOTES

1. WOOD 4"X6" POST MATERIAL SHALL CONFORM TO 507.2.2 OF THE WisDOT STANDARD SPECIFICATIONS
2. BLOCK BANDING AND CLIPS SHALL BE STAINLESS STEEL,  $\frac{3}{4}$ " WIDTH AND 0.025" THICKNESS
3. SIGNS 3' OR GREATER IN HEIGHT SHALL UTILIZE 3 BLOCK BANDS. SIGNS UNDER 3' IN HEIGHT SHALL UTILIZE 2 BLOCK BANDS
4. ACTUAL NUMBER OF FASTENERS PER SIGN VARIES WITH THE SIGN AREA, BUT NORMALLY THERE ARE TWO. FOR SIGNS GREATER THAN 9 S.F. 3 FASTENERS SHALL BE USED.
5. ALL SIGN MOUNTING BOLTS AND WASHERS SHALL BE EITHER:
  - a. Hot dip or mechanically galvanized in accordance with ASTM Designation: A 153, Class D
  - b. Electro-galvanized in accordance with ASTM Designation : B 633, TYPE III, SC 3
6. ALL BOLTS SHALL HAVE HEXAGONAL HEADS.
7. STEEL WASHERS SHALL BE  $1\frac{1}{4}$ " O.D. X  $\frac{3}{8}$ " I.D. X  $\frac{1}{16}$ "
8. NYLON WASHERS SHALL BE  $1\frac{1}{4}$ " O.D. X  $\frac{3}{8}$ " I.D. X .080 FOR TYPE H OR TYPE F FACE SIGN

✱ LAG BOLTS SHALL BE  $\frac{3}{8}$ " X  $2\frac{1}{2}$ "

BLOCK BANDING DETAIL  
( V-BLOCK OPTION )

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

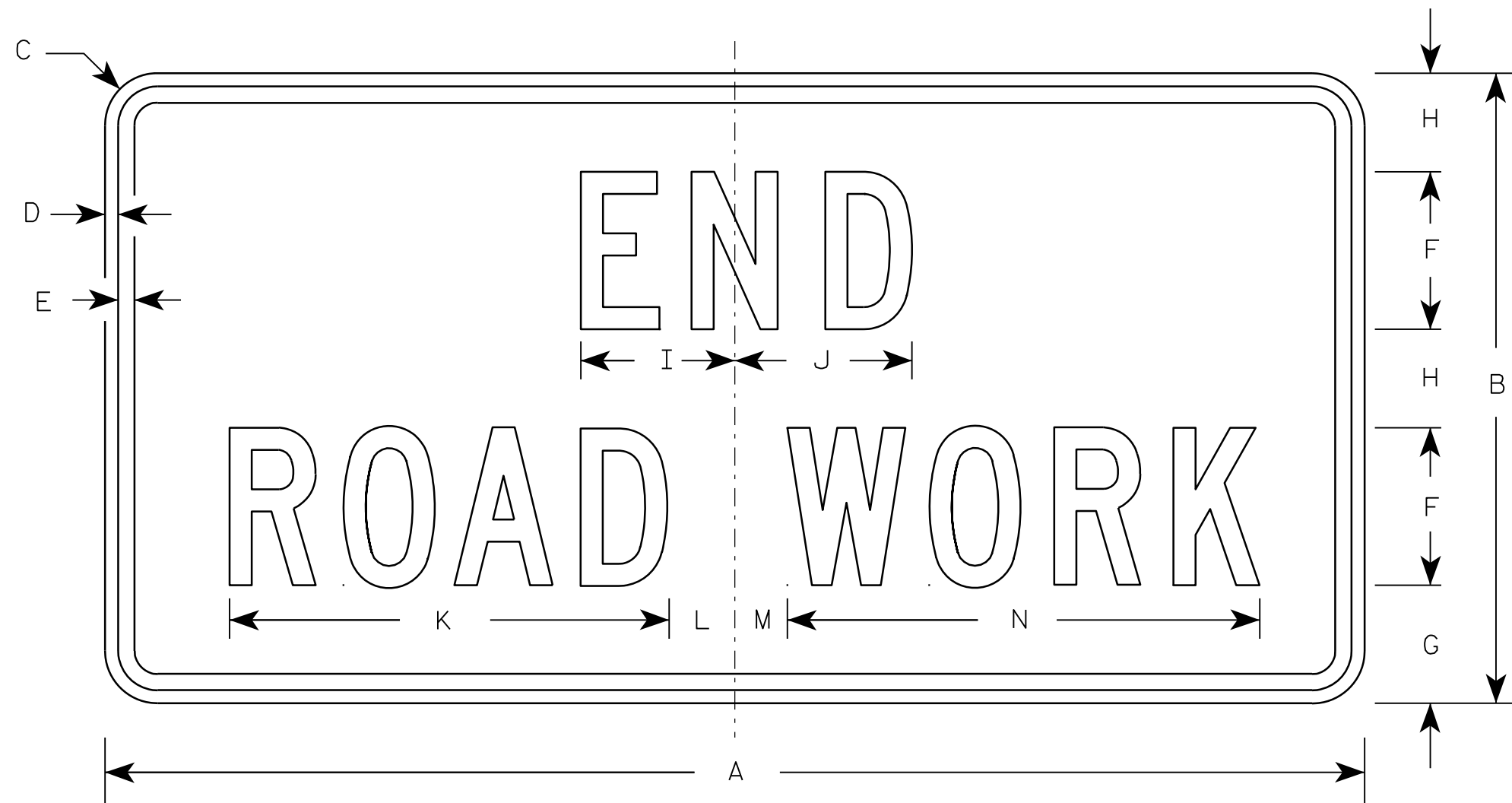
DATE 6/10/19 PLATE NO. A5-10.2

PROJECT NO:

SHEET NO:

E

7



G20-2A

Metric equivalent  
for this sign is:

