

Madison, Wisconsin

# CITY OF MADISON

## CITY ENGINEERING DIVISION

### DEPARTMENT OF PUBLIC WORKS

# PLAN OF PROPOSED IMPROVEMENT

PUBLIC IMPROVEMENT PROJECT APPROVED

MAY 14, 2019

BY THE COMMON COUNCIL OF MADISON, WISCONSIN

PUBLIC IMPROVEMENT DESIGN APPROVED BY:

*[Signature]* 5/24/19  
City Engineer Date

STREET DESIGNED BY:

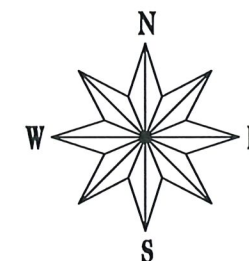
*[Signature]*  
JAMES M. WOLFE  
E-42725  
MADISON, WI  
5/23/19  
PROFESSIONAL ENGINEER

INDEX OF SHEETS

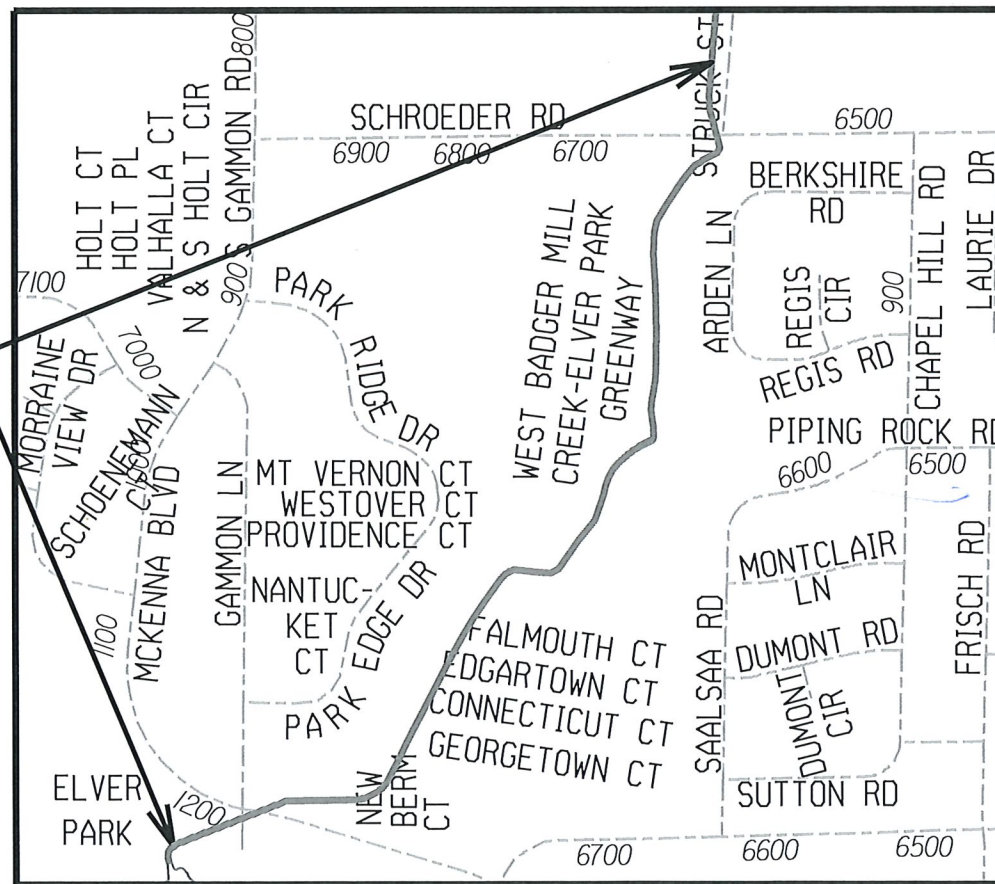
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2	DETAILS
DI	STORM DETAILS
SD1	EROSION CONTROL PLAN
EC1-EC3	MCKENNA BLVD. PLAN
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DTI	

## MCKENNA FLOOD MITIGATION

CITY PROJECT NO. 12011  
9411



PROJECT EXTENTS



CONVENTIONAL SIGNS

FIELD VERIFY ALL UTILITY LOCATIONS

GAS	— G —
STORM SEWER	— ST —
SANITARY SEWER	— SAN —
WATER	— W —
OVERHEAD ELECTRIC	— OH —
POWER POLE	□

NOTES:  
ALL GUTTERS SHALL DRAIN WITH A MINIMUM GRADE OF 0.50% TOWARD STORM SEWER INLETS.  
SIDEWALK RAMPS AND CURB THRU SIDEWALK RAMPS SHALL HAVE A MAXIMUM SLOPE OF 1" PER 12". SIDEWALK AND CURB RAMPS SHALL BE CONSTRUCTED WITH A SIDE SLOPE OF 2.00%.  
SIDEWALK SHALL HAVE A MINIMUM LONGITUDINAL SLOPE OF 0.50% AND A MAXIMUM LONGITUDINAL SLOPE OF 5.00% EXCEPT WHERE STREET GRADES EXCEED 5.00%.

PAVEMENT MARKINGS & TRAFFIC CONTROL DESIGNED BY:

*[Signature]*  
THOMAS A. MOHR  
E-42481  
MADISON, WI  
5/23/19  
PROFESSIONAL ENGINEER

SANITARY SEWER DESIGNED BY:

*[Signature]*  
MATTHEW A. ALLIE  
E-44986  
MADISON, WI  
5/23/19  
PROFESSIONAL ENGINEER

WATER MAIN DESIGNED BY:

*[Signature]*  
KELLY B. MIESS  
E-41821  
MADISON, WI  
5/23/19  
PROFESSIONAL ENGINEER

STORM SEWER DESIGNED BY:

*[Signature]*  
MATTHEW A. ALLIE  
E-44986  
MADISON, WI  
5/23/19  
PROFESSIONAL ENGINEER

PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

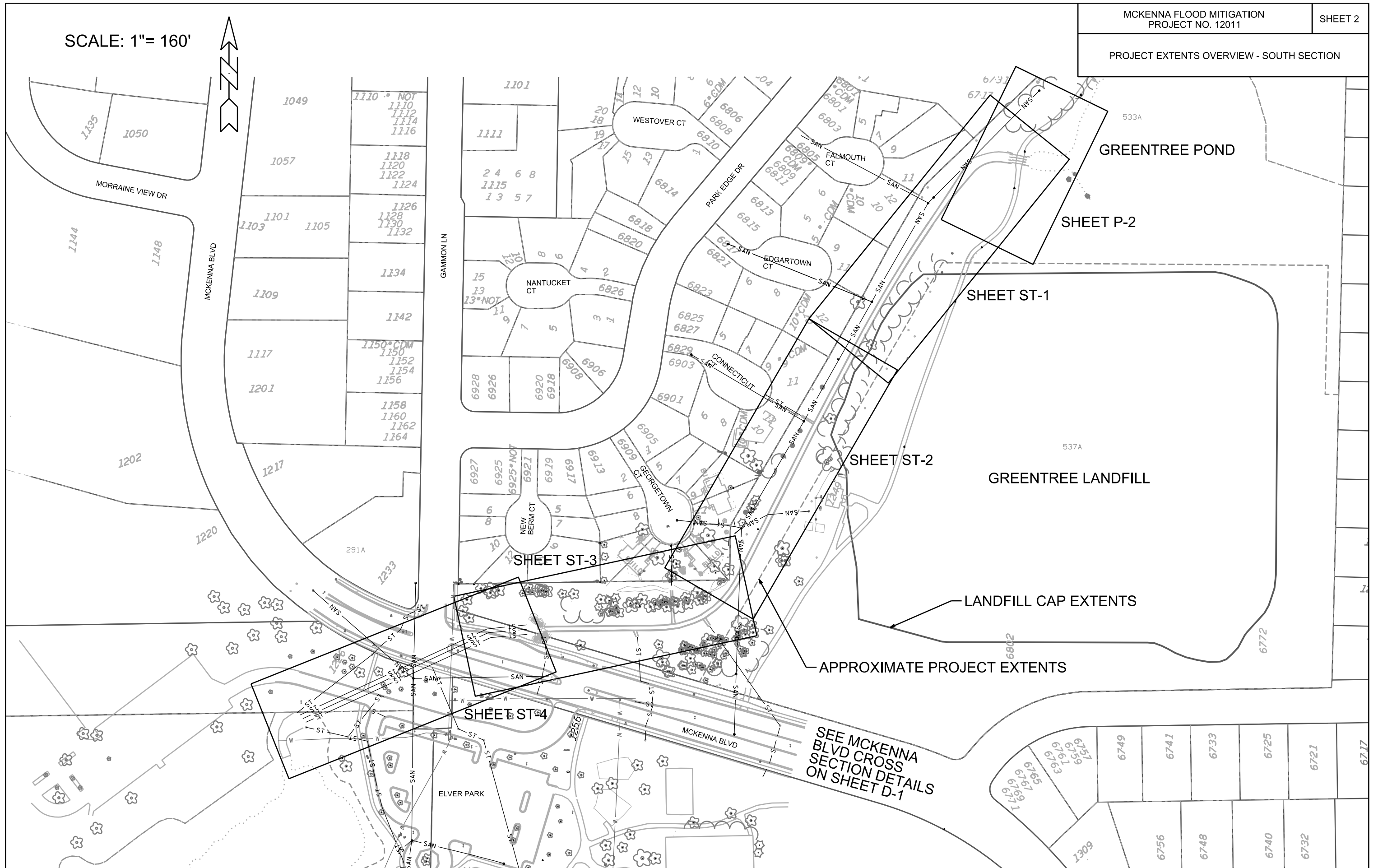
PROJECT EXTENTS OVERVIEW - SOUTH SECTION

SCALE: 1"= 160'



REV. DATE: \_\_\_\_\_

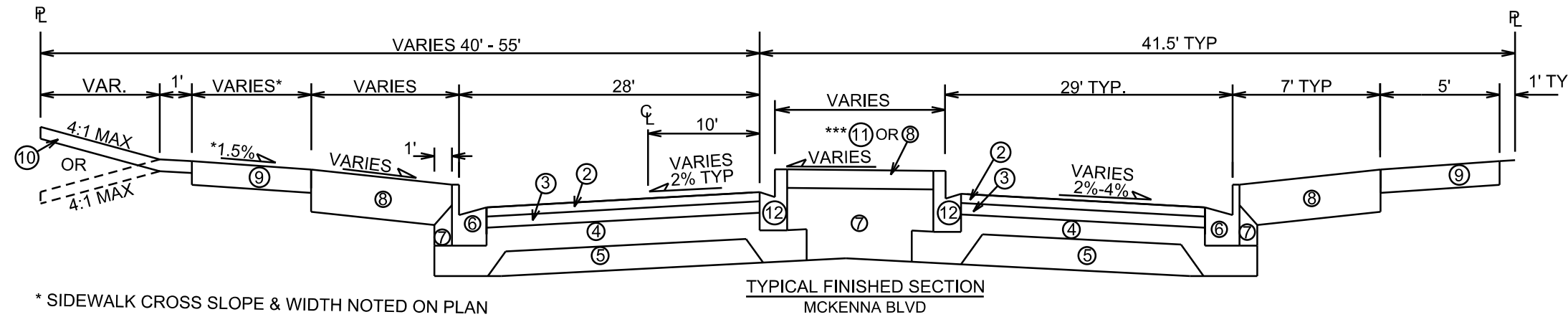
ORIGINATOR: CITY OF MADISON, STREETS DIVISION



LANDFILL CAP EXTENTS

APPROXIMATE PROJECT EXTENTS

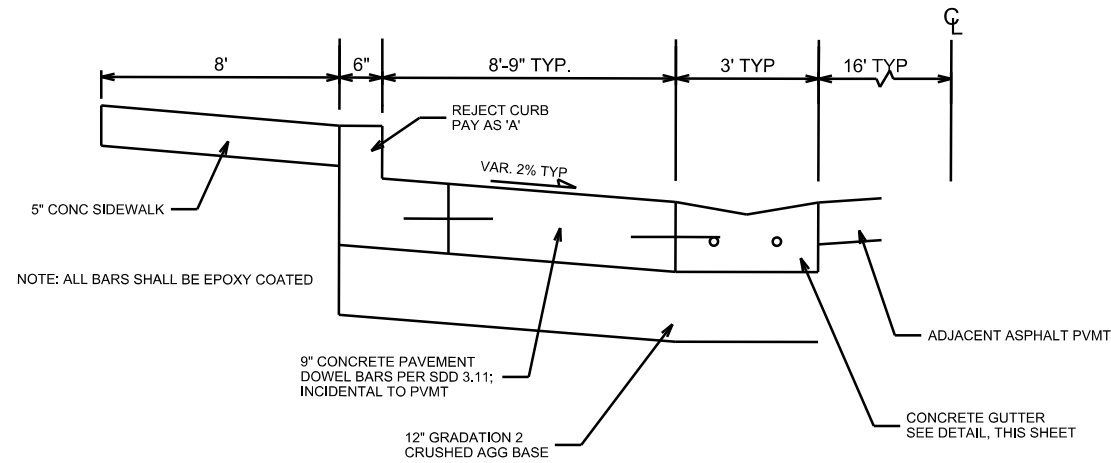
SEE MCKENNA  
BLVD CROSS  
SECTION DETAILS  
ON SHEET D-1



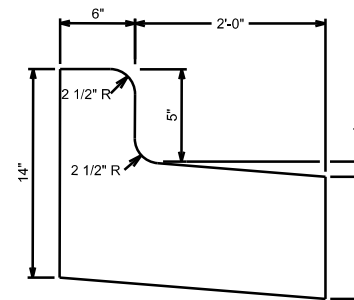
\* SIDEWALK CROSS SLOPE & WIDTH NOTED ON PLAN

- ① POINT REFERRED TO ON PROFILE
- ② 2" HMA PAVEMENT, 4 MT 58-28 S
- ③ 4" HMA PAVEMENT, 3 MT 58-28 S
- ④ 8" GRADATION 2 CRUSHED AGGREGATE BASE
- ⑤ 8" GRADATION 1 CRUSHED AGGREGATE BASE
- ⑥ TYPE 'A' CONCRETE CURB & GUTTER
- ⑦ FILL, INCIDENTAL
- ⑧ 12" TOPSOIL, SEED & EROSION MAT
- ⑨ 5" CONCRETE SIDEWALK, SEE PLAN FOR LOCATIONS
- ⑩ 6" TOPSOIL, SEED & EROSION MAT
- ⑪ 7" STAMPED & COLORED CONCRETE
- ⑫ TYPE 'H' CONCRETE CURB & GUTTER
- ⑬ 2.5" HMA PAVEMENT, 3 MT 58-28 S
- ⑭ 6" GRADATION 2 CRUSHED AGGREGATE BASE
- ⑮ 6" GRADATION 1 CRUSHED AGGREGATE BASE
- ⑯ PULVERIZE & SHAPE EXISTING PAVEMENT

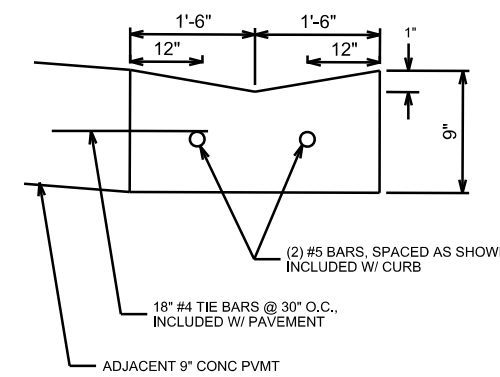
**BUS PULL-OUT DETAIL**  
NOT TO SCALE



**REJECT CURB DETAIL**  
NOT TO SCALE

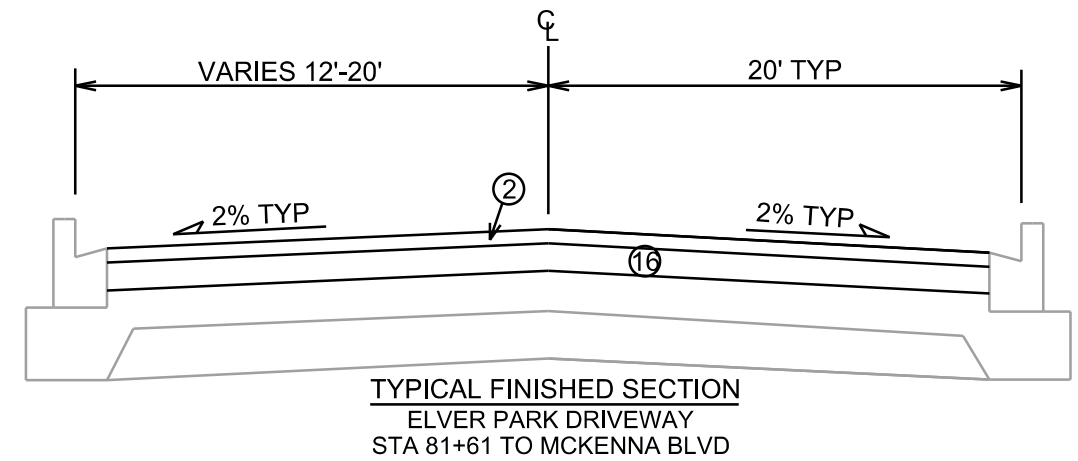
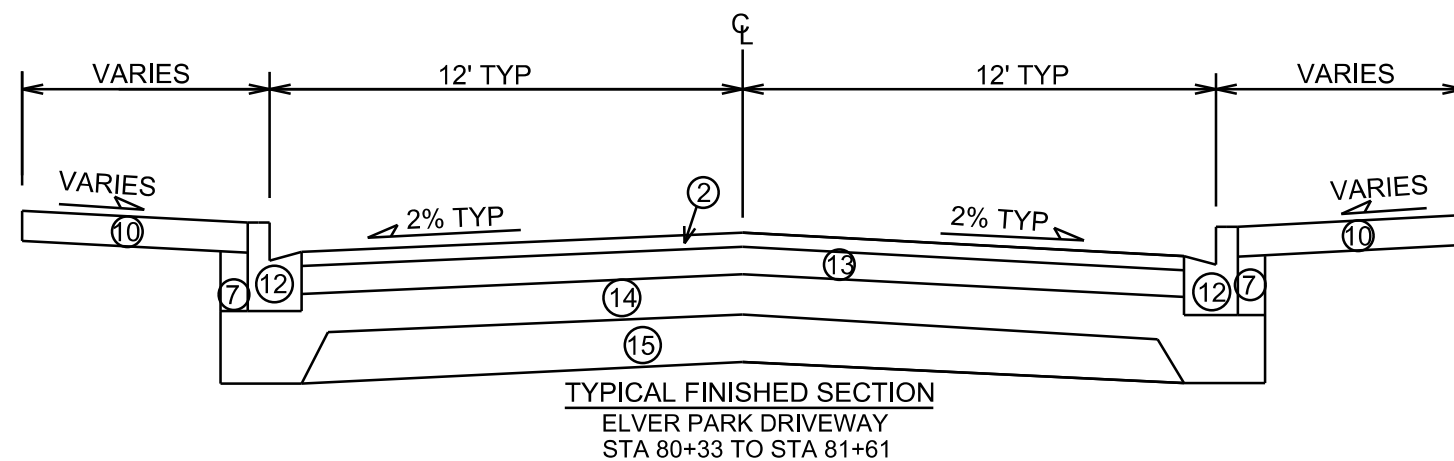