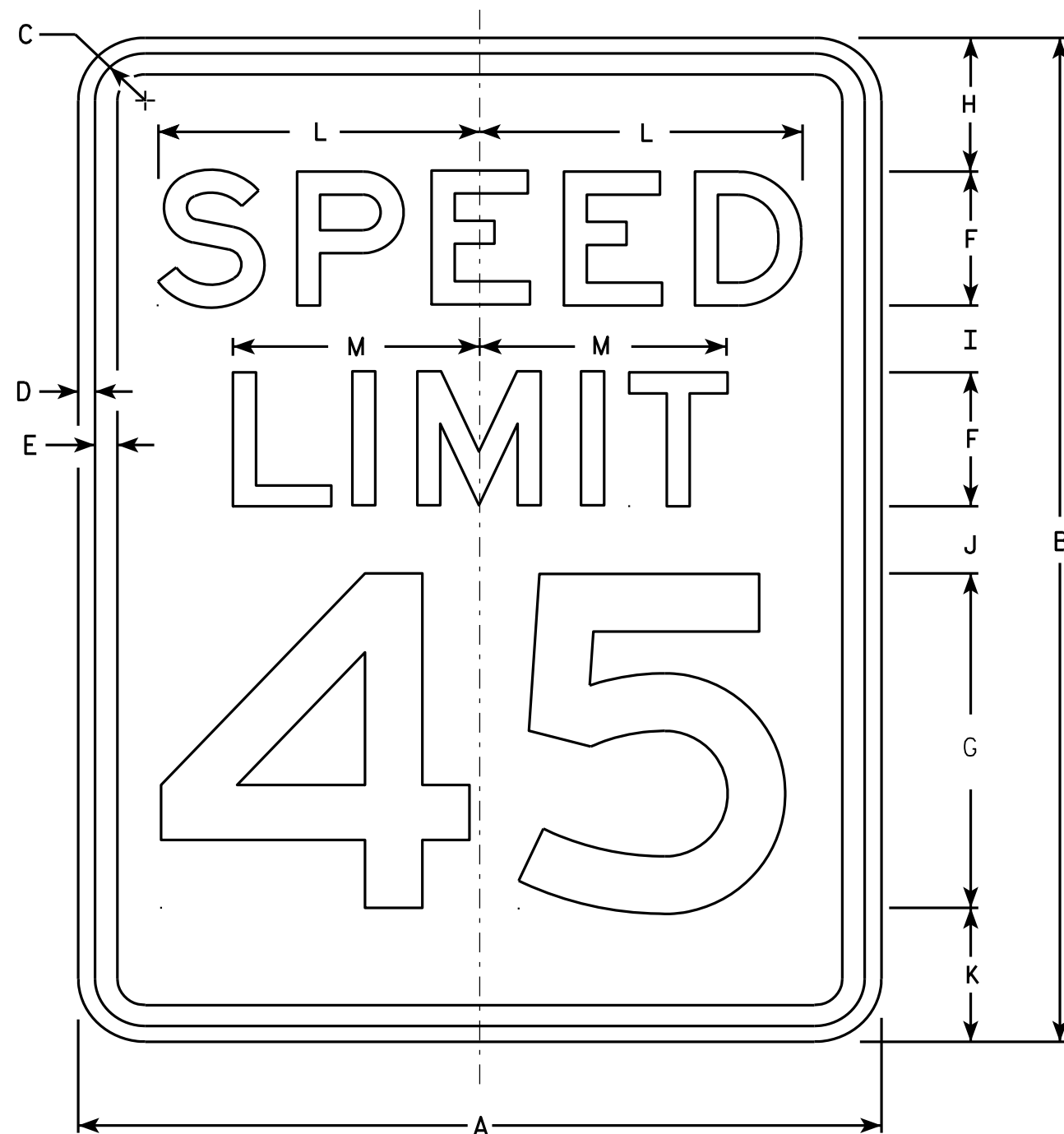
SIZE	
1	900 mm X 450 mm
2	1200 mm X 600 mm
3	1200 mm X 600 mm
4	1200 mm X 600 mm
5	1200 mm X 600 mm

SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Area sq. ft.	Area sq. m.
1	36	18	1 1/8	3/8	1/2	4	3 3/4	2 1/2	4 1/8	4 1/8	11 1/8	2	1	12 1/8													4.5	0.41
2	48	24	1 1/2	1/2	5/8	6	4 1/2	3 3/4	5 7/8	6 3/4	16 3/4	2 1/2	1 3/4	18 1/2													8.0	0.72
3	48	24	1 1/2	1/2	5/8	6	4 1/2	3 3/4	5 7/8	6 3/4	16 3/4	2 1/2	1 3/4	18 1/2													8.0	0.72
4	48	24	1 1/2	1/2	5/8	6	4 1/2	3 3/4	5 7/8	6 3/4	16 3/4	2 1/2	1 3/4	18 1/2													8.0	0.72
5	48	24	1 1/2	1/2	5/8	6	4 1/2	3 3/4	5 7/8	6 3/4	16 3/4	2 1/2	1 3/4	18 1/2													8.0	0.72

NOTES

- Sign is Type II - Type F Reflective - reference WIS DOT Standard Specification for HIGHWAY and STRUCTURE CONSTRUCTION latest edition.
- Color:  
Background - Orange  
Message - Black
- Message Series - C
- Corners may be square or rounded when base material is plywood but borders shall be rounded as shown. When base material is metal, the corners and borders shall be rounded.

7



R2-1

# NOTES

1. Sign is Type II - Type H Reflective - reference WIS DOT Standard Specification for HIGHWAY and STRUCTURE CONSTRUCTION latest edition.
2. Color:  
Background - White  
Message - Black
3. Message Series - E
4. Corners may be square or rounded when base material is plywood but borders shall be rounded as shown. When base material is metal, the corners and borders shall be rounded.
5. Substitute appropriate numerals and optically adjust spacing to achieve proper balance.

SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Area sq. ft.
1	18	24	1 1/8	3/8	1/2	3	8	3	2	2	3	7 1/4	5 1/2														3.0
2S	24	30	1 1/8	3/8	1/2	4	10	3	2 1/4	3 3/8	3 3/8	9 5/8	7 3/8														5.0
2M	30	36	1 3/8	1/2	5/8	5	12	5	2 1/2	2 1/2	4	12	9 1/4														7.5
3	36	48	1 3/8	1/2	5/8	6	14	6	5	5	6	14 3/8	11														12.0
4	36	48	1 3/8	1/2	5/8	6	14	6	5	5	6	14 3/8	11														12.0
5	48	60	2 1/4	3/4	1	8	20	6	4 1/2	6 3/4	6 3/4	19 1/4	14 5/8														20.0