**CONCRETE GUTTER DETAIL**  
NOT TO SCALE



TYPICAL SECTIONS & DETAILS NOT TO SCALE

FOR BIKE PATH TYPICAL SECTION  
SEE S.D.D. 4.08. WIDTH VARIES; SEE  
PLAN FOR OFFSETS & DIMENSIONS



NOTE: EXISTING CURB & BASE MATERIAL TO REMAIN

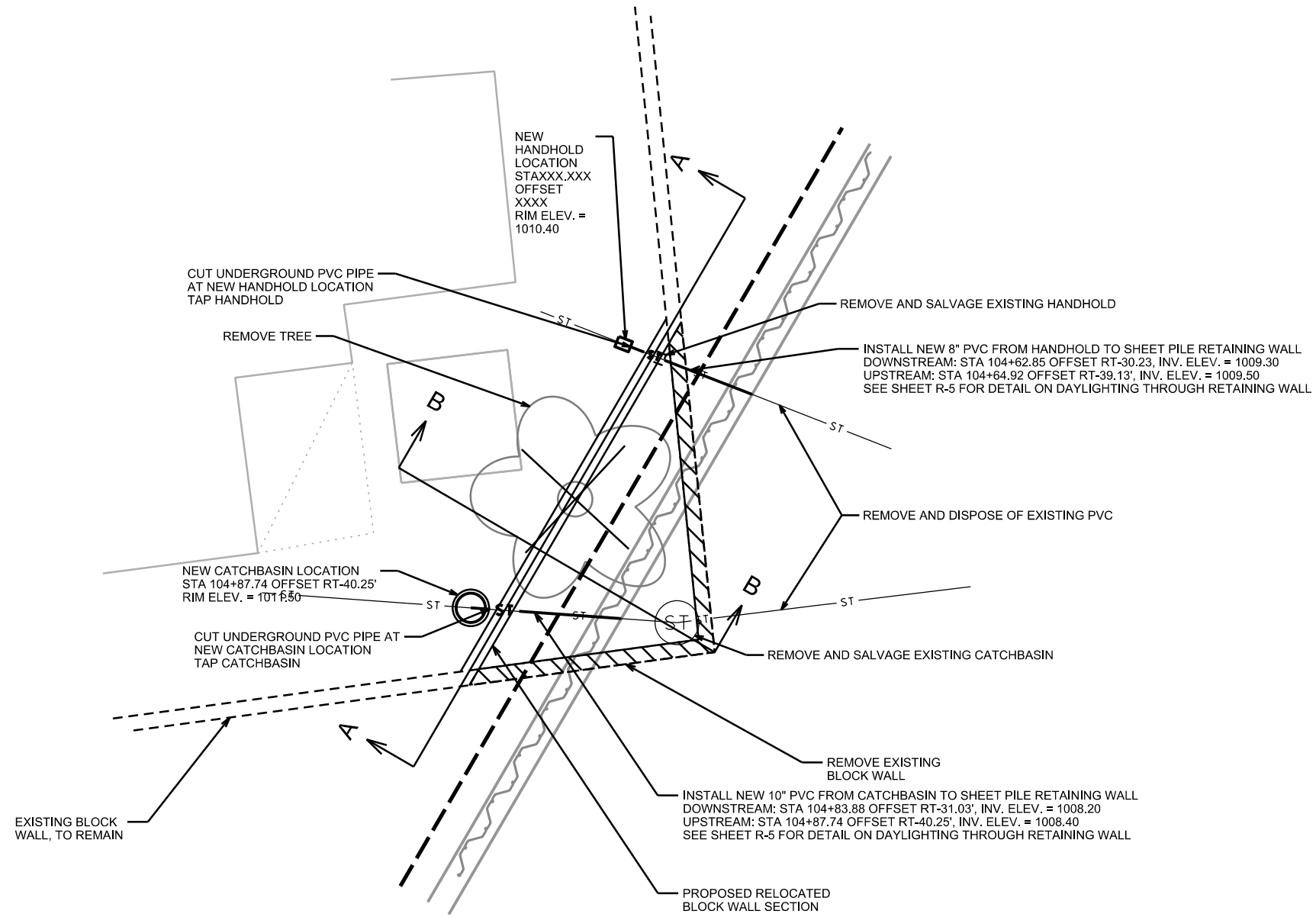
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PLOT NAME: \_\_\_\_\_

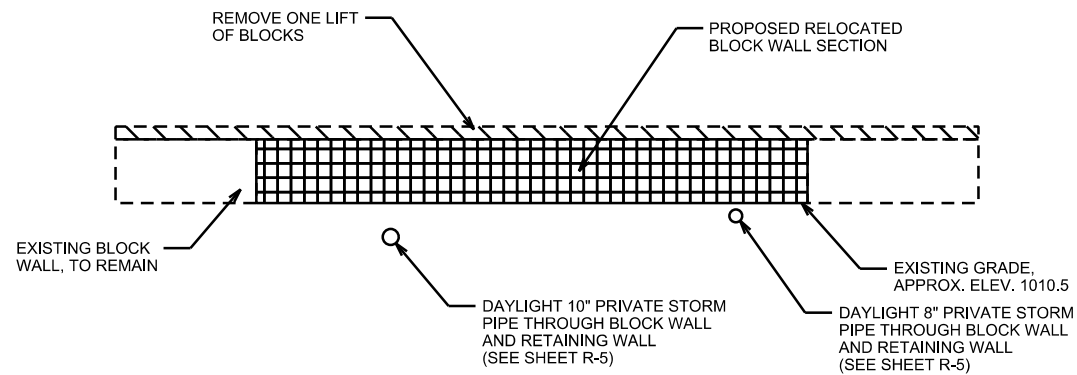
REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

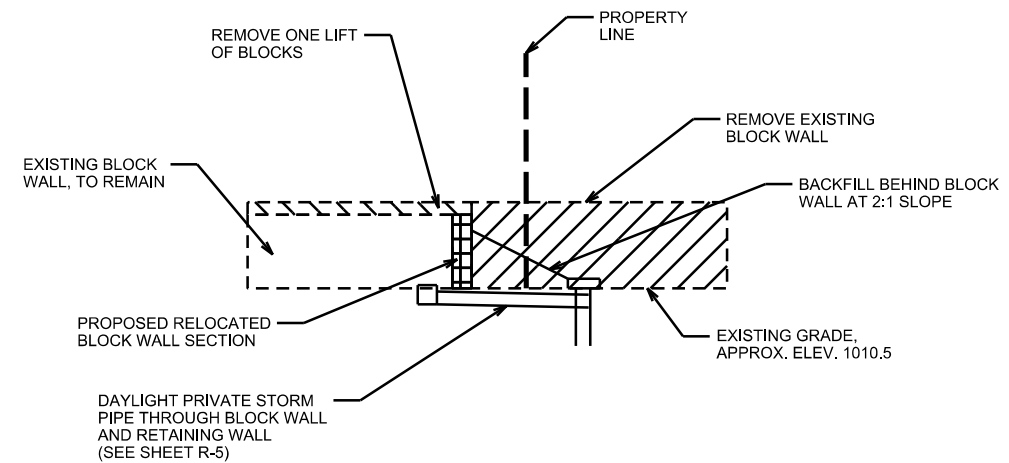
**DETAIL FOR REMOVAL AND REPLACEMENT OF BLOCK WALL (BID ITEM 90035)**



**SECTION A-A**



**SECTION B-B**



PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_






REV. DATE: \_\_\_\_\_

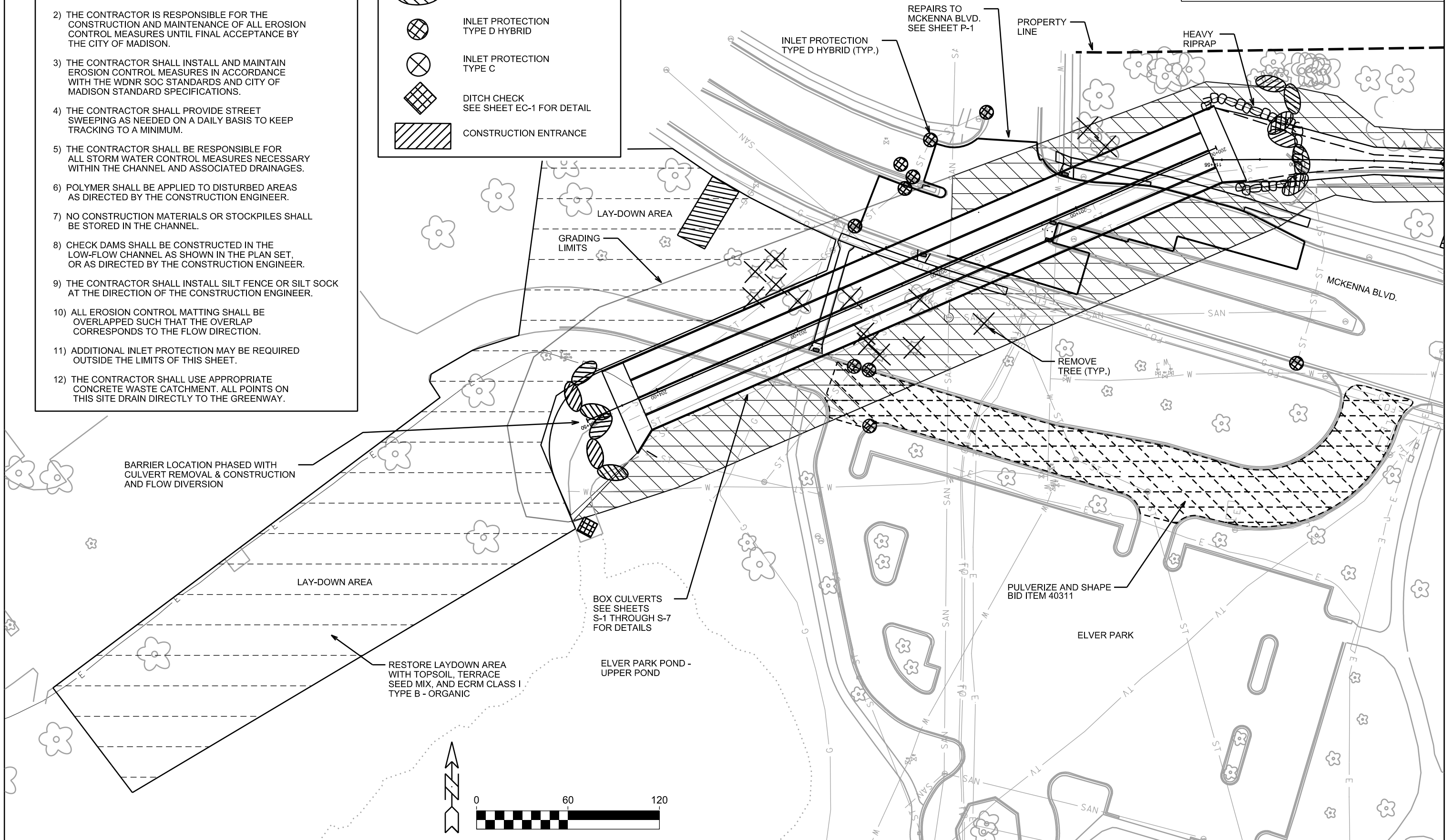
ORIGINATOR: CITY OF MADISON, STREETS DIVISION

EROSION CONTROL NOTES:

- 1) EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO ANY OTHER CONSTRUCTION ACTIVITIES.
- 2) THE CONTRACTOR IS RESPONSIBLE FOR THE CONSTRUCTION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES UNTIL FINAL ACCEPTANCE BY THE CITY OF MADISON.
- 3) THE CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE WDNR SOC STANDARDS AND CITY OF MADISON STANDARD SPECIFICATIONS.
- 4) THE CONTRACTOR SHALL PROVIDE STREET SWEEPING AS NEEDED ON A DAILY BASIS TO KEEP TRACKING TO A MINIMUM.
- 5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL STORM WATER CONTROL MEASURES NECESSARY WITHIN THE CHANNEL AND ASSOCIATED DRAINAGES.
- 6) POLYMER SHALL BE APPLIED TO DISTURBED AREAS AS DIRECTED BY THE CONSTRUCTION ENGINEER.
- 7) NO CONSTRUCTION MATERIALS OR STOCKPILES SHALL BE STORED IN THE CHANNEL.
- 8) CHECK DAMS SHALL BE CONSTRUCTED IN THE LOW-FLOW CHANNEL AS SHOWN IN THE PLAN SET, OR AS DIRECTED BY THE CONSTRUCTION ENGINEER.
- 9) THE CONTRACTOR SHALL INSTALL SILT FENCE OR SILT SOCK AT THE DIRECTION OF THE CONSTRUCTION ENGINEER.
- 10) ALL EROSION CONTROL MATTING SHALL BE OVERLAPPED SUCH THAT THE OVERLAP CORRESPONDS TO THE FLOW DIRECTION.
- 11) ADDITIONAL INLET PROTECTION MAY BE REQUIRED OUTSIDE THE LIMITS OF THIS SHEET.
- 12) THE CONTRACTOR SHALL USE APPROPRIATE CONCRETE WASTE CATCHMENT. ALL POINTS ON THIS SITE DRAIN DIRECTLY TO THE GREENWAY.

EROSION CONTROL LEGEND

-  VELOCITY CHECK / DEWATERING BARRIER
-  INLET PROTECTION TYPE D HYBRID
-  INLET PROTECTION TYPE C
-  DITCH CHECK SEE SHEET EC-1 FOR DETAIL
-  CONSTRUCTION ENTRANCE

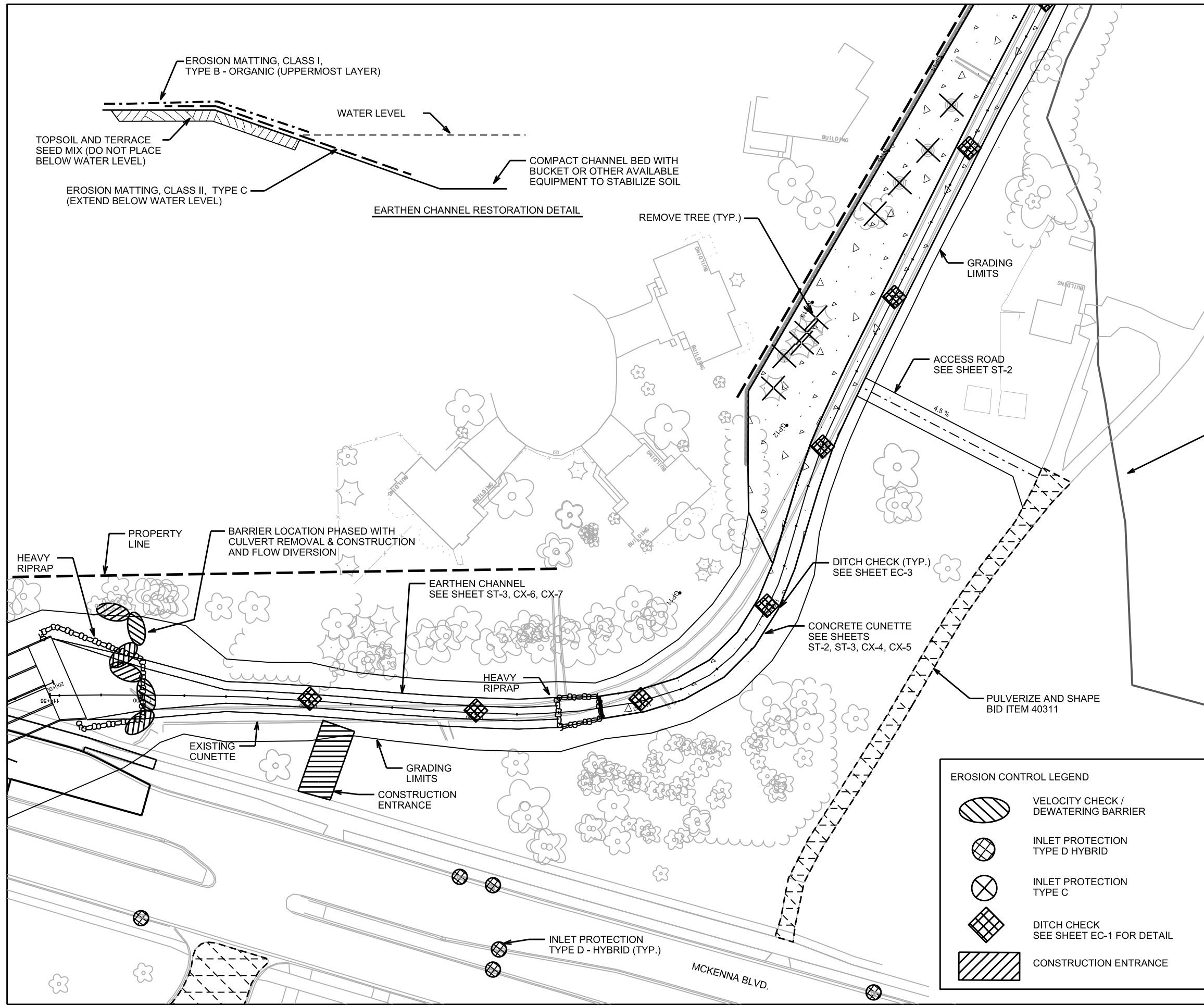


PLOT SCALE: \_\_\_\_\_

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ORIGINATOR: CITY OF MADISON, STREETS DIVISION



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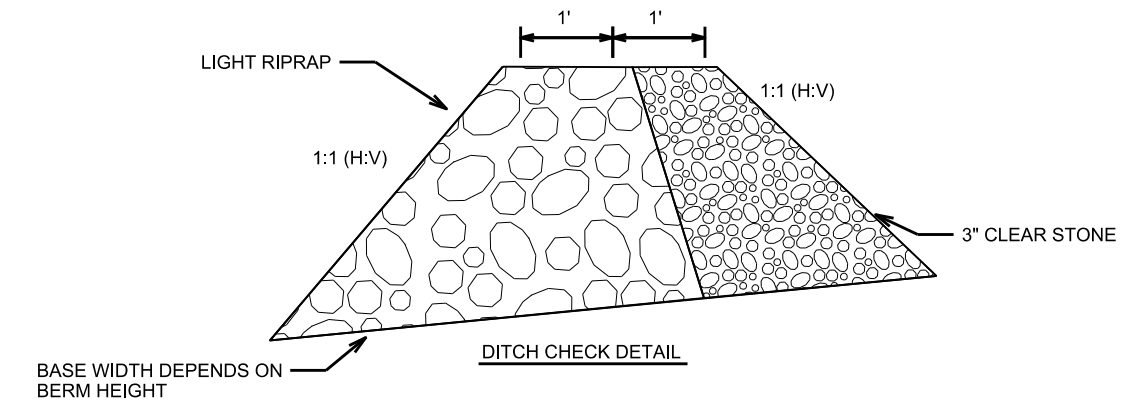
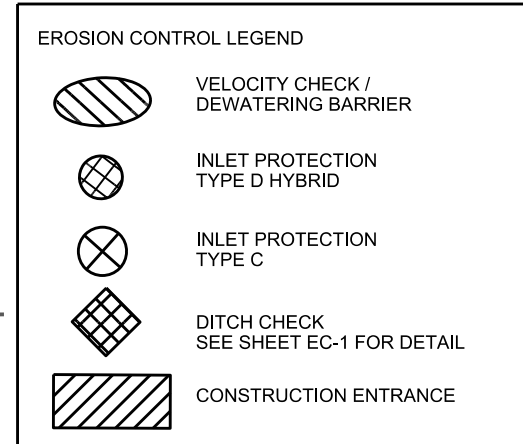
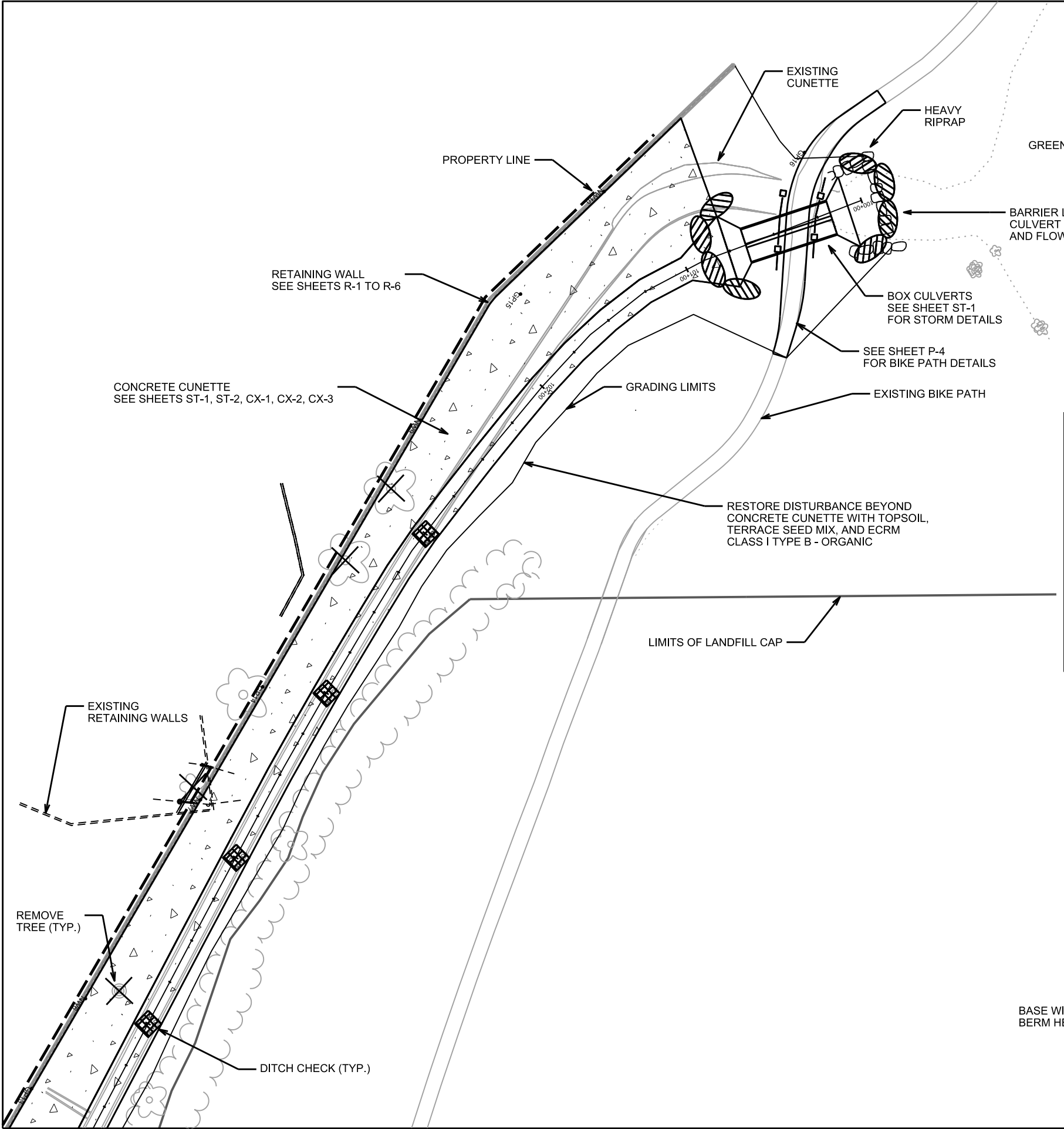
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REV. DATE: \_\_\_\_\_

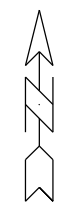
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 ORIGINATOR: CITY OF MADISON, STREETS DIVISION

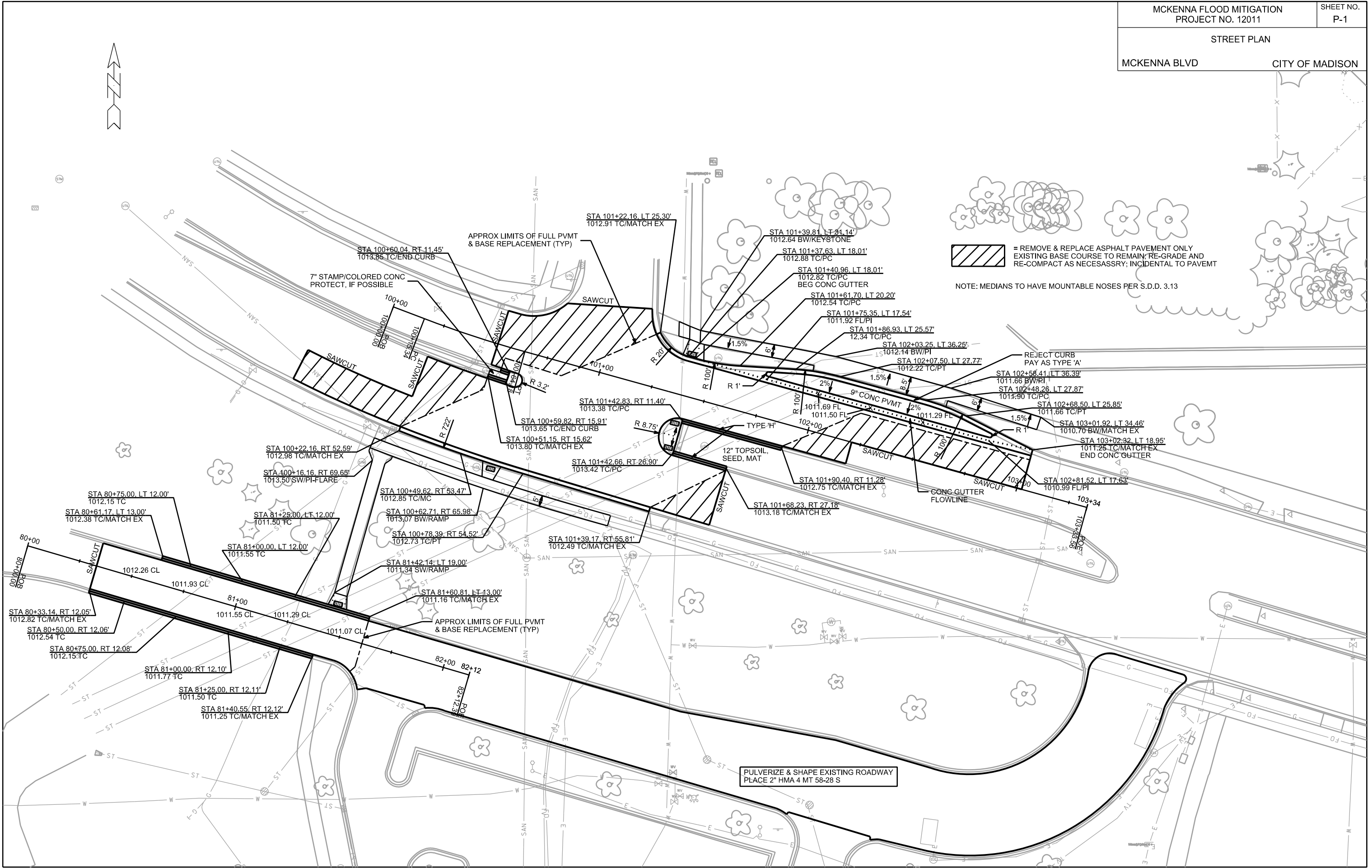


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PLOT NAME: \_\_\_\_\_

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ORIGINATOR: CITY OF MADISON, STREETS DIVISION



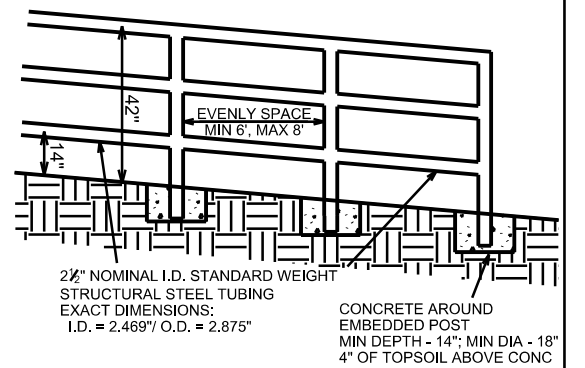


PLAN AND PROFILE

BIKE PATH

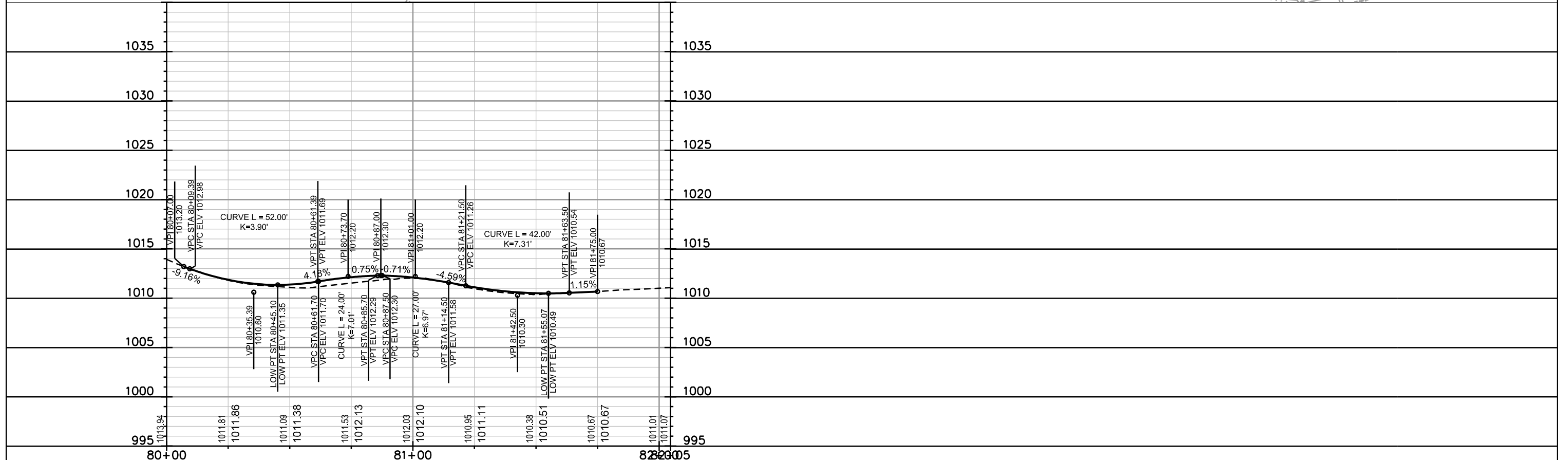
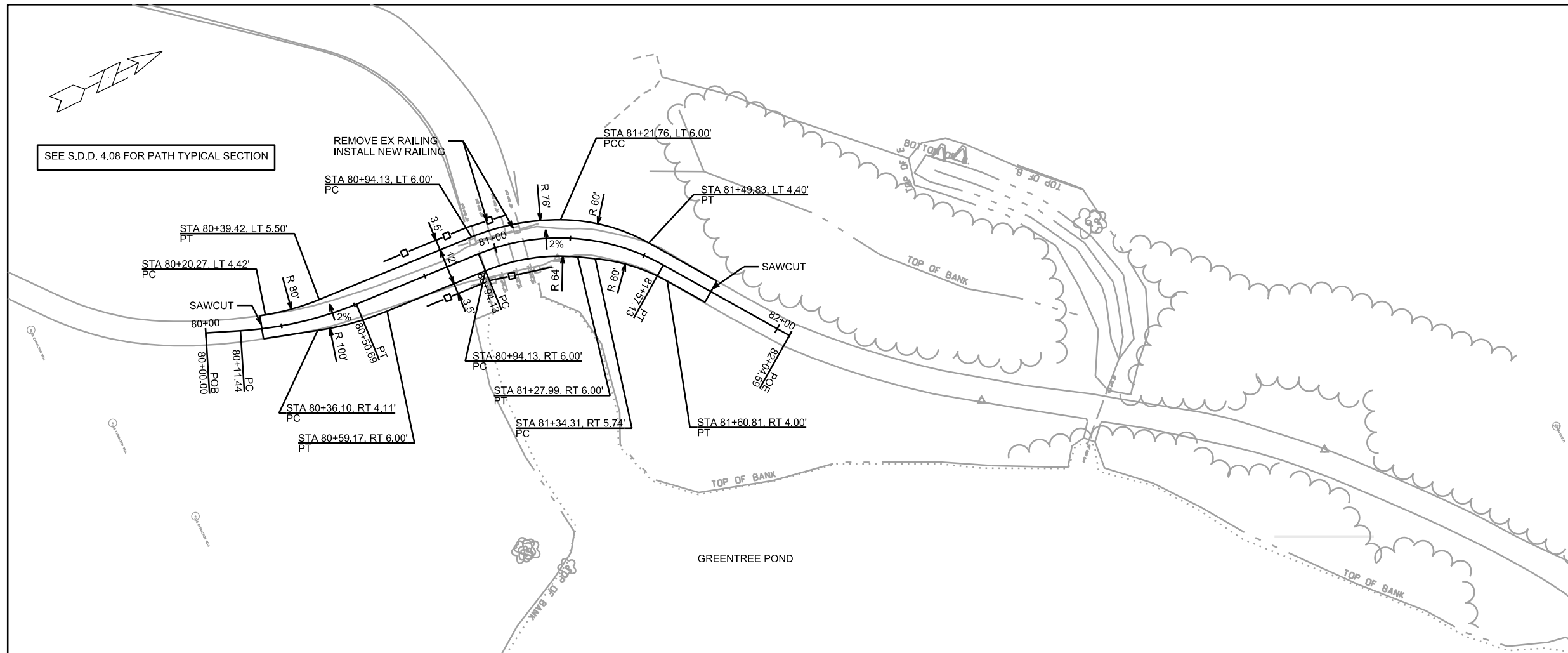
CITY OF MADISON

RAILING DETAILS



GENERAL RAILING NOTES:

- GUARD RAIL SHALL BE PAINTED BROWN IN ACCORDANCE WITH RAL 8011.
- ALL PIPES SHALL BE CUT TO FIT AND JOINTS SHALL BE WELDED CONTINUOUSLY AROUND THE PERIMETER TO ASSURE A BURR FREE AND STRUCTURALLY SOUND CONNECTION.
- IF ON A SLOPE, THE POSTS SHOULD REMAIN VERTICAL AND THE RAILS SLOPED WITH THE WINGWALL



PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

CROSS SECTIONS

SCHROEDER RD.