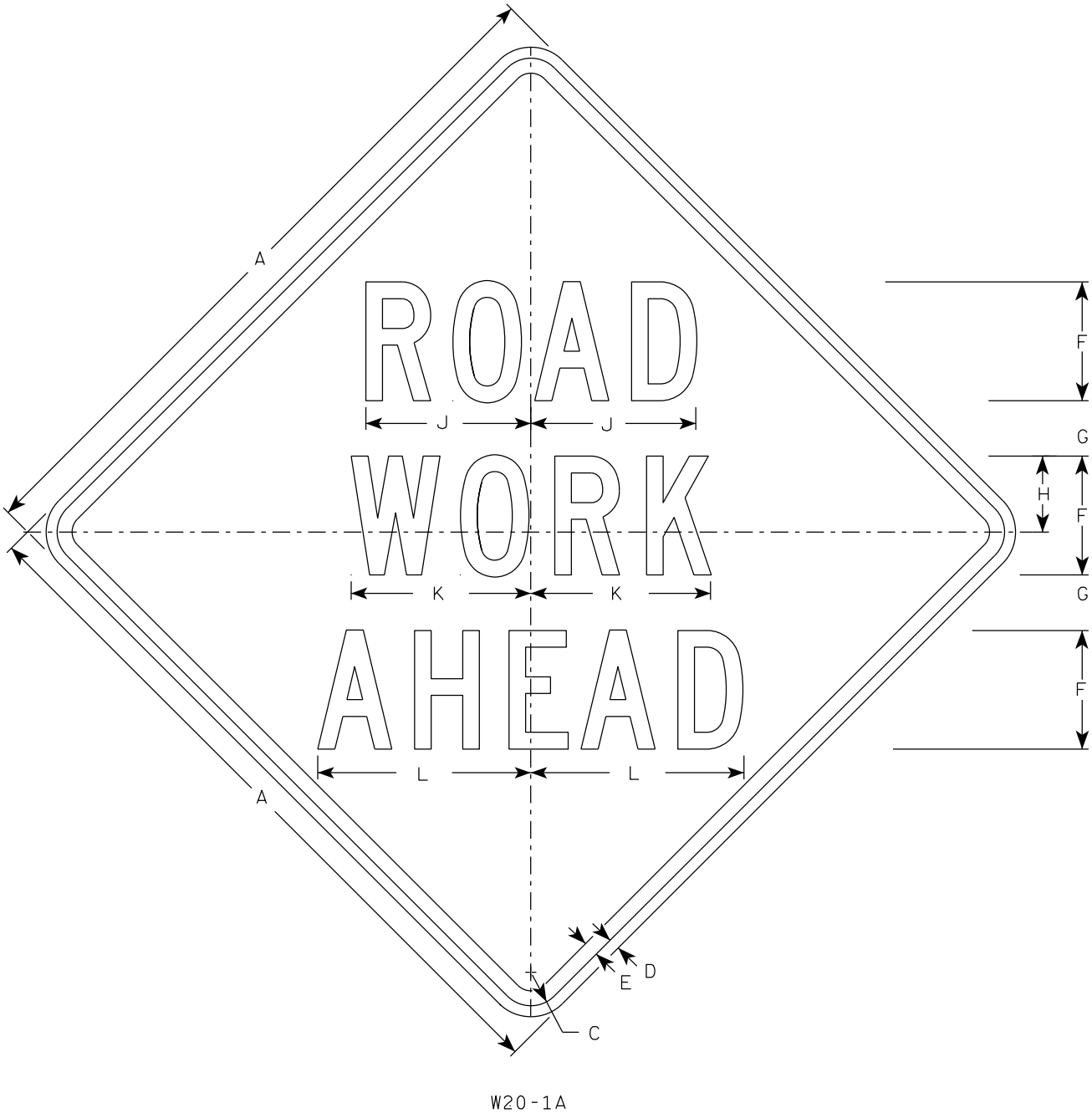
## STANDARD SIGN R2-1

WISCONSIN DEPT OF TRANSPORTATION  
APPROVED *Matthew R. Rauch*  
For State Traffic Engineer  
DATE 5/26/10 PLATE NO. R2-1.13

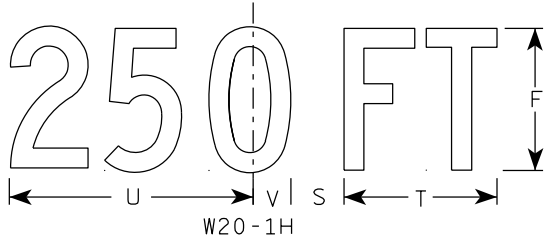
PROJECT NO: HWY: COUNTY: SHEET NO: E

NOTES

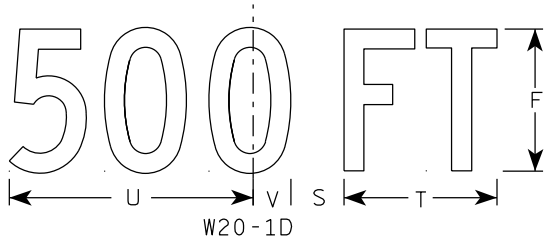
1. Sign is Type II - Type F Reflective
2. Color:  
Background - Orange  
Message - Black
3. Message Series - C
4. Corners may be square or rounded when base material is plywood but borders shall be rounded as shown. When base material is metal, the corners and borders shall be rounded.



W20-1A



W20-1H



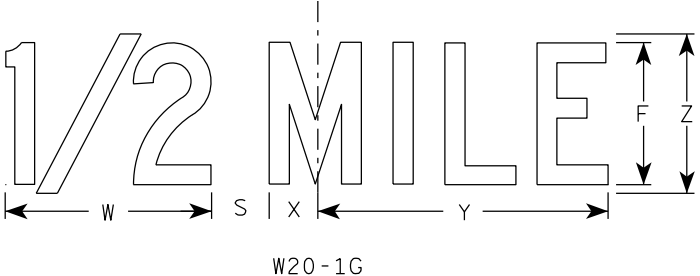
W20-1D



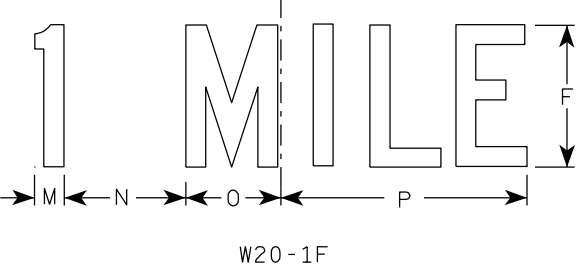
W20-1C



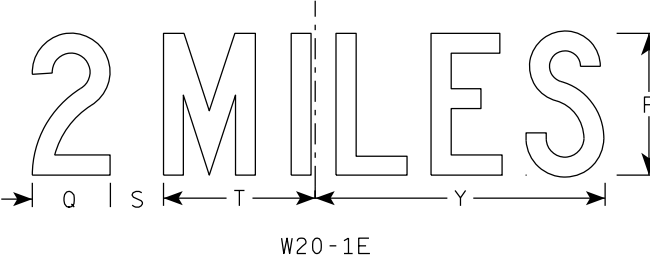
W20-1B



W20-1G



W20-1F



W20-1E

SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A <sub>req</sub> sq. ft.
1	36		1 5/8	5/8	3/4	5	2 5/8	3 1/4	10 1/8	7	7 5/8	8 7/8	1 1/8	4 1/2	3 1/2	9	3 1/4	2 1/2	2 1/4	5 5/8	9	1 3/8	8	1 3/4	10 3/4	6	9.0
2S	48		2 1/4	3/4	1	8	3 3/4	5 1/8	15 3/8	11 1/8	12 1/8	14 3/8	1 5/8	6 7/8	5 3/8	13 7/8	4 3/8	3 7/8	3	8 5/8	13 3/4	2 1/8	11 7/8	2 3/4	16 3/8	9	16.0
2M	48		2 1/4	3/4	1	8	3 3/4	5 1/8	15 3/8	11 1/8	12 1/8	14 3/8	1 5/8	6 7/8	5 3/8	13 7/8	4 3/8	3 7/8	3	8 5/8	13 3/4	2 1/8	11 7/8	2 3/4	16 3/8	9	16.0
3	48		2 1/4	3/4	1	8	3 3/4	5 1/8	15 3/8	11 1/8	12 1/8	14 3/8	1 5/8	6 7/8	5 3/8	13 7/8	4 3/8	3 7/8	3	8 5/8	13 3/4	2 1/8	11 7/8	2 3/4	16 3/8	9	16.0
4	48		2 1/4	3/4	1	8	3 3/4	5 1/8	15 3/8	11 1/8	12 1/8	14 3/8	1 5/8	6 7/8	5 3/8	13 7/8	4 3/8	3 7/8	3	8 5/8	13 3/4	2 1/8	11 7/8	2 3/4	16 3/8	9	16.0
5	48		2 1/4	3/4	1	8	3 3/4	5 1/8	15 3/8	11 1/8	12 1/8	14 3/8	1 5/8	6 7/8	5 3/8	13 7/8	4 3/8	3 7/8	3	8 5/8	13 3/4	2 1/8	11 7/8	2 3/4	16 3/8	9	16.0