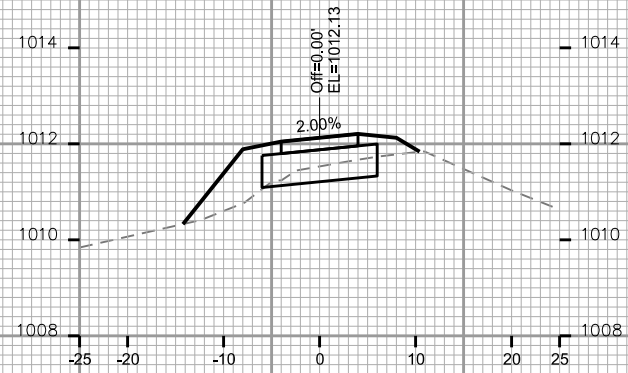
CITY OF MADISON

PLOT SCALE:

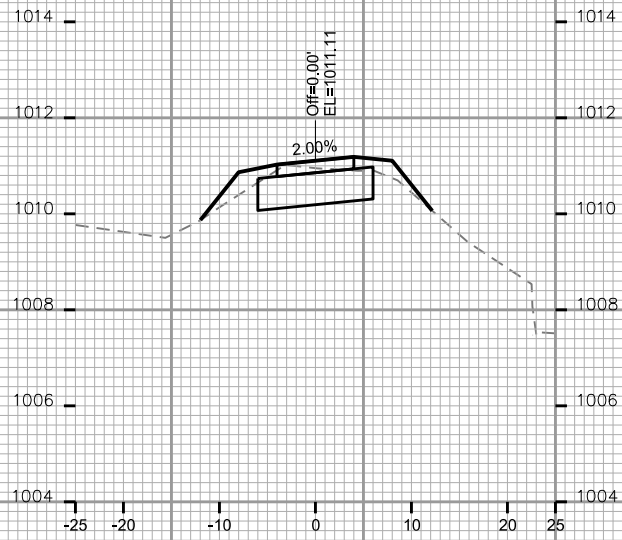
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REV. DATE:

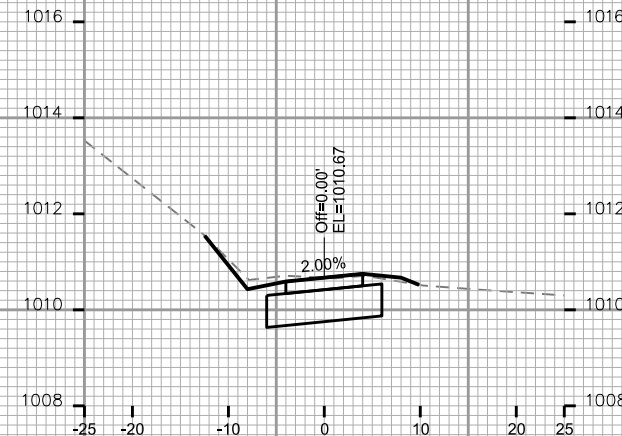
ORIGINATOR: CITY OF MADISON, STREETS DIVISION



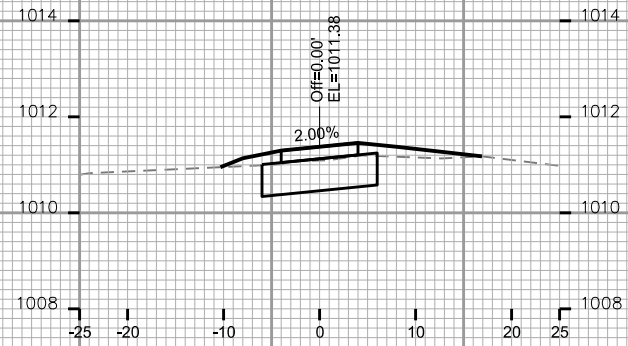
STA. 80+75



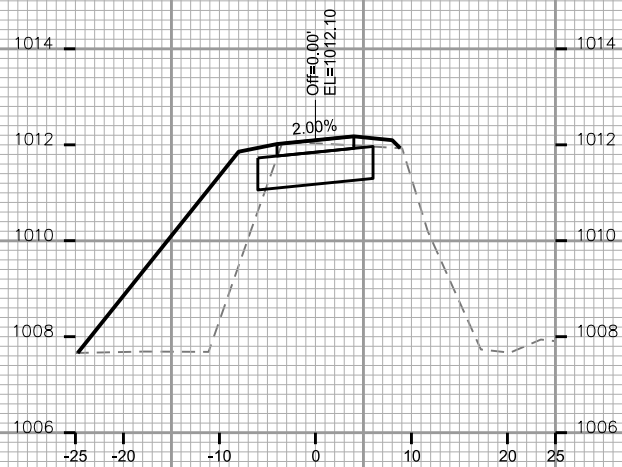
STA. 81+25



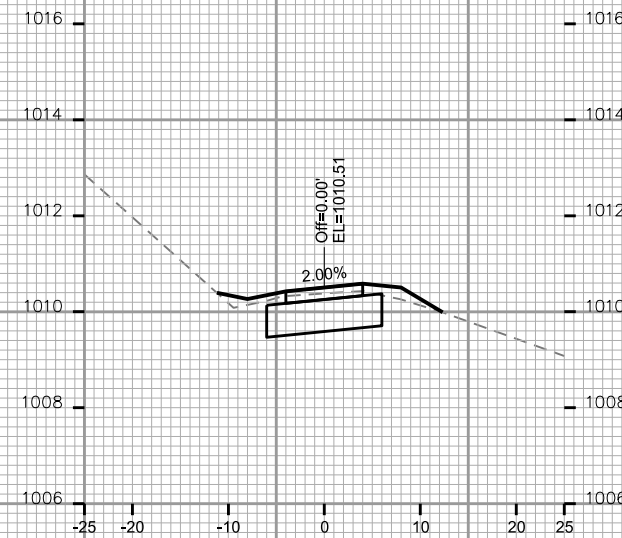
STA. 81+75



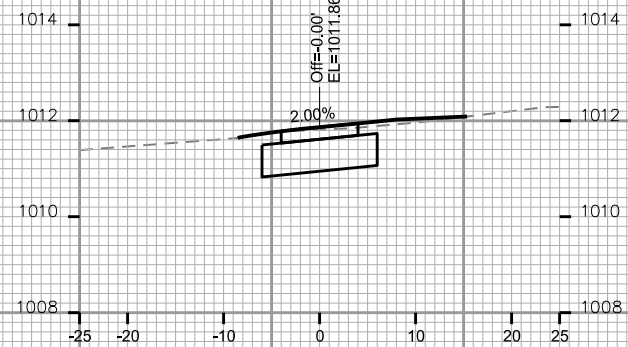
STA. 80+50



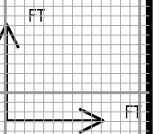
STA. 81+00



STA. 81+50



STA. 80+25

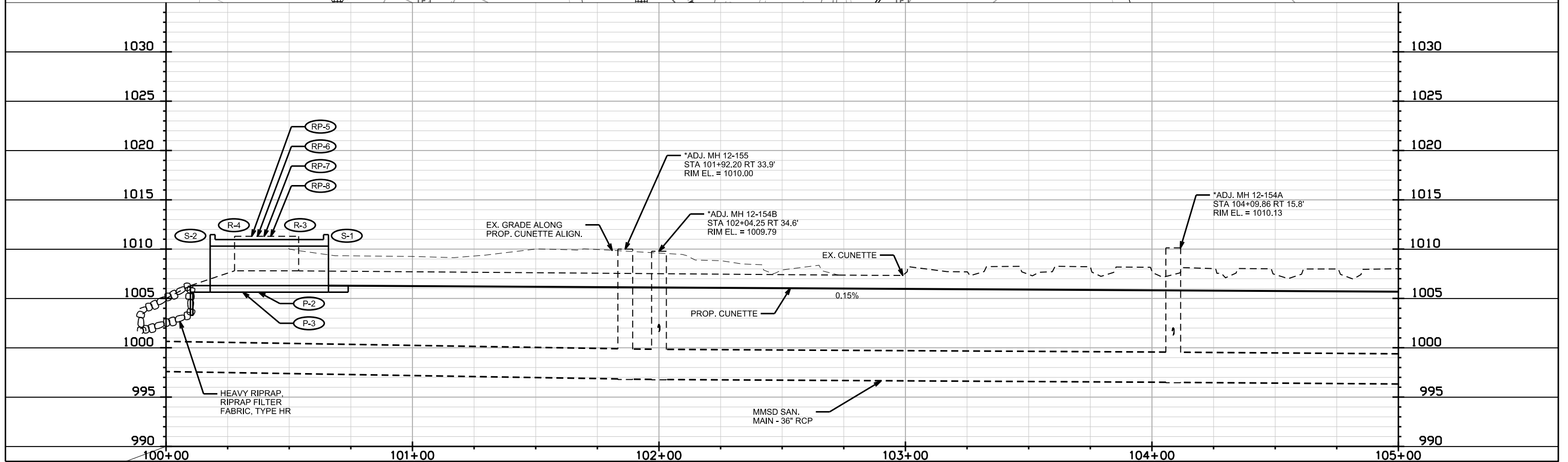
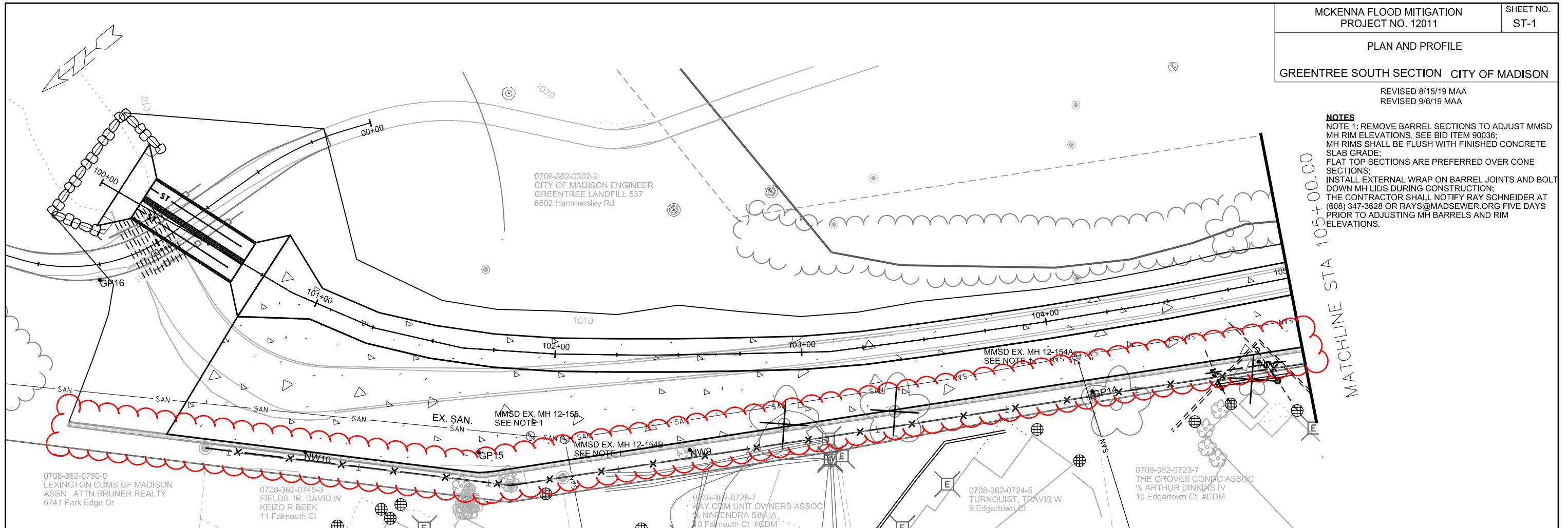


PLAN AND PROFILE

GREENTREE SOUTH SECTION CITY OF MADISON

REVISED 8/15/19 MAA  
REVISED 9/6/19 MAA

**NOTES**  
NOTE 1: REMOVE BARREL SECTIONS TO ADJUST MMSD MH RIM ELEVATIONS. SEE BID ITEM 90036; MH RIMS SHALL BE FLUSH WITH FINISHED CONCRETE SLAB GRADE; FLAT TOP SECTIONS ARE PREFERRED OVER CONE SECTIONS; INSTALL EXTERNAL WRAP ON BARREL JOINTS AND BOLT DOWN MH LIDS DURING CONSTRUCTION; THE CONTRACTOR SHALL NOTIFY RAY SCHNEIDER AT (608) 347-3628 OR RAYS@MADSEWER.ORG FIVE DAYS PRIOR TO ADJUSTING MH BARRELS AND RIM ELEVATIONS.



PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

PLAN AND PROFILE  
GREENTREE SOUTH SECTION CITY OF MADISON

REVISED 8/15/19 MAA  
REVISED 9/6/19 MAA

**NOTES**  
NOTE 1: REPLACE SANITARY LATERALS PRIOR TO DRIVING SHEET PILE, SET PIPE INVERT AT ELEV = 1001 FT AMSL OR LOWER AT SHEET PILE WALL ALIGNMENT.

NOTE 2: REMOVE BARREL SECTIONS TO ADJUST MMSD MH RIM ELEVATIONS, SEE BID ITEM 90036;  
MH RIMS SHALL BE FLUSH WITH FINISHED CONCRETE SLAB GRADE, ADDITIONAL CONCRETE FORMING AROUND MH12-154A CASTING TO BE ALLOWED;  
FLAT TOP SECTIONS ARE PREFERRED OVER CONE SECTIONS;  
INSTALL EXTERNAL WRAP ON BARREL JOINTS AND BOLT DOWN MH LIDS DURING CONSTRUCTION;  
THE CONTRACTOR SHALL NOTIFY RAY SCHNEIDER AT (608) 347-3628 OR RAYS@MADSEWER.ORG FIVE DAYS PRIOR TO ADJUSTING MH BARRELS AND RIM ELEVATIONS.

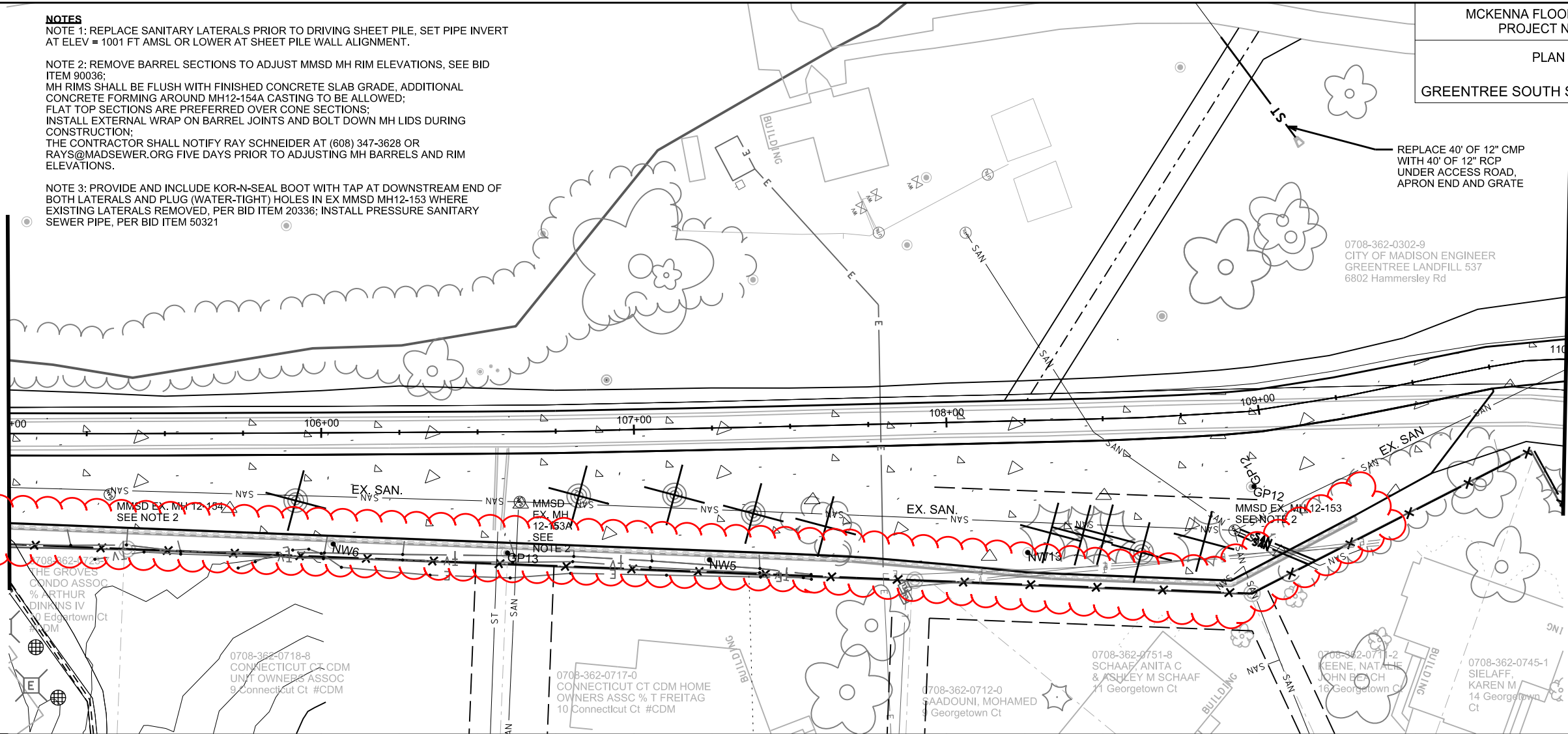
NOTE 3: PROVIDE AND INCLUDE KOR-N-SEAL BOOT WITH TAP AT DOWNSTREAM END OF BOTH LATERALS AND PLUG (WATER-TIGHT) HOLES IN EX MMSD MH12-153 WHERE EXISTING LATERALS REMOVED, PER BID ITEM 20336; INSTALL PRESSURE SANITARY SEWER PIPE, PER BID ITEM 50321

REPLACE 40' OF 12" CMP WITH 40' OF 12" RCP UNDER ACCESS ROAD, APRON END AND GRATE

0708-362-0302-9  
CITY OF MADISON ENGINEER  
GREENTREE LANDFILL 537  
6802 Hammersley Rd

MATCHLINE STA 105+00.00

MATCHLINE STA 110+00.00



PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

0708-362-0302-9  
CITY OF MADISON ENGINEER  
GREENTREE LANDFILL 537  
6802 Hammerstey Rd

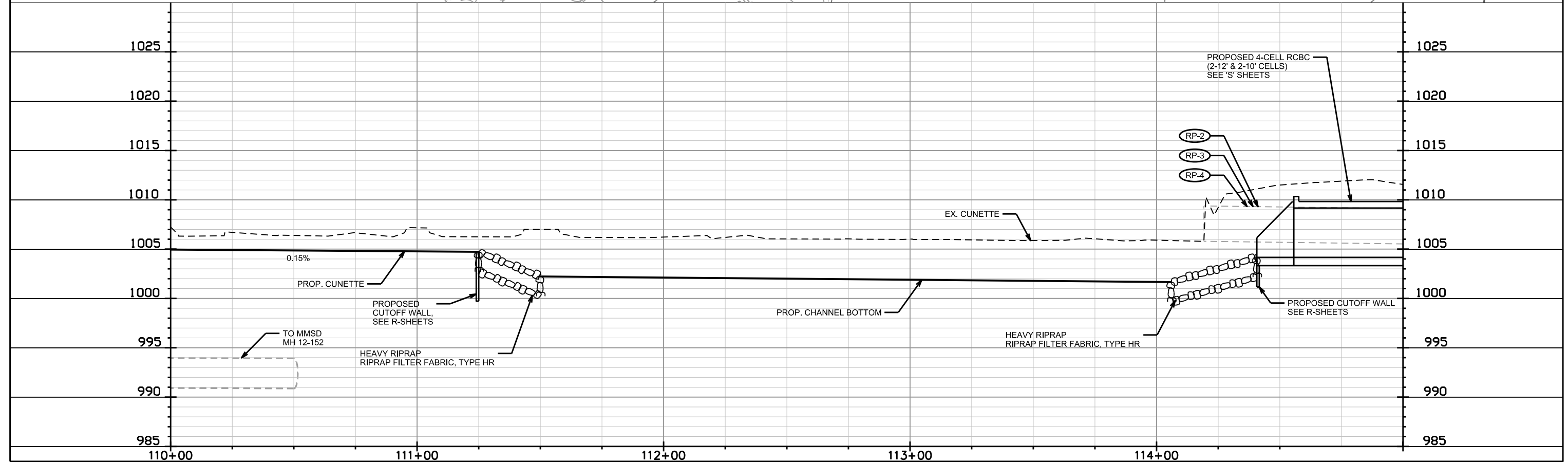
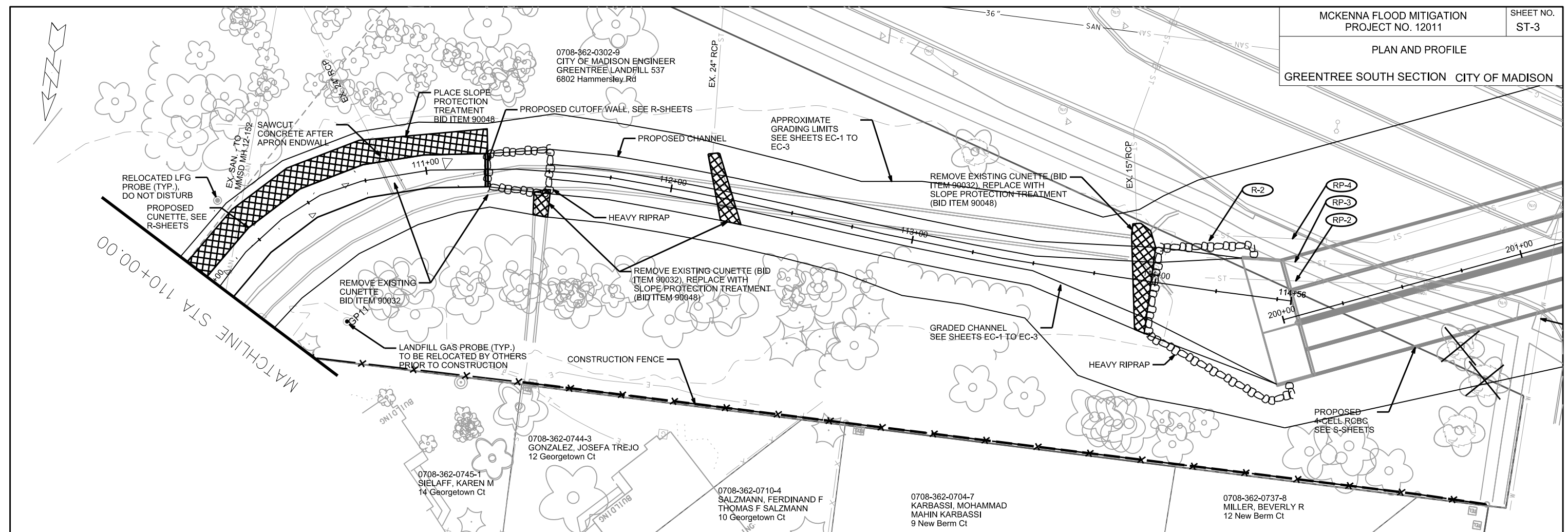
0708-362-0744-3  
GONZALEZ, JOSEFA TREJO  
12 Georgetown Ct

0708-362-0745-1  
SIELAFF, KAREN M  
14 Georgetown Ct

0708-362-0710-4  
SALZMANN, FERDINAND F  
THOMAS F SALZMANN  
10 Georgetown Ct

0708-362-0704-7  
KARBASSI, MOHAMMAD  
MAHIN KARBASSI  
9 New Berm Ct

0708-362-0737-8  
MILLER, BEVERLY R  
12 New Berm Ct



PLOT SCALE: \_\_\_\_\_

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PLAN AND PROFILE  
GREENTREE SOUTH SECTION CITY OF MADISON

REVISED 8/15/19 MAA

**NOTES**  
 NOTE 1: THE CONTRACTOR SHALL NOTIFY RAY SCHNEIDER AT (608) 347-3628 OR RAYS@MADSEWER.ORG FIVE DAYS PRIOR TO CORING THROUGH MH BARREL.  
 \*EXISTING ULO DONE MARCH 2019, SEE SHEET ST-7 FOR ADDITIONAL INFORMATION  
 \*\*PRESSURE SANITARY SEWER PIPE, PER BID ITEM 50321  
 \*\*\*FIELD CORE (TAP) FOR NEW 8" PVC MAIN MUST GO THROUGH EXTENDED HEIGHT BENCH; PROVIDE AND INSTALL KOR-N-SEAL BOOT WITH TAP AT DOWNSTREAM END OF NEW 8" PVC MAIN AND PLUG (WATER-TIGHT) HOLES IN BARREL WHERE EXISTING MAINS WERE REMOVED, PER BID ITEM 20336

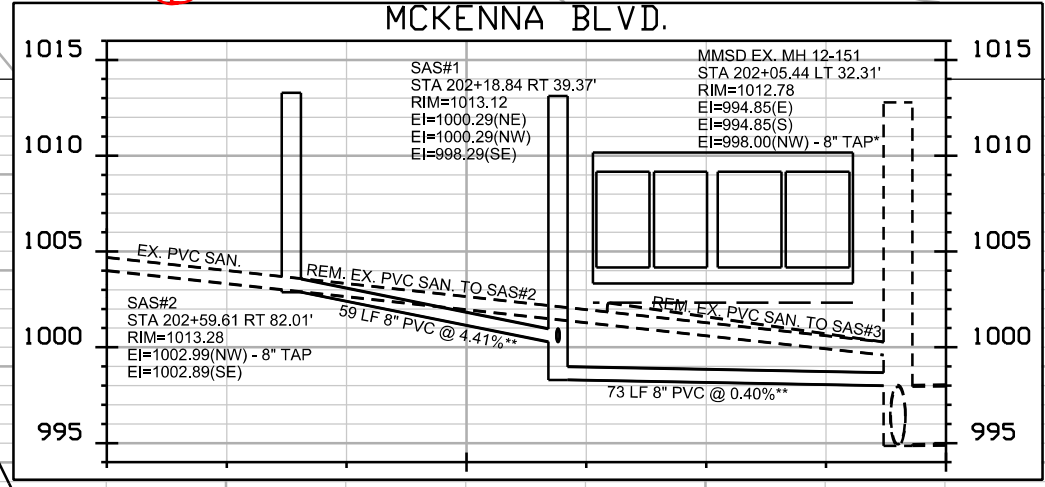
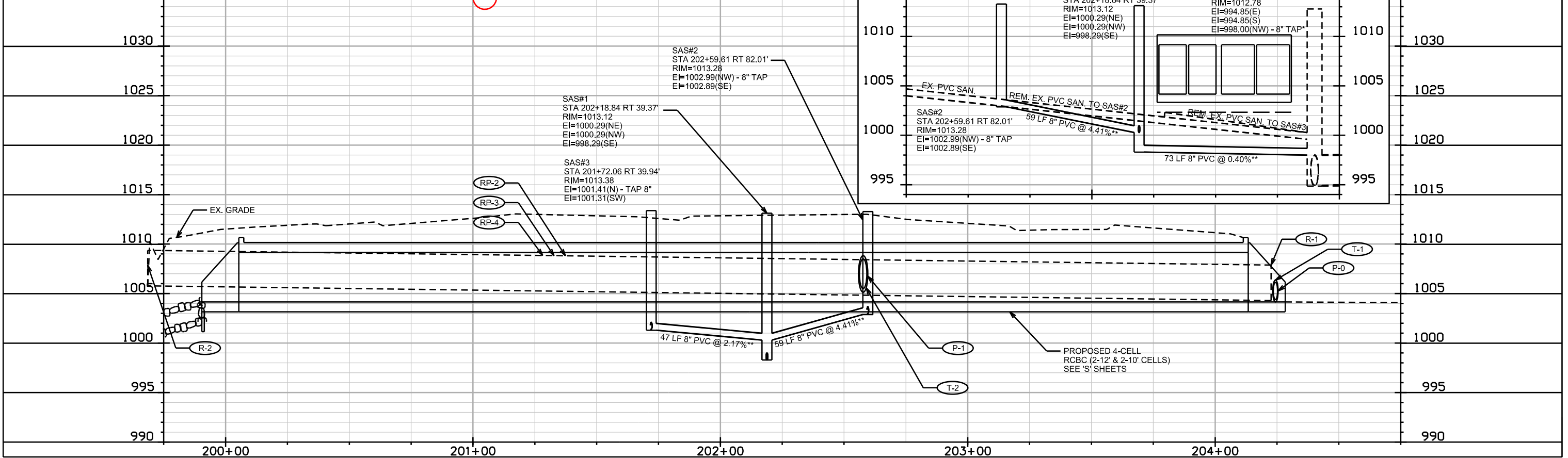
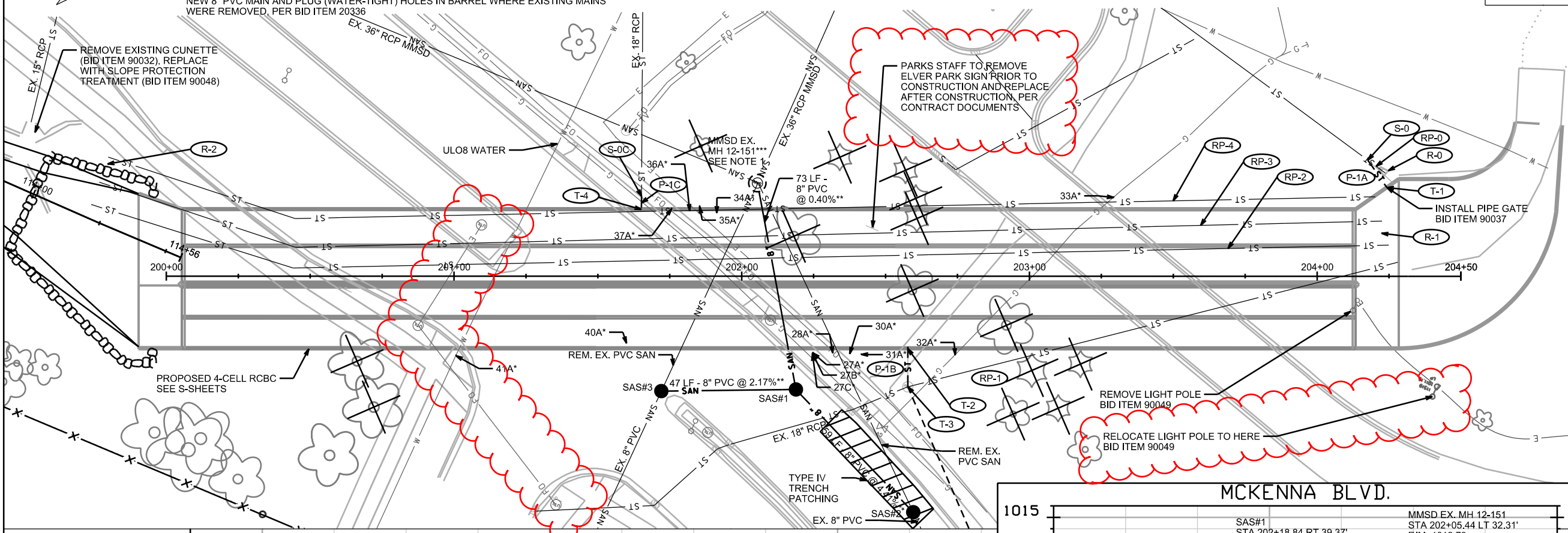
REMOVE EXISTING CUNETTE (BID ITEM 90032), REPLACE WITH SLOPE PROTECTION TREATMENT (BID ITEM 90048)

PARKS STAFF TO REMOVE ELVER PARK SIGN PRIOR TO CONSTRUCTION AND REPLACE AFTER CONSTRUCTION, PER CONTRACT DOCUMENTS

INSTALL PIPE GATE BID ITEM 90037

REMOVE LIGHT POLE BID ITEM 90049

RELOCATE LIGHT POLE TO HERE BID ITEM 90049



PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

# SANITARY SEWER SCHEDULE

## PROPOSED SANITARY STRUCTURES

SAS NO.	STATION	LOCATION (OFFSET)	TOP OF CASTING	E.I.	DEPTH	NOTES
<b>MCKENNA BOULEVARD</b>						
SAS#1	202+18.84	RT-39.37	1013.12	998.29	14.83	[7]
SAS#2	202+59.61	RT-82.01	1013.28	1002.89	10.39	[7]
SAS#3	201+72.06	RT-39.94	1013.38	1001.31	12.07	[7]