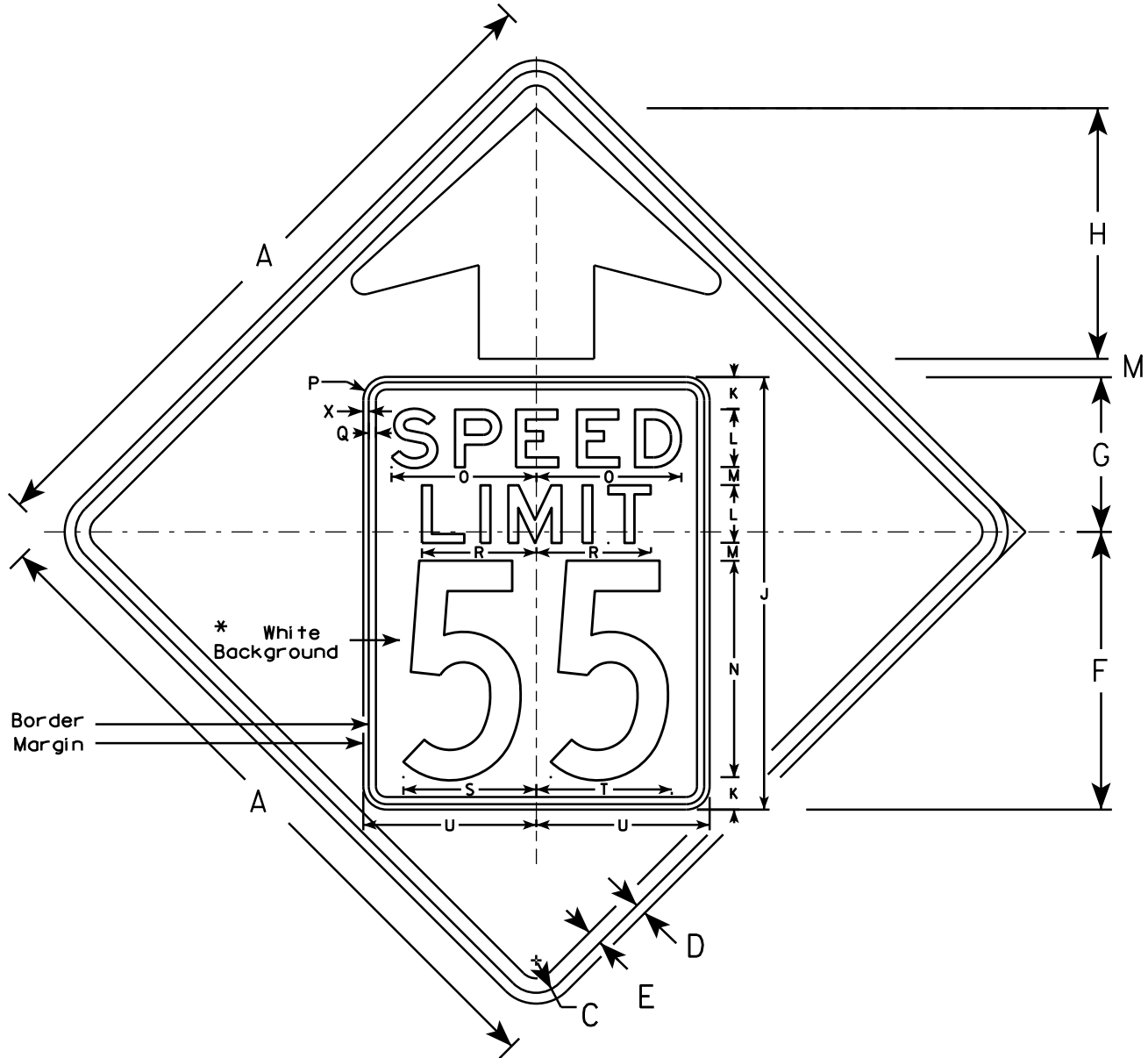
STANDARD SIGN  
W20-1A, B, C, D, E, F, G & H

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 3/25/2020 PLATE NO. W20-1.11



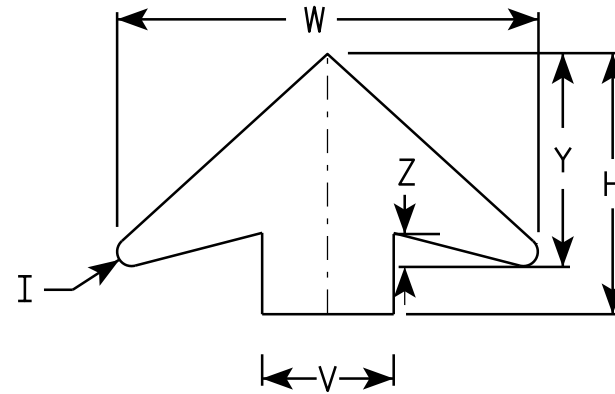


W03-5

NOTES

1. Sign is Type II - Type F Reflective - reference WIS DOT Standard Specification for HIGHWAY and STRUCTURE CONSTRUCTION latest edition.
2. Color: \*  
Background - ORANGE\*  
Message - BLACK
3. Message Series - C for numbers Series E for wording
4. Substitute appropriate numerals and optically adjust spacing to achieve proper balance

\*Speed Limit Sign shall have a White Background



ARROW DETAIL

SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Area sq. ft.
1	36		1 5/8	5/8	3/4	14 1/2	9 1/2	11 1/2	5/8	24	2	3	1	12	7 1/8	1 1/2	3/8	5 3/4	7 1/4	7 1/8	9	6	19 1/4	3/8	9 3/4	1 5/8	9.0
2S	48		2 1/4	3/4	1	19 1/4	10 3/4	17 3/8	7/8	30	2 1/4	4	1 1/4	15	10	1 5/8	1/2	8	9 1/4	9 3/8	12	8	25 5/8	3/8	13	2	16.0
2M	48		2 1/4	3/4	1	19 1/4	10 3/4	17 3/8	7/8	30	2 1/4	4	1 1/4	15	10	1 5/8	1/2	8	9 1/4	9 3/8	12	8	25 5/8	3/8	13	2	16.0
3	48		2 1/4	3/4	1	19 1/4	10 3/4	17 3/8	7/8	30	2 1/4	4	1 1/4	15	10	1 5/8	1/2	8	9 1/4	9 3/8	12	8	25 5/8	3/8	13	2	16.0
4	48		2 1/4	3/4	1	19 1/4	10 3/4	17 3/8	7/8	30	2 1/4	4	1 1/4	15	10	1 5/8	1/2	8	9 1/4	9 3/8	12	8	25 5/8	3/8	13	2	16.0
5	48		2 1/4	3/4	1	19 1/4	10 3/4	17 3/8	7/8	30	2 1/4	4	1 1/4	15	10	1 5/8	1/2	8	9 1/4	9 3/8	12	8	25 5/8	3/8	13	2	16.0