## PROPOSED SANITARY PIPES

FROM (DNSTM)	TO (UPSTM)	DWNSTRM E.I.	UPSTRM E.I.	PLAN LGTH (FT)	SLOPE (%)	PIPE SIZE	PVC TYPE	NOTES
<b>MCKENNA BOULEVARD</b>								
MMSD EX MH12-151	SAS#1	998.00	998.29	73	0.40%	8"	C900	[1]; [2]; [6]
SAS#1	SAS#2	1000.29	1002.89	59	4.41%	8"	C900	-
SAS#1	SAS#3	1000.29	1001.31	47	2.17%	8"	C900	-

## EXISTING SANITARY PIPES

FROM (DNSTM)	TO (UPSTM)	DWNSTRM E.I.	UPSTRM E.I.	PLAN LGTH (FT)	SLOPE (%)	PIPE SIZE	PIPE TYPE	NOTES
<b>MCKENNA BOULEVARD</b>								
SAS#2	EX SAS 2664-003	1002.99	1006.21	120	2.68%	8"	PVC	[3]
SAS#3	EX SAS 2664-004	1001.41	1003.60	97	2.26%	8"	PVC	[3]

## REMOVE SANITARY PIPES

FROM (DNSTM)	TO (UPSTM)	PLAN LGTH (FT)	PAID (Y/N)	PAY LGTH (FT)	PIPE SIZE	PIPE TYPE	NOTES
<b>MCKENNA BOULEVARD</b>							
MMSD EX MH12-151	SAS#2	127	N	51	8"	PVC	[4]
MMSD EX MH12-151	SAS#3	80	Y	10	8"	PVC	[4]

## ADJUST SANITARY STRUCTURE RIMS

SAS NO.	STATION	LOCATION (OFFSET)	TOP OF CASTING	PROP. RIM ELEV.	ADJ. HEIGHT	NOTES
<b>GREENWAY</b>						
MMSD EX MH12-153	108+90.06	RT-37.7	1010.23	1006.55	-3.68	[5]; [6]
MMSD EX MH12-153A	106+63.35	RT-22.5	1009.62	1006.74	-2.88	[5]; [6]
MMSD EX MH12-154	105+32.35	RT-19.4	1009.84	1006.90	-2.94	[5]; [6]
MMSD EX MH12-154A	104+09.86	RT-15.8	1010.13	1007.04	-3.09	[5]; [6]
MMSD EX MH12-154B	102+04.25	RT-34.6	1009.79	1007.53	-2.26	[5]; [6]
MMSD EX MH12-155	101+92.20	RT-33.9	1010.00	1007.54	-2.46	[5]; [6]

### SPECIFIC NOTES:

- [1] PROVIDE AND INSTALL KOR-N-SEAL BOOT WITH TAP CONNECTION AT DOWNSTREAM END OF PIPE, AT EX MMSD MH12-151
- [2] FIELD CORE (TAP) FOR PROPOSED SANITARY MAIN MUST GO THROUGH EXTENDED HEIGHT BENCH IN EX MMSD MH12-151
- [3] FIELD CORE OPENING FOR EXISTING PIPE INTO SAS
- [4] PLUG (WATER-TIGHT) HOLE IN EX MMSD MH12-151 BARREL WHERE EXISTING SANITARY MAIN IS REMOVED
- [5] DO NOT SAW CUT CHIMNEY BARREL; REPLACE CHIMNEY SECTION(S) AND ADJUSTING RINGS TO ADJUST ELEVATION
- [6] THE CONTRACTOR SHALL NOTIFY RAY SCHNEIDER (MMSD) AT (608) 347-3628 OR RAYS@MADSEWER.ORG FIVE (5) DAYS PRIOR TO DOING WORK ON MMSD FACILITIES; PERMIT AND FEES FOR THIS WORK IS THE RESPONSIBILITY OF THE CONTRACTOR
- [7] INSTALL INTERNAL CHIMNEY SEAL IN CONFORMANCE WITH S.D.D. 5.7.17

# STORM SEWER SCHEDULE

MCKENNA FLOOD MITIGATION  
PROJECT NO. 12011

SHEET NO.  
ST-6

STORM SEWER SCHEDULE

CITY OF MADISON

## PROPOSED STORM STRUCTURES

STRUC. NO.	STATION	LOCATION (OFFSET)	TYPE	TOP OF CASTING	E.I.	DEPTH	NOTES
<b>MCKENNA BOULEVARD</b>							
S-0	204+17.62	LT-40.3	COLLAR	-	1005.00	-	-
S-0C	201+65.17	LT-27.8	COLLAR	-	1005.95	-	-
<b>GREENWAY</b>							
S-1	100+76.00	LT-0.4	RCBC WINGWALL	-	1006.30	-	[1]
S-2	100+18.08	LT-2.9	RCBC WINGWALL	-	1006.30	-	[1]
S-3	24+11.20	CL	RCBC WINGWALL	-	1006.80	-	[1]
S-4	23+79.20	CL	RCBC WINGWALL	-	1006.80	-	[1]
S-5	9+59.37	LT-1.1	RCBC WINGWALL	-	1010.80	-	[1]
S-6	7+70.66	CL	RCBC WINGWALL	-	1012.10	-	[1]

## PROPOSED STORM PIPES

PIPE NO.	FROM (DNSTM)	TO (UPSTM)	DISCH. E.I.	INLET E.I.	PLAN (PAY) LGTH (FT)	PIPE LGTH (FT)	SLOPE (%)	PIPE SIZE	TYPE	NOTES
<b>MCKENNA BOULEVARD</b>										
P-1A	T-3	S-0	1004.16	1005.00	11.6	11.1	7.57%	21"	TYPE I	[3]; TAP WINGWALL FOR DS END
P-1B	T-1	T-2	1005.50	1007.10	16.9	13.9	11.51%	36"	TYPE I	TAP FOR BOTH ENDS
P-1C	T-4	S-0C	1005.92	1005.95	4.7	4.7	0.64%	18"	TYPE I	
<b>GREENWAY</b>										
P-2	S-1	S-2	1006.3	1006.3	48.0	48.0	0.00%	4'X8'	RCBC	-
P-3	S-1	S-2	1006.3	1006.3	48.0	48.0	0.00%	4'X8'	RCBC	-
P-4	S-3	S-4	1006.8	1006.8	32.0	32.0	0.00%	42"	TYPE I	-
P-5	S-3	S-4	1006.8	1006.8	32.0	32.0	0.00%	42"	TYPE I	-
P-6	S-3	S-4	1006.8	1006.8	32.0	32.0	0.00%	42"	TYPE I	-
P-7	S-3	S-4	1006.8	1006.8	32.0	32.0	0.00%	42"	TYPE I	-
P-8	S-5	S-6	1010.80	1012.10	200.0	200.0	0.65%	4'X8'	RCBC	-
P-9	S-5	S-6	1010.80	1012.10	200.0	200.0	0.65%	4'X8'	RCBC	-

## STORM STRUCTURE TAPS

STRUC. NO.	STRUC. I.D.	STATION	LOCATION (OFFSET)	E.I.	NOTES
<b>MCKENNA BOULEVARD</b>					
T-1		204+24.27	LT-30.8	1004.16	RCBC WW (S-1)
T-2		202+57.72	RT-25.2	1005.50	4-CELL RCBC
T-3	AS 2664-010	202+57.72	RT-38.4	1007.10	4X4 AS (EX AS 2664-010)
T-4		201+65.14	LT-23.2	1005.92	4-CELL RCBC

## STANDARD NOTES:

- ABBREVIATIONS: AE = APRON ENDWALL; RCP = REINFORCED CONCRETE PIPE; HERCP = HORIZONTAL ELLIPTICAL REINFORCED CONCRETE PIPE; DNA = DOES NOT APPLY; SAS = SEWER ACCESS STRUCTURE; LP = LOW POINT INLET STRUCTURE; FP = FIELD POURED STRUCTURE; TR = TOP OF CONCRETE ROOF; NCM = NO CROWN MATCH FOR PIPES; UD = UNDERDRAIN; RCBC = REINFORCED CONCRETE BOX CULVERT; DS = DOWNSTREAM

- APPROXIMATE DISCHARGE E.I. GIVEN, ADJUST E.I. AND PIPE SLOPE IN THE FIELD.

- TOP OF CASTING GRADE GIVEN IS THE TOP OF CURB FOR INLET STRUCTURES AND THE FLOWLINE OF THE CLOSED CASTING FOR SAS's.

- TOP OF CONCRETE ROOF (TR) IS 1.25' BELOW TOP OF CASTING UNLESS OTHERWISE NOTED.

- ALL REINFORCED CONCRETE PIPES TO BE CLASS III UNLESS OTHERWISE NOTED.

- SURVEYOR TO CONFIRM THAT ALL INLET STATION / OFFSETS LINE UP WITH PROPOSED CURB AND GUTTER.

- ALL STRUCTURES CALLED OUT AS FIELD POURED SHALL BE FIELD POURED. ALL OTHER STRUCTURES (NOT INDICATED AS FIELD POURED) SHALL BE SUBMITTED TO CITY ENGINEERING FOR APPROVAL IF PRECAST STRUCTURES ARE PREFERRED. CONTACT MATT OF CITY ENGINEERING AT (608) 266-4058 FOR PRECAST APPROVALS, FAX SHOP DRAWINGS TO (608)264-9275, OR EMAIL SHOP DRAWINGS TO MALLIE@CITYOFMADISON.COM.

## SPECIFIC NOTES

[1] PER S.D.D. 5.5.1

[2] PER S.D.D. 5.7.12A

[3] INSTALL PIPE GRATE AT OUTLET, PER BID ITEM 90031

[4] INSTALL PIPE GRATE AT OUTLET, PER BID ITEM 90032

[5] INSTALL PIPE GRATE AT OUTLET, PER BID ITEM 90033



# STORM SEWER SCHEDULE

MCKENNA FLOOD MITIGATION  
PROJECT NO. 12011

SHEET NO.  
ST-7

STORM SEWER SCHEDULE

CITY OF MADISON

## UTILITY LINE OPENINGS (ULO)

ULO NO.	STATION	LOCATION (OFFSET)	TYPE	TOP ELEV.	NOTES
<b>GREENWAY</b>					
ULO1	102+06.80	RT-46.7	SAN	-	-
ULO2	104+11.82	RT-30.0	SAN	-	-
ULO3	106+62.15	RT-39.5	SAN	-	-
ULO4	107+78.62	RT-46.4	ELEC	-	-
ULO5	108+85.63	RT-54.2	SAN LAT	-	-
ULO6	108+94.56	RT-51.8	SAN	-	-
ULO7	109+01.85	RT-46.8	SAN LAT	-	-
ULO8	201+36.19	LT-46.0	WAT	-	-

## EXISTING UTILITY LINE OPENINGS (ULO)

ULO NO.	TYPE	TOP ELEV.	*IN CONFLICT WITH BOX CULVERT (Y/N)
<b>MCKENNA BOULEVARD</b>			
ULO 27A	ELEC	1009.72	Y
ULO 27B	ELEC	1009.74	Y
ULO 27C	ELEC	1009.79	Y
ULO 28A	FO	1010.07	Y
ULO 30A	TV	1011.54	N
ULO 31A	FO	1011.02	N
ULO 32A	GAS	1013.15	N
ULO 33A	GAS	1007.83	Y
ULO 34A	FO	1010.04	Y
ULO 35A	ELEC	1010.03	Y
ULO 36A	TV	1011.09	N
ULO 37A	FO	1010.12	Y
ULO 40A	ELEC	1011.00	N
ULO 41A	WAT	1003.08	Y

\*REVISED 8/15/19 MAA

NOTE: BOX CULVERT AND BASE COURSE EXTEND FROM ELEV. 1002.5 TO 1010.2 ACROSS ENTIRE FOOTPRINT OF THE BOX CULVERT

## REMOVE STORM STRUCTURES

STRUC. NO.	ID NO.	STATION	LOCATION (OFFSET)	TYPE	NOTES
<b>MCKENNA BOULEVARD</b>					
R-0		204+23.98	LT-35.7	APRON ENDWALL	-
R-1		204+22.55	LT-19.1	WINGWALL	SEE SPEC. NOTE 1
R-2		114+19.18	LT-13.5	WINGWALL	-
<b>GREENWAY</b>					
R-3		100+40.23	RT-17.5	WINGWALL	-
R-4		100+17.83	RT-4.3	WINGWALL	-
R-5		24+07.61	RT-0.2	WINGWALL	-
R-6		23+81.73	CL	WINGWALL	-

## REMOVE STORM PIPES

REMOVE NO.	REMOVE FROM	REMOVE TO	PLAN LGTH (FT)	PIPE SIZE	PIPE TYPE	PAID (Y/N)	PAY LGTH (FT)	NOTES
<b>MCKENNA BOULEVARD</b>								
RP-0	R-0	S-0	5.0	21"	RCP	N	0	-
RP-1	R-1	AS 2664-010	175.7	36"	RCP	Y	41.7	-
RP-2	R-1	R-2	454.5	43"X68"	HERCP	N	0	-
RP-3	R-1	R-2	449.6	43"X68"	HERCP	N	0	-
RP-4	R-1	R-2	443.9	43"X68"	HERCP	N	0	-
<b>GREENWAY</b>								
RP-5	R-3	R-4	26.0	42"	CMP	Y	0	-
RP-6	R-3	R-4	26.0	42"	CMP	Y	18.9	-
RP-7	R-3	R-4	26.0	42"	CMP	Y	9.3	-
RP-8	R-3	R-4	26.0	42"	CMP	N	0	-
RP-9	R-5	R-6	26.0	36"	CMP	N	0	-
RP-10	R-5	R-6	26.0	36"	CMP	N	0	-
RP-11	R-5	R-6	26.0	36"	CMP	N	0	-
RP-12	R-5	R-6	26.0	36"	CMP	N	0	-

## SPECIFIC NOTES

1) WORK TO BE PAID UNDER BID ITEM 90042

## STANDARD NOTES:

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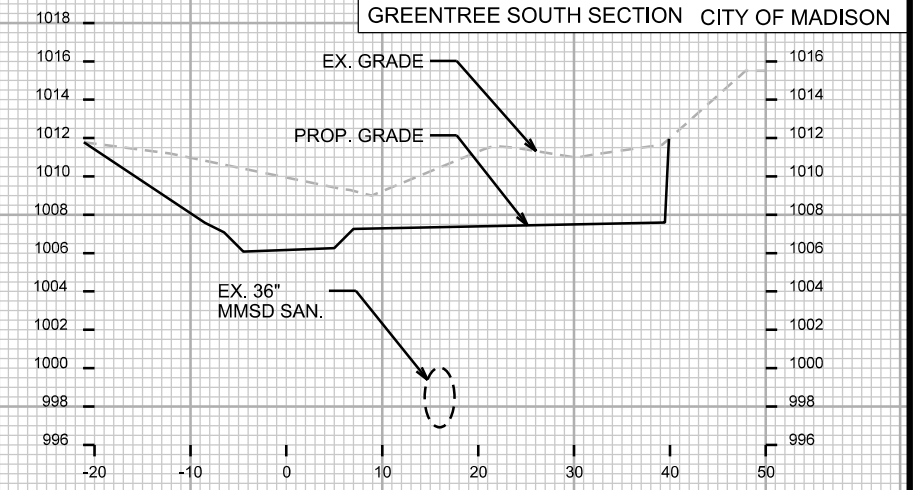
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CROSS SECTIONS

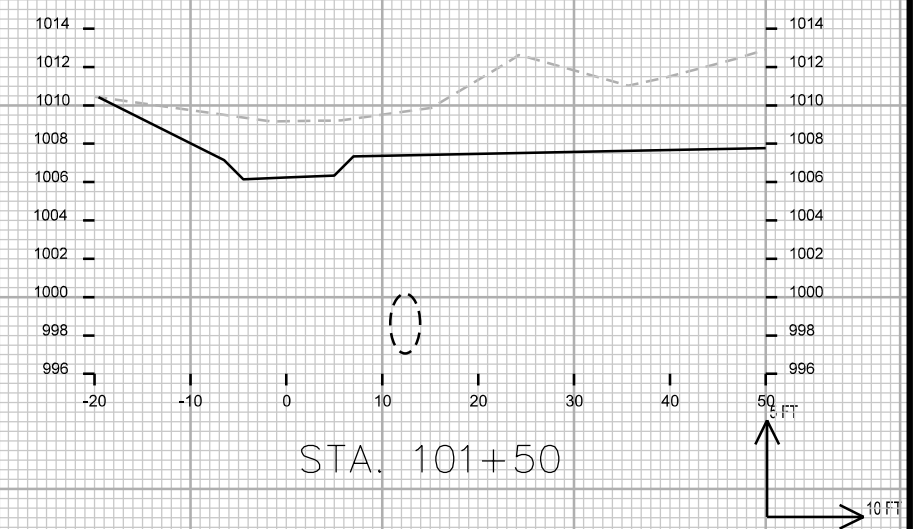
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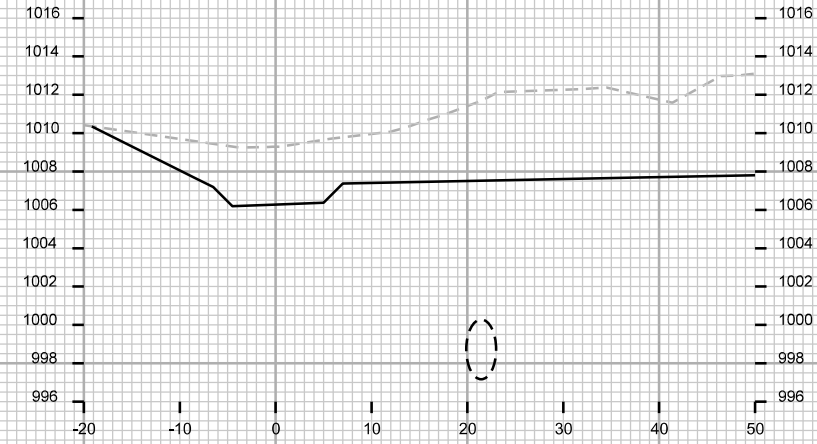
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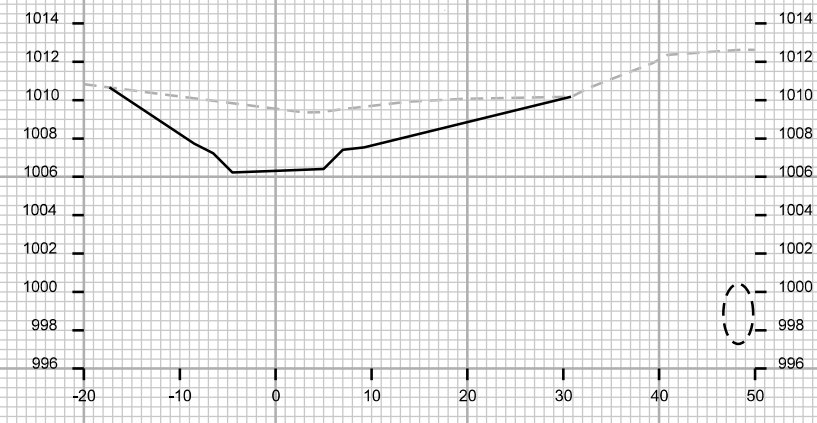
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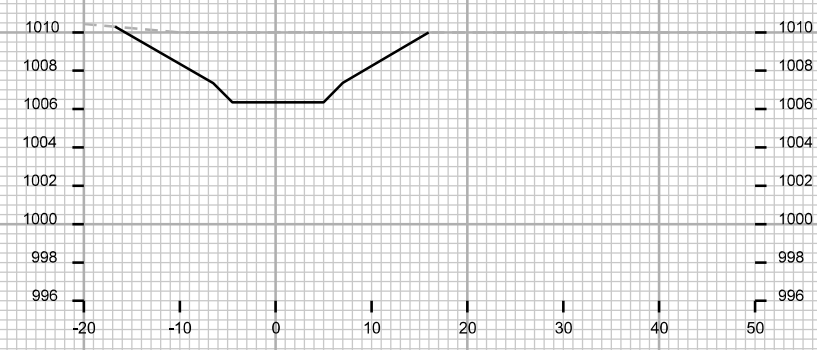
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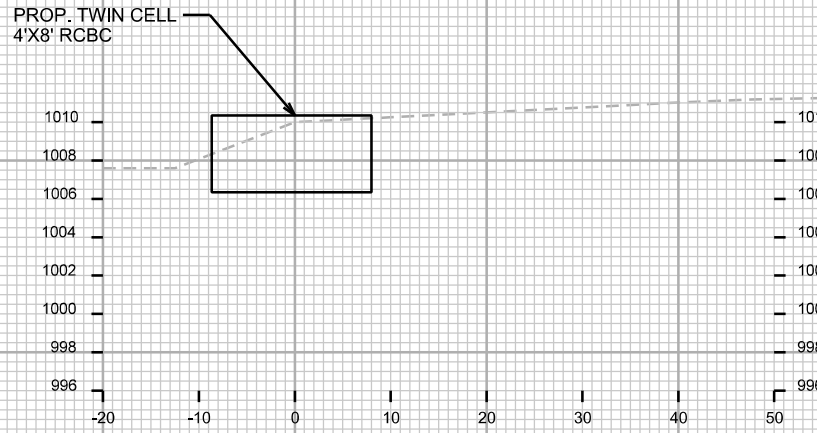
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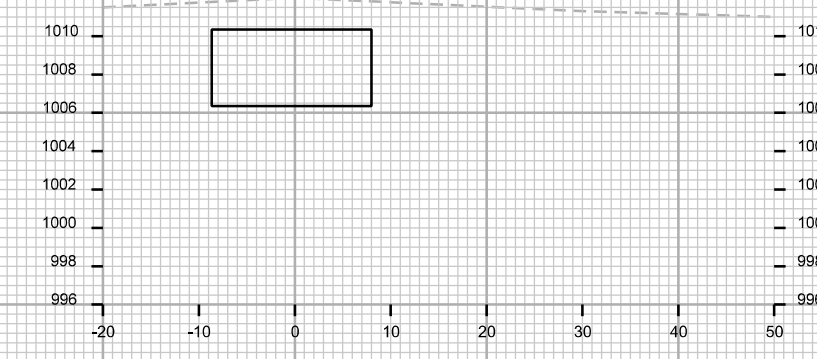
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PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON - STREETS DIVISION



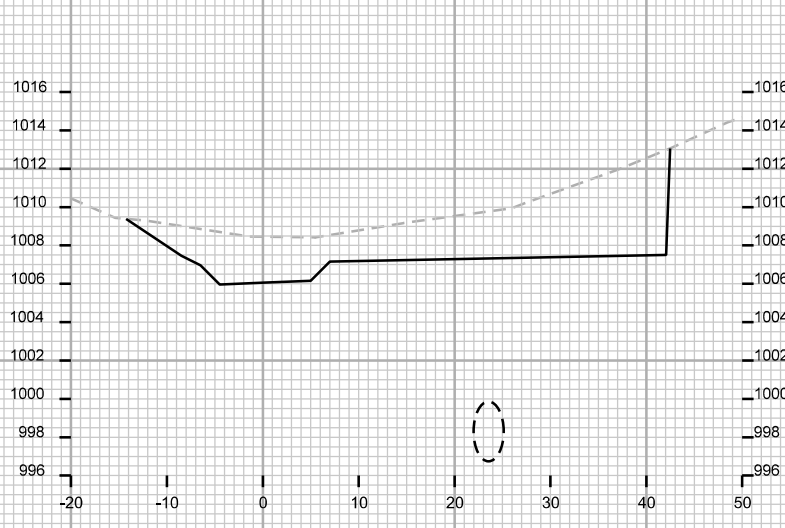
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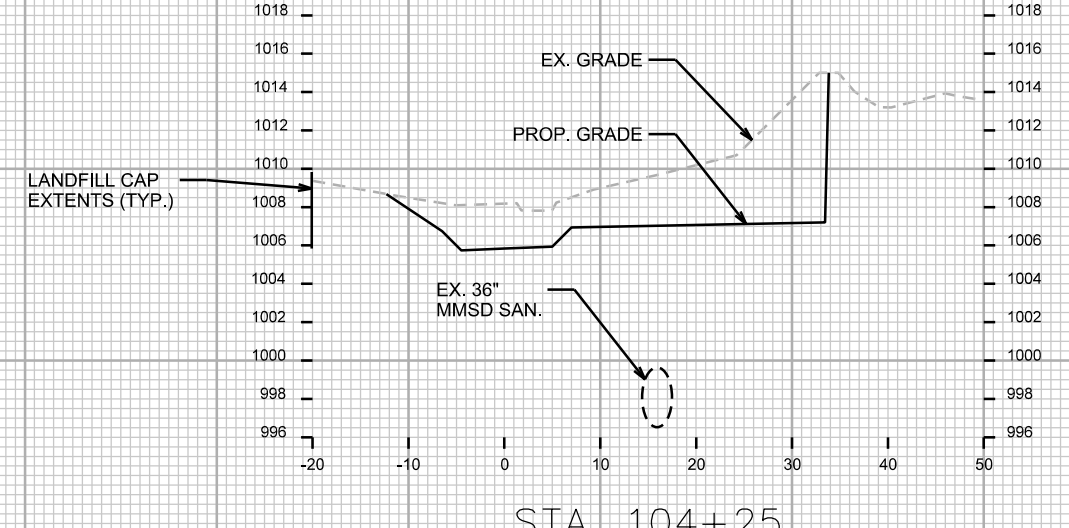
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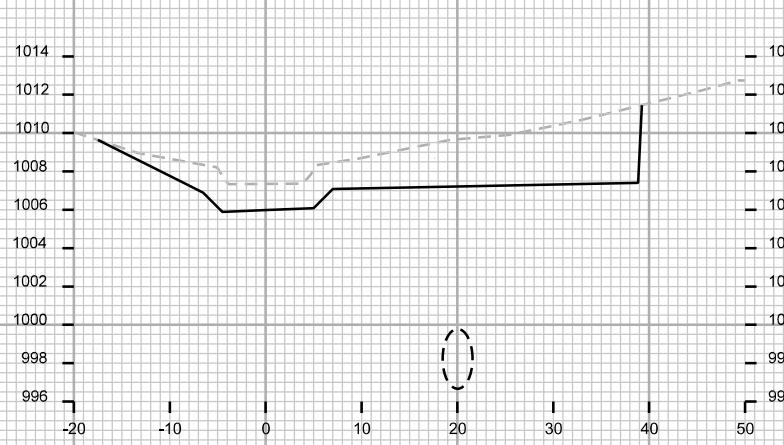
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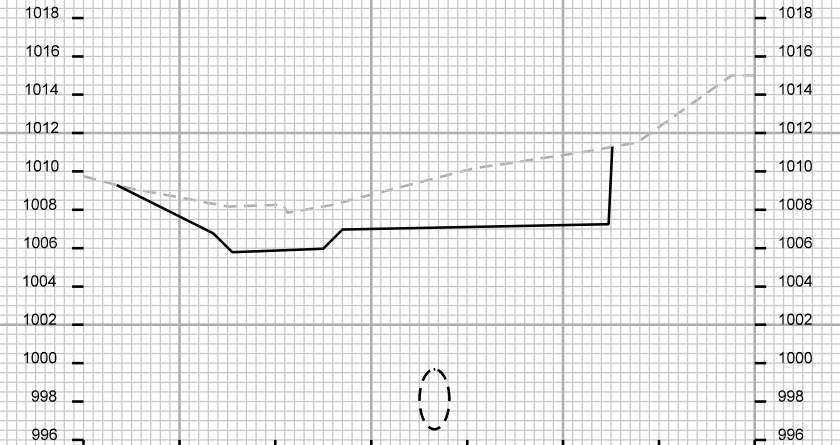
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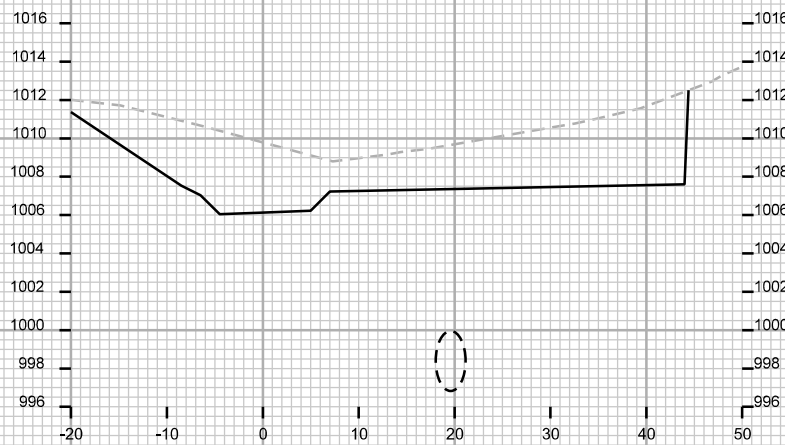
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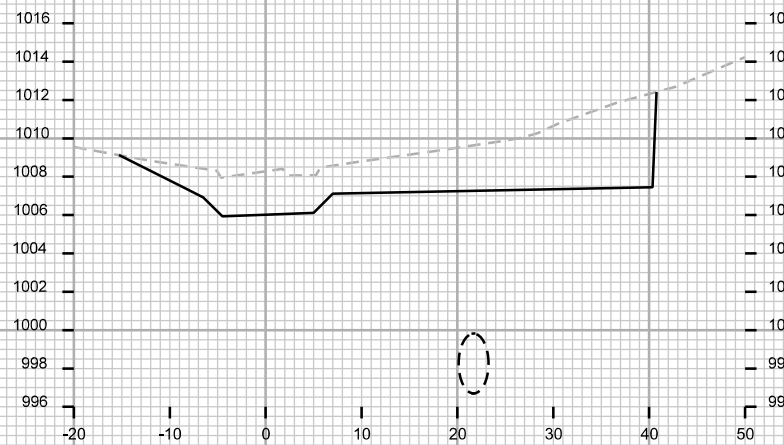
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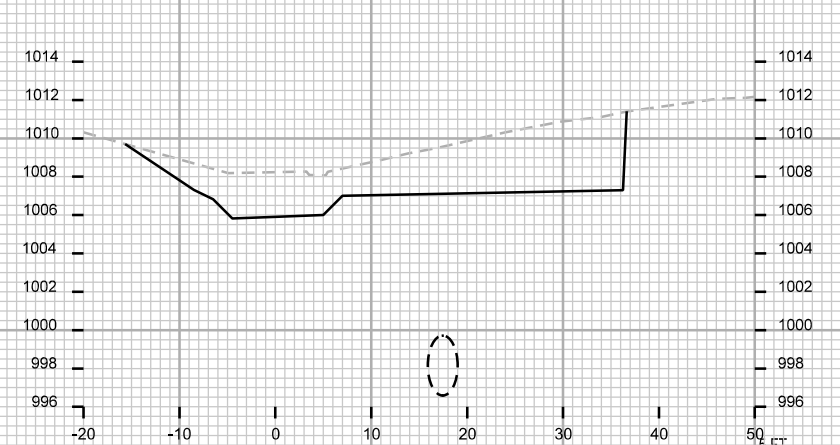
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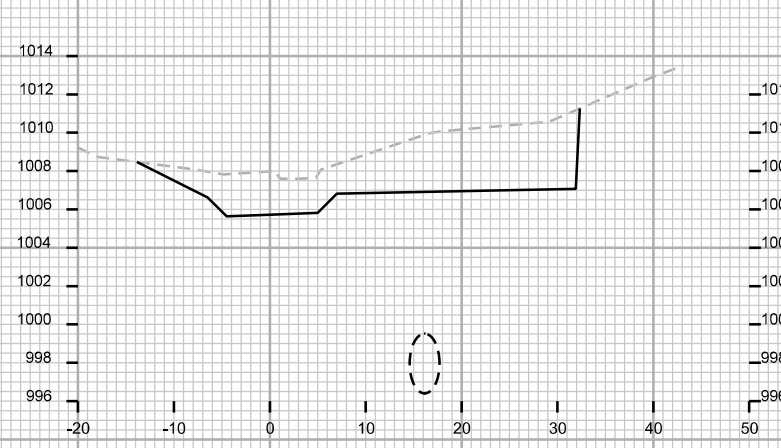
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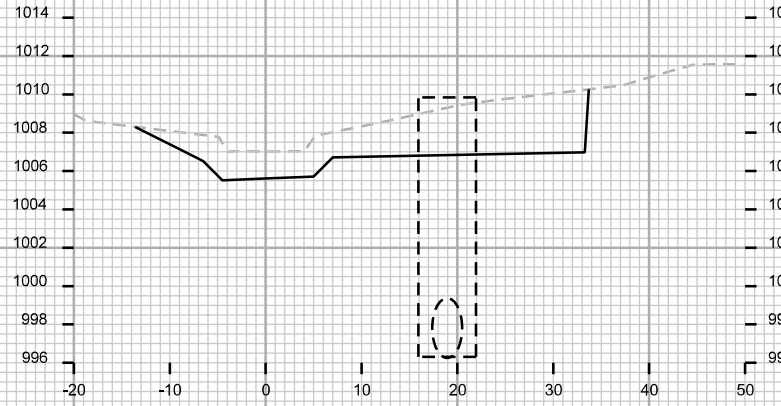
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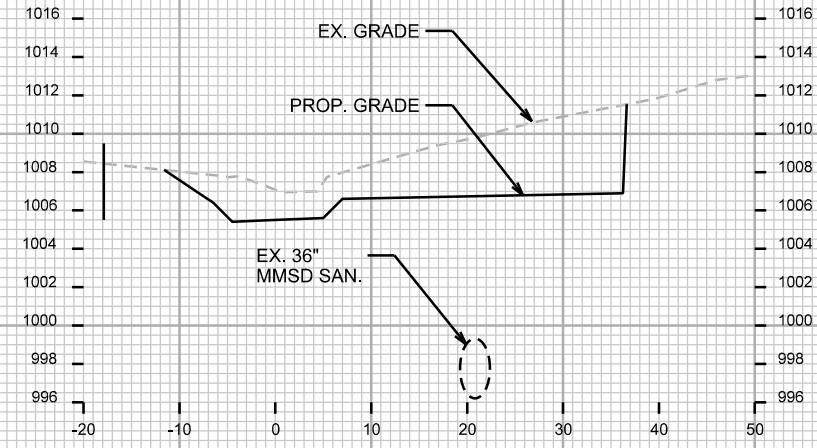
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GREENTREE SOUTH SECTION CITY OF MADISON