STANDARD SIGN  
W03-5

WISCONSIN DEPT OF TRANSPORTATION

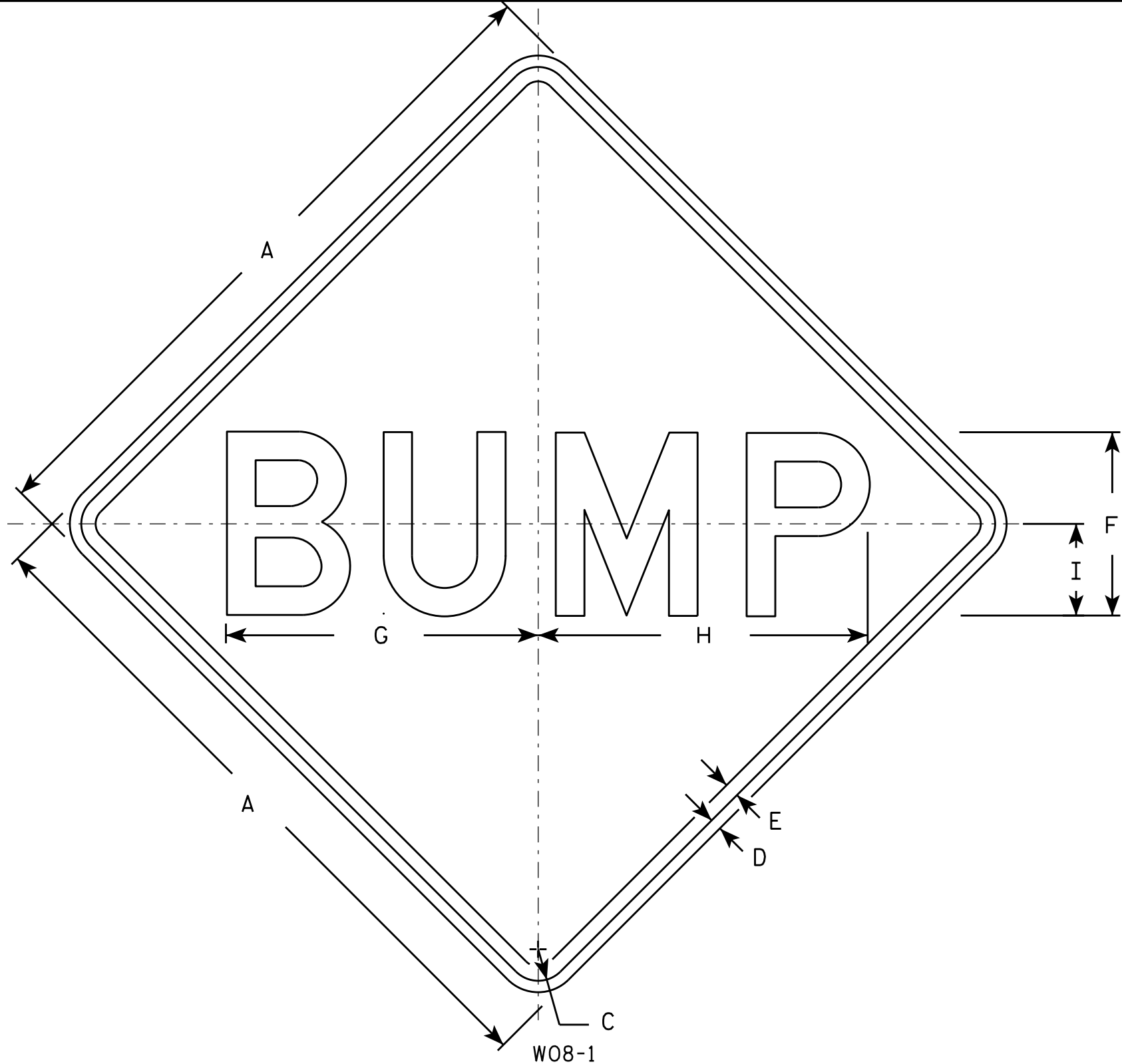
APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 11/20/13 PLATE NO. W03-5.1

PROJECT NO:

SHEET NO:

E



NOTES

- 1. Sign is Type II - Type F Reflective - reference WIS DOT Standard Specification for HIGHWAY and STRUCTURE CONSTRUCTION latest edition.
- 2. Color:  
Background - Orange  
Message - Black
- 3. Message Series - D
- 4. Corners may be square or rounded when base material is plywood but borders shall be rounded as shown. When base material is metal, the corners and borders shall be rounded.

SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Area sq. ft.
1	36		1 5/8	5/8	3/4	10	16 7/8	17 7/8	5																		9.0
2S	48		2 1/4	3/4	1	12	20 3/8	21 5/8	6																		16.0
2M	48		2 1/4	3/4	1	12	20 3/8	21 5/8	6																		16.0
3	48		2 1/4	3/4	1	12	20 3/8	21 5/8	6																		16.0
4	48		2 1/4	3/4	1	12	20 3/8	21 5/8	6																		16.0
5	48		2 1/4	3/4	1	12	20 3/8	21 5/8	6																		16.0

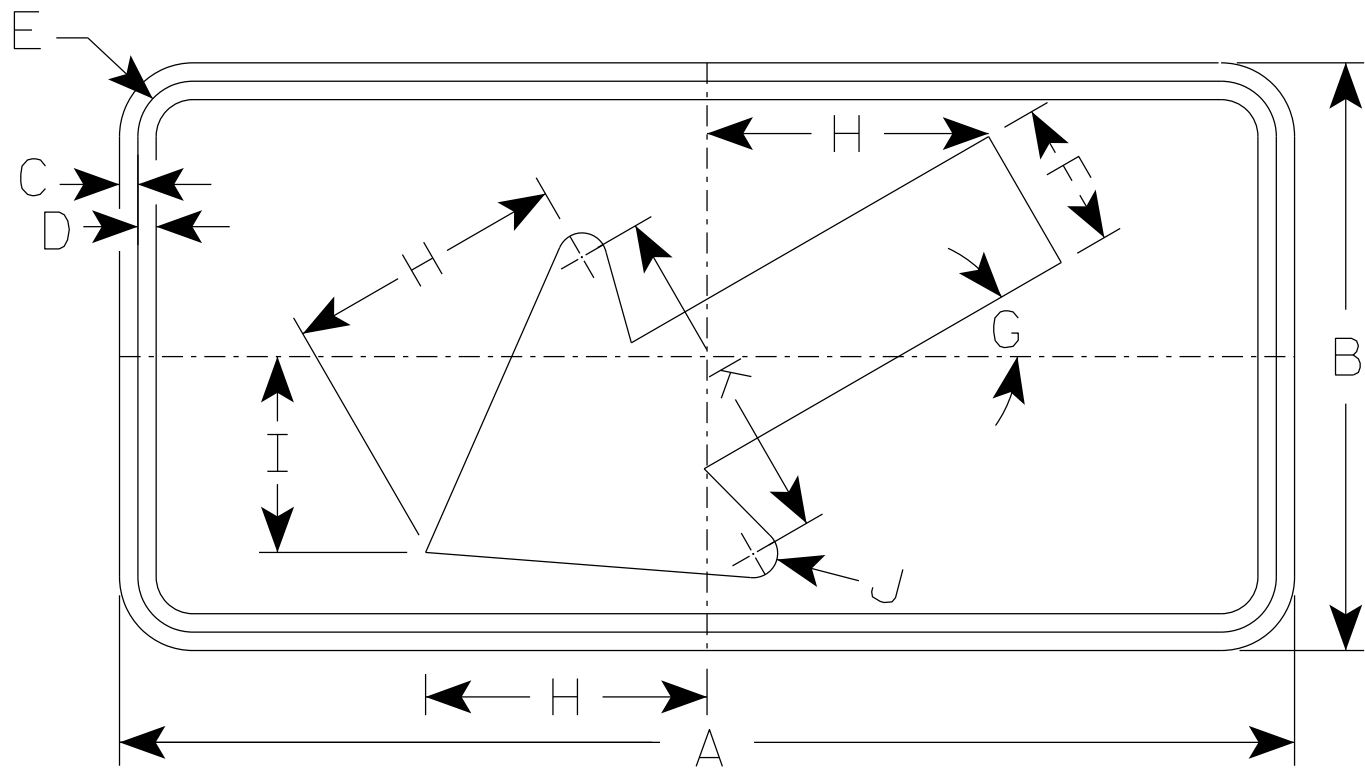
STANDARD SIGN

W08 - 1

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 11/20/13 PLATE NO. W08-1.1



W016 - 7L

NOTES

- 1. Sign is Type II - Type F Reflective
- 2. Color:  
Background - Orange  
Message - Black
- 3. Corners may be square or rounded but corners shall be rounded when base material is metal.
- 4. W016-7R is the same as W016-L except the arrow is reversed along the vertical centerline.

SIZE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Area sq. ft.
1	30	18	3⁄8	1⁄2	1 1⁄8	4 1⁄2	30°	8 1⁄2	6	5⁄8	10 1⁄4																3.75
2S	48	24	1⁄2	5⁄8	1 3⁄8	6	30°	11 1⁄2	8	1	14																8.0
2M	48	24	1⁄2	5⁄8	1 3⁄8	6	30°	11 1⁄2	8	1	14																8.0
3	48	24	1⁄2	5⁄8	1 3⁄8	6	30°	11 1⁄2	8	1	14																8.0
4	48	24	1⁄2	5⁄8	1 3⁄8	6	30°	11 1⁄2	8	1	14																8.0
5	48	24	1⁄2	5⁄8	1 3⁄8	6	30°	11 1⁄2	8	1	14																8.0

STANDARD SIGN

W016 - 7

WISCONSIN DEPT OF TRANSPORTATION

APPROVED *Matthew R. Rauch*  
for State Traffic Engineer

DATE 7/11/18 PLATE NO. W016-7.1

## DESIGN DATA

LIVE LOAD:  
INVENTORY RATING FACTOR: 1.0  
OPERATING RATING FACTOR: 1.67  
WIS. STD. PERMIT VEHICLE (Wis-SPV): 190 KIPS

MATERIAL PROPERTIES  
CONCRETE MASONRY  $f'_c = 3,500$  PSI  
HIGH STRENGTH BAR STEEL  
REINFORCEMENT GRADE 60  $f_y = 60,000$  PSI

## TRAFFIC DATA

CTH D (CLEVELAND AVE)  
AADT = 12,200 (2018)  
RDS = 40 MPH

## GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

ALL STATIONS AND ELEVATIONS ARE IN FEET.  
ELEVATIONS ARE REFERENCE TO THE NAVD 88 2012.

DIMENSIONS SHOWN ARE BASED ON FIELD MEASUREMENTS.

EXISTING STRUCTURE P-67-779 IS A 3-BARREL CORRUGATED METAL PIPE CULVERT WITH A LENGTH OF APPROX. 184'-6". ALL (3) BARRELS ARE TO BE RELINED. THE INSIDE DIAMETER OF THE LINER MUST NOT BE LESS THAN 5'-0".

ANY EXCAVATION REQUIRED TO COMPLETE THE RELINING IS TO BE CONSIDERED INCIDENTAL TO THE BID ITEM "CLEANING CULVERT PIPES FOR LINER VERIFICATION". ALL DEBRIS AND SEDIMENT LADEN WATER MUST BE CAPTURED AND TREATED BEFORE DISCHARGE AND/OR REMOVED FROM THE SITE. NO MATERIALS MAY BE FLUSHED/BLOWN OR OTHERWISE LOST FROM THE SITE. DETAIL OF THIS OPERATION SHALL BE INCLUDED IN THE PROPOSED EROSION CONTROL IMPLEMENTATION PLAN.

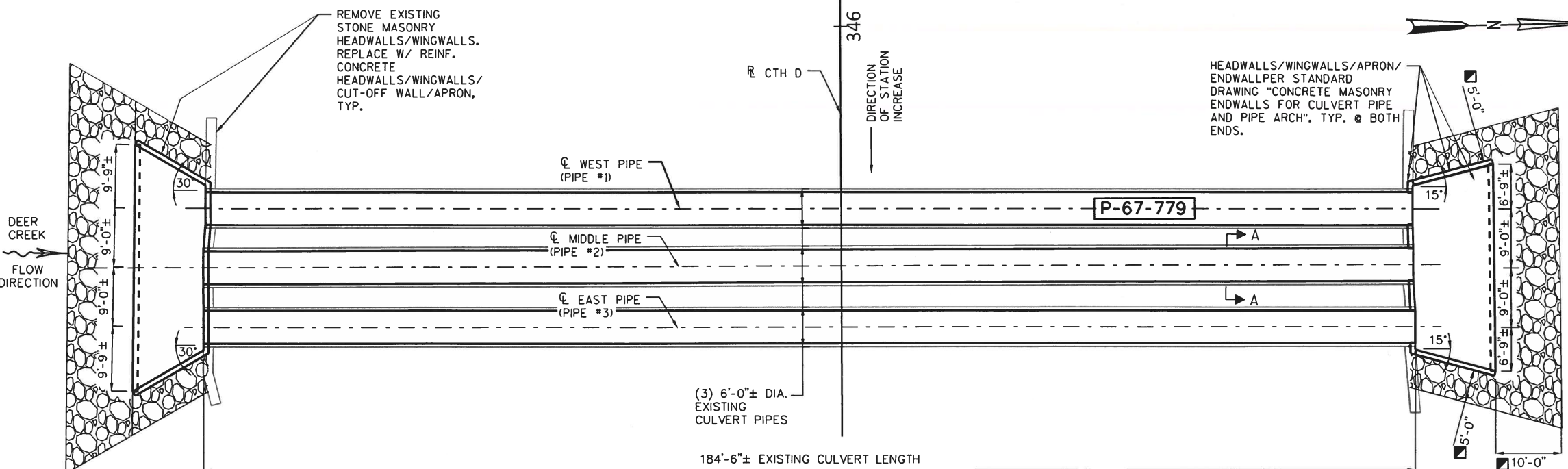
ANY EXCAVATION REQUIRED AT ENDS OF PIPE FOR ENDWALL CONSTRUCTION IS TO BE INCIDENTAL TO THE BID ITEM "CONCRETE MASONRY ENDWALLS".

## LIST OF DRAWINGS

1. GENERAL PLAN & ELEVATION
2. END WALL DETAILS

## LEGEND

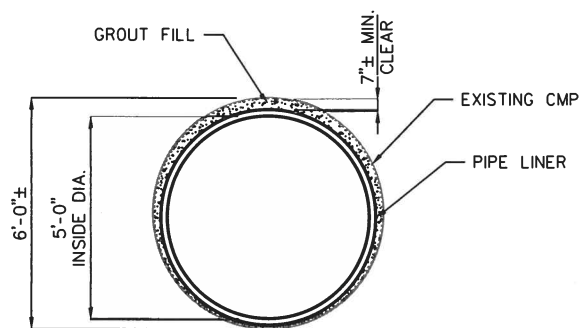
- RIPRAP LIMITS. LIMITS SHOWN APPLY TO BOTH INLET AND OUTLET. SHAPE RIPRAP TO FOLLOW EXISTING STREAM PATH.



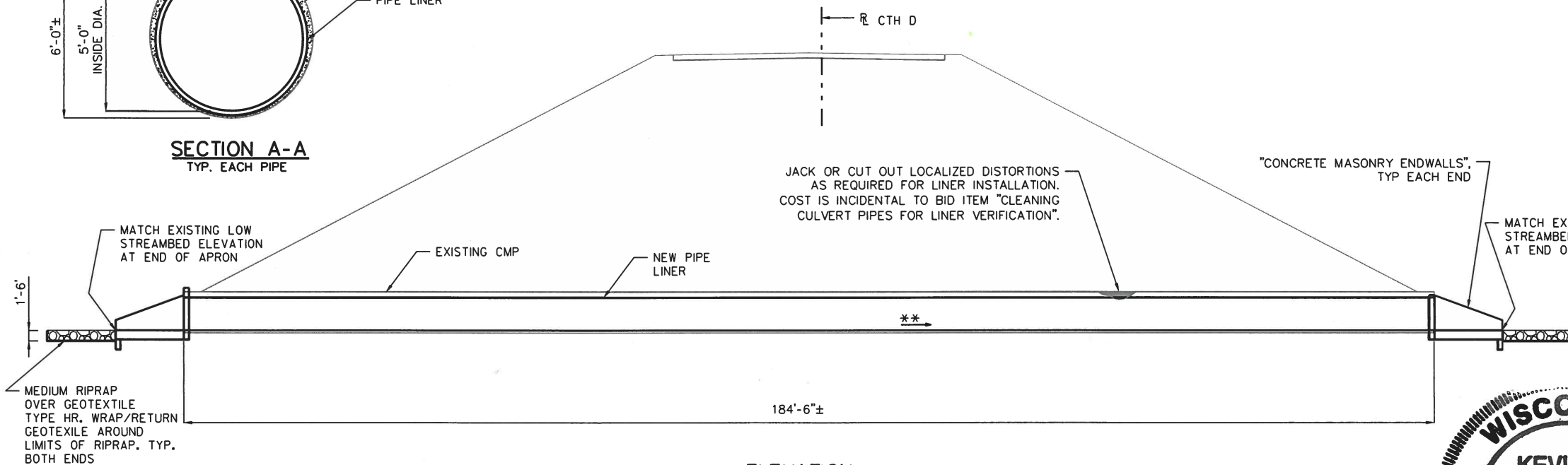
## PLAN

(3-BARREL CULVERT LINING)

HEADWALLS/WINGWALLS/APRON/ENDWALL PER STANDARD DRAWING "CONCRETE MASONRY ENDWALLS FOR CULVERT PIPE AND PIPE ARCH"



SECTION A-A  
TYP. EACH PIPE



ELEVATION  
(LOOKING WEST)

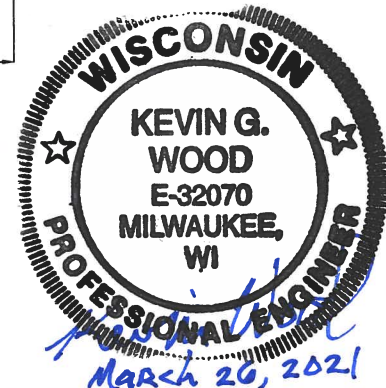
## \*\*INVERT ELEVATIONS

		EXISTING	MAX PROPOSED	PROPOSED SLOPE
WEST PIPE	INLET	848.78	849.03	0.0024 FT/FT
	OUTLET	848.34	848.59	
MIDDLE PIPE	INLET	848.30	848.55	0.0031 FT/FT
	OUTLET	847.73	847.98	
EAST PIPE	INLET	848.51	848.76	0.0003 FT/FT
	OUTLET	848.45	848.70	

## HYDRAULIC DATA

100 YEAR FREQUENCY  
 $Q_{100} = 375$  C.F.S.  
DRAINAGE AREA = 1.9 SQ. MI.  
HIGH WATER EL. = 854.97  
VELOCITY = 6.37 F.P.S.  
WATER AREA = 58.9 SQ. FT.  
ROADWAY OVERTOPPING = N/A

2 YEAR FREQUENCY  
 $Q_2 = 60$  C.F.S.  
HIGH WATER EL. = 850.99  
VELOCITY = 1.16 F.P.S.



BUREAU OF STRUCTURES CONTACT:  
AARON BONK (608) 261-0261  
CONSULTANT CONTACT:  
KEVIN WOOD (414) 266-9144

NO.	DATE	REVISION	BY
275 W Wisconsin Avenue Suite 300 Milwaukee, WI 53203 414 / 258 1500 414 / 259 0037 fax www.graef-usa.com			
ACCEPTED  SDR <b>03/26/21</b> CHIEF STRUCTURES DESIGN ENGINEER DATE			
<b>STRUCTURE P-67-779</b>			
CTH D (CLEVELAND AVE) OVER DEER CREEK			
COUNTY	WAUKESHA	TOWN/CITY/VILLAGE	NEW BERLIN
DESIGN SPEC.	REHABILITATION N/A		
DESIGNED BY	WAR	DESIGN CK'D.	KGW
DRAWN BY	TMM	PLANS CK'D.	KGW
<b>GENERAL PLAN &amp; ELEVATION</b>			SHEET 1 OF 2



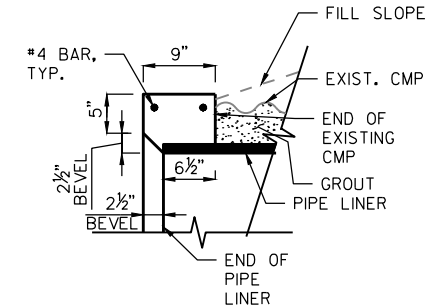
CULVERT END WALL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

FILL SLOPES FLATTER THAN 2½:1 SHALL BE WARPED TO MEET THE TOP OF THE WINGWALLS.

ALL STEEL REINFORCEMENT AND WELDED STEEL WIRE FABRIC SHALL BE EMBEDDED 2 INCHES CLEAR UNLESS OTHERWISE NOTED.

MINIMUM LAP LENGTH OF #3 & #4 BAR = 1'-5"



SECTION B-B  
AT CL OF PIPE

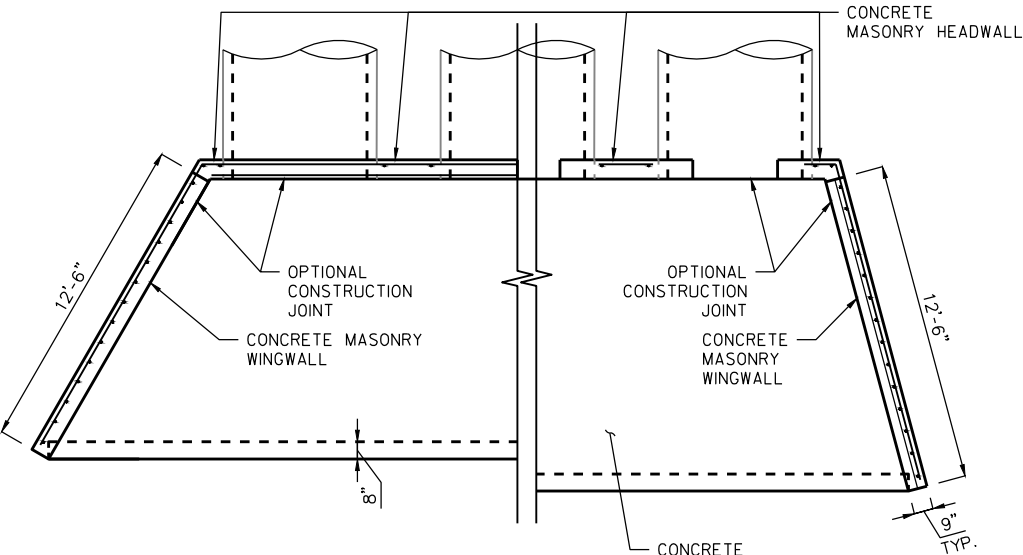
LEGEND

- ① MINIMUM REINFORCEMENT SHALL BE 6" X 6" - W4.0 X W4.0 OR NO. 3 BARS SPACED 12 C-C IN BOTH DIRECTIONS.

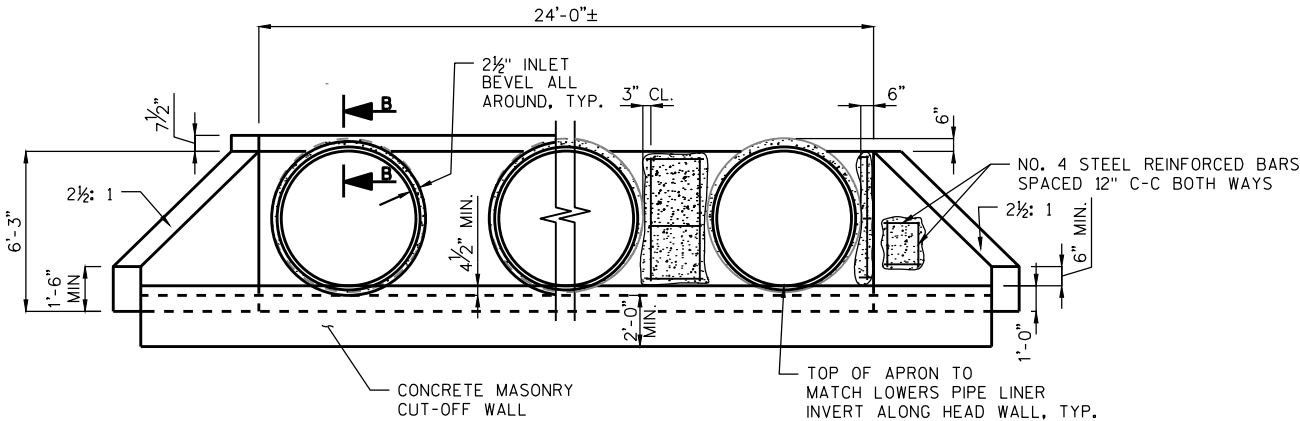
↑ STREAM FLOW DIRECTION

NO.	DATE	REVISION	BY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION			
STRUCTURE P-67-779			
DRAWN BY		WAR	PLANS CRD. KGW
END WALL DETAILS		SHEET 2 OF 2	

SCALE =



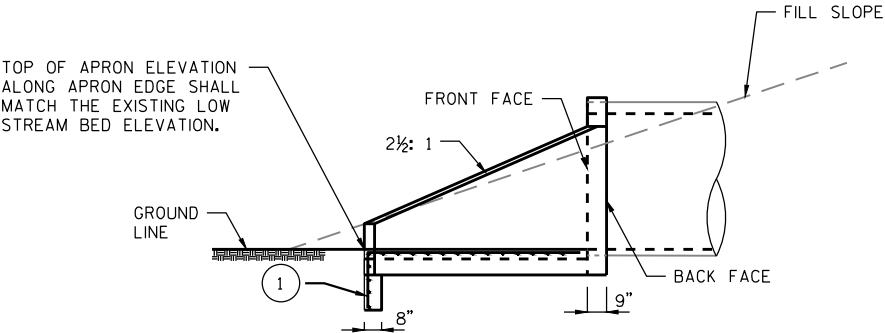
INLET  
PLAN VIEW  
OUTLET



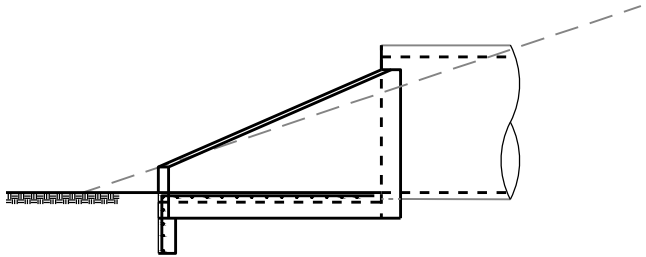
INLET  
END ELEVATION VIEW  
OUTLET

TOTAL ESTIMATED QUANTITIES

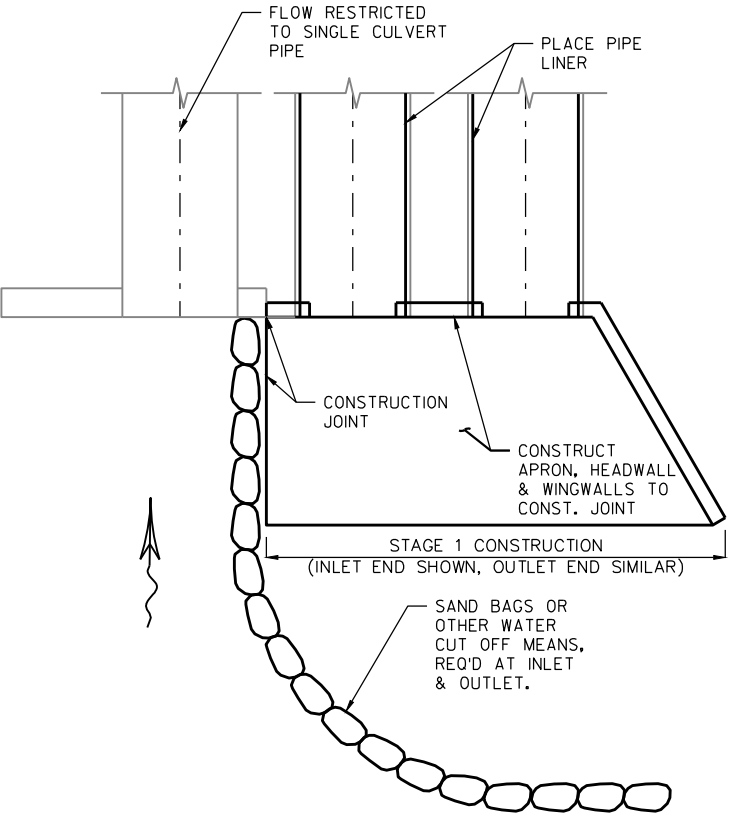
ITEM NUMBER	BID ITEM	UNITS	TOTAL
203.0600.S	REMOVING OLD STRUCTURE OVER WATERWAY WITH MINIMAL DEBRIS STA. 346+36	LS	1
210.2500	BACKFILL STRUCTURE TYPE B	TON	117
504.0900	CONCRETE MASONRY ENDWALLS	CY	24
520.9700.S	CULVERT PIPE LINERS, 60-INCH	LF	554
520.9750.S	CLEANING CULVERT PIPES FOR LINER VERIFICATION	EACH	3
606.0200	RIPRAP MEDIUM	CY	72
645.0120	GEOTEXTILE TYPE HR	SY	205



INLET ELEVATION



OUTLET ELEVATION  
SEE INLET ELEVATION FOR ADDITIONAL INFORMATION



STAGE 1 CONSTRUCTION

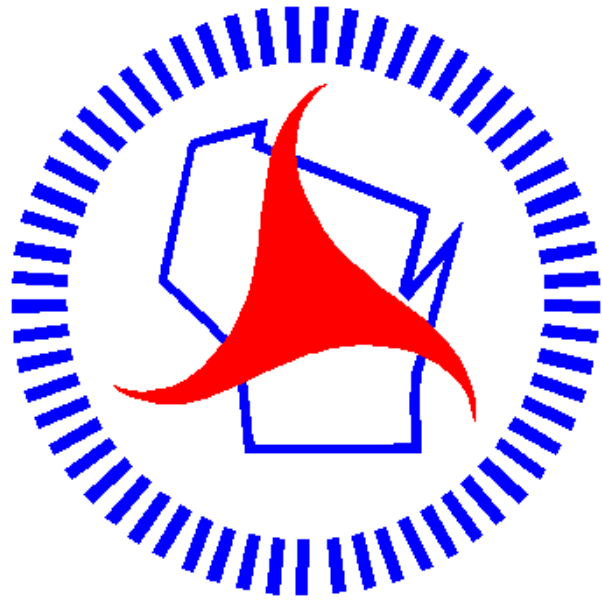
REMOVE EXISTING STRUCTURE (STONE MASONRY HEADWALLS)

SAND BAGS OR OTHER MEANS, METHODS OF DIVERTING FLOW, AND DEWATERING ARE INCIDENTAL TO PAY ITEM "REMOVING OLD STRUCTURE OVER WATERWAY WITH MINIMAL DEBRIS STA 346+36".

ALTERNATE MEANS AND METHODS MAY BE PROPOSED IN THE EROSION CONTROL IMPLEMENTATION PLAN AND SUBMITTED TO THE ENGINEER.

STAGE 2 CONSTRUCTION SHALL BE SIMILAR BUT RESTRICTING FLOW TO (2) CULVERT BARRELS.

## Notes



## ***Wisconsin Department of Transportation***

Dedicated people creating transportation solutions  
through innovation and exceptional service.

<http://www.dot.wisconsin.gov>