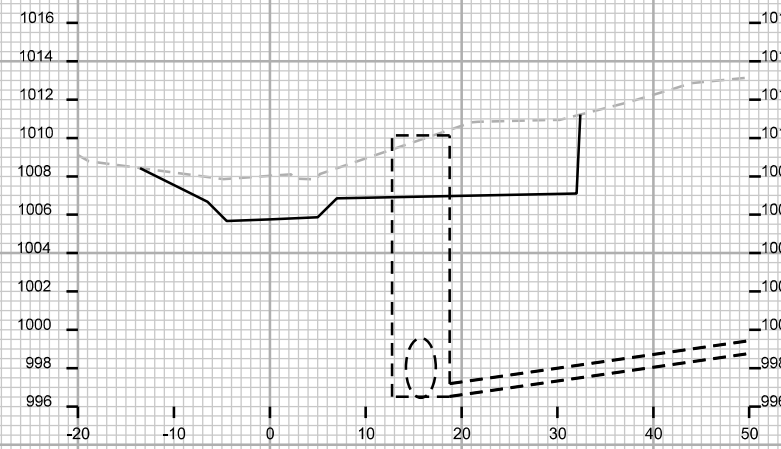
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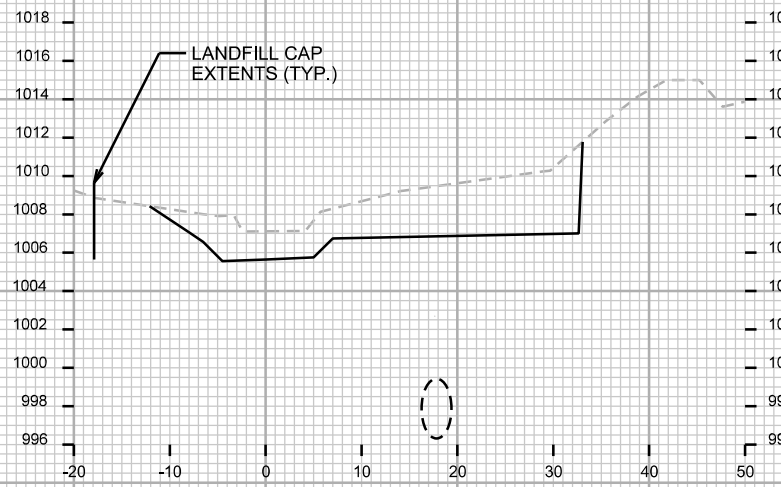
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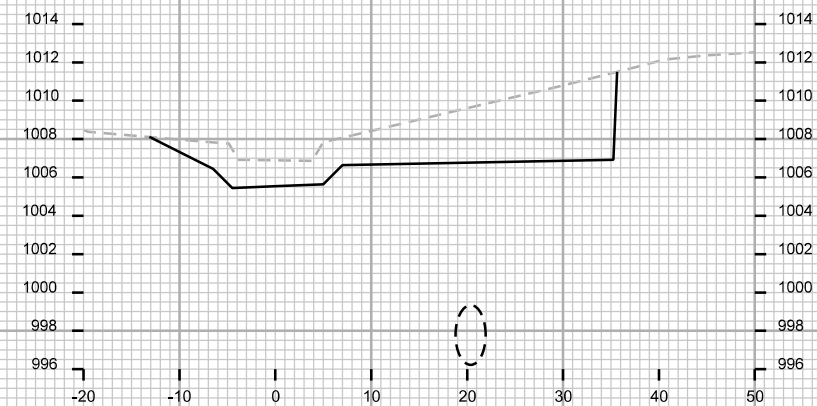
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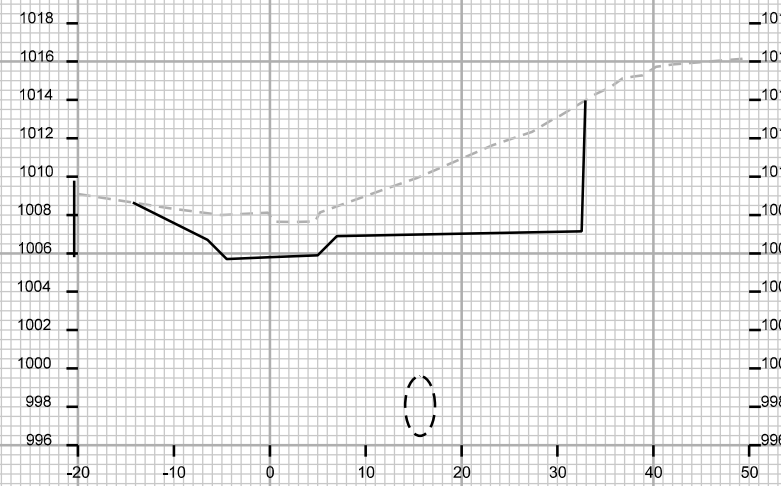
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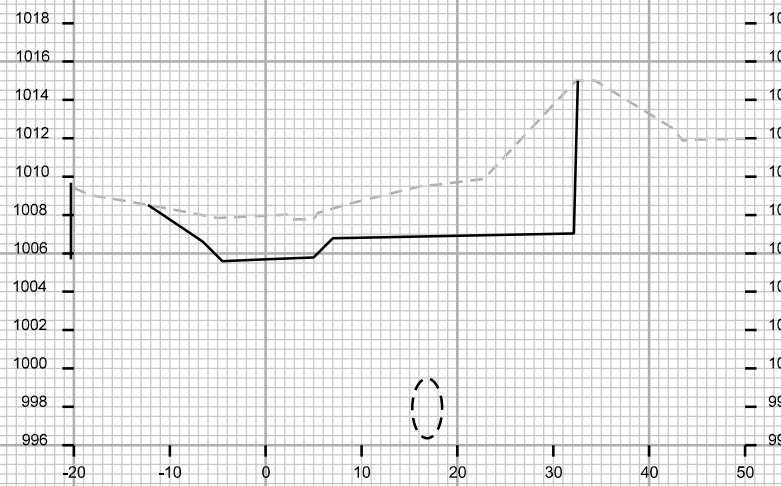
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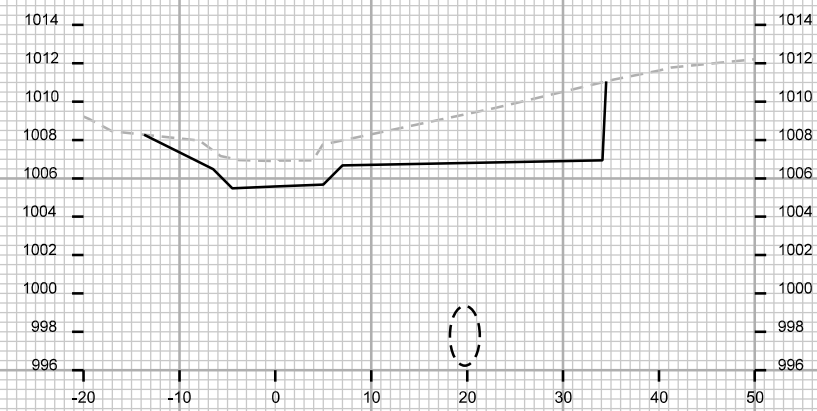
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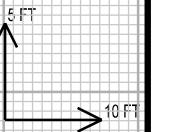
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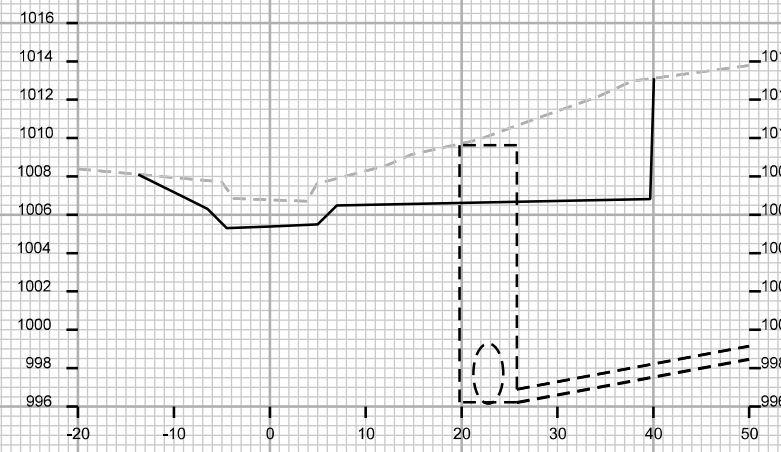
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PLOT NAME: \_\_\_\_\_

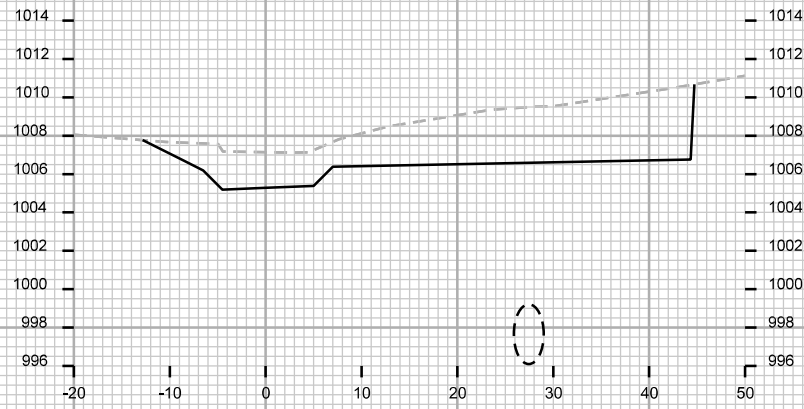
REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON - STREETS DIVISION

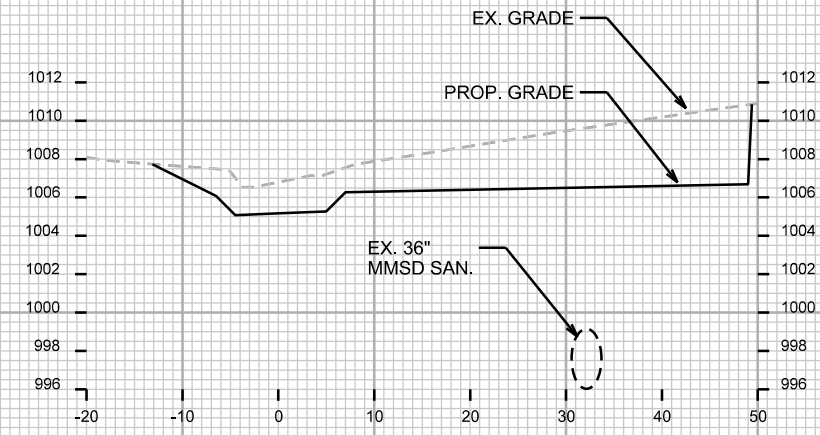
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GREENTREE SOUTH SECTION CITY OF MADISON



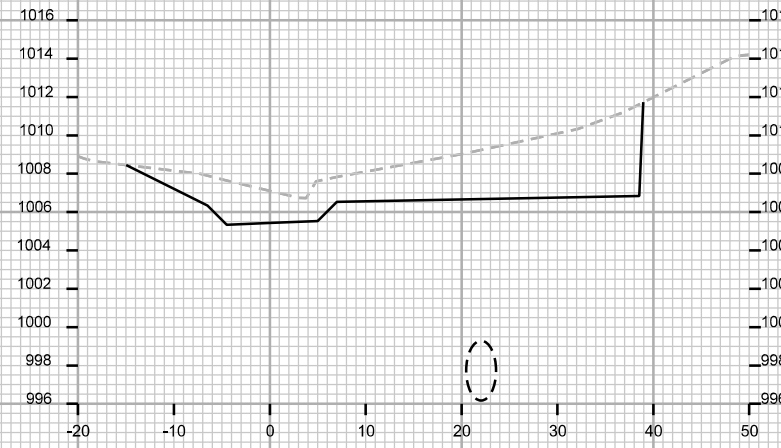
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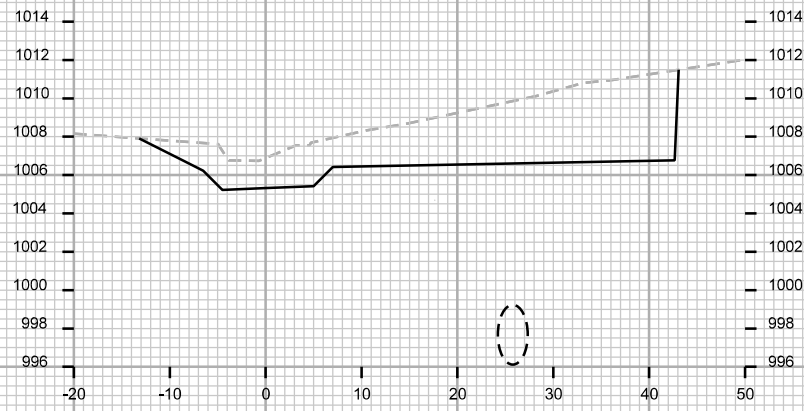
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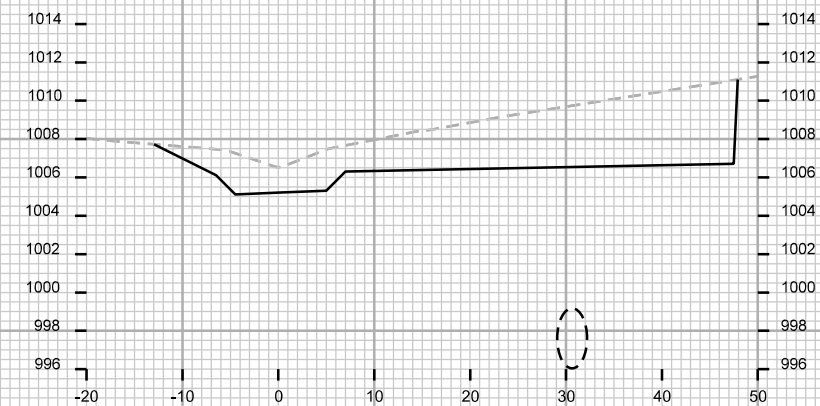
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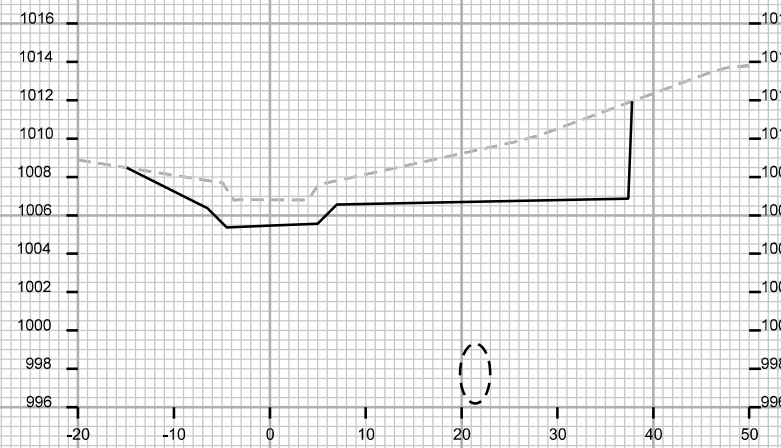
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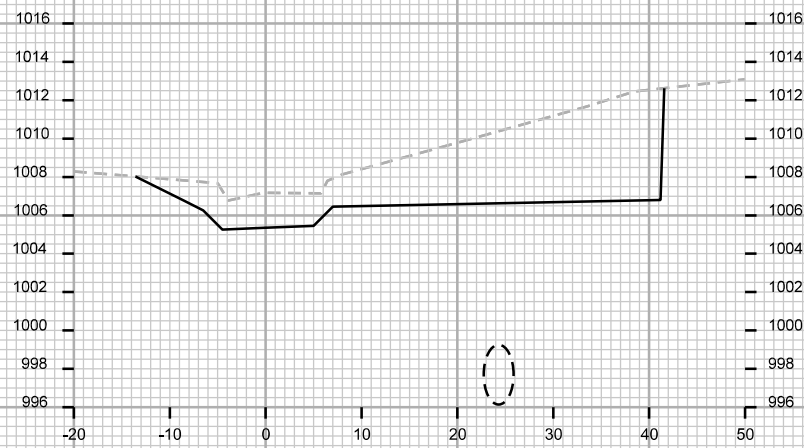
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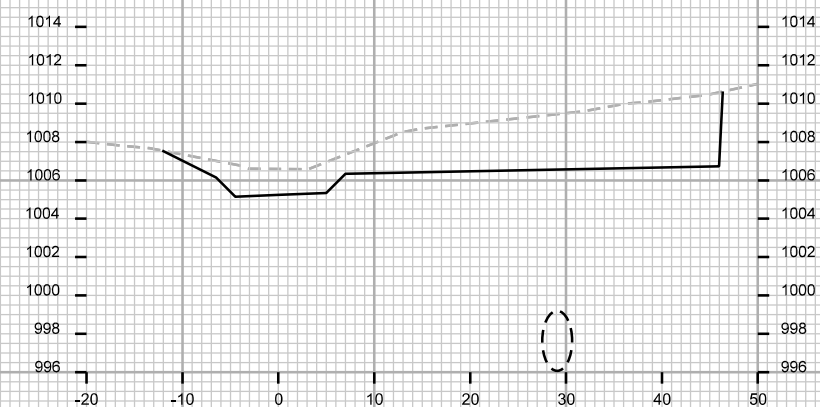
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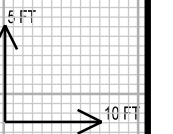
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STA. 107+50



STA. 108+25



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ORIGINATOR: CITY OF MADISON - STREETS DIVISION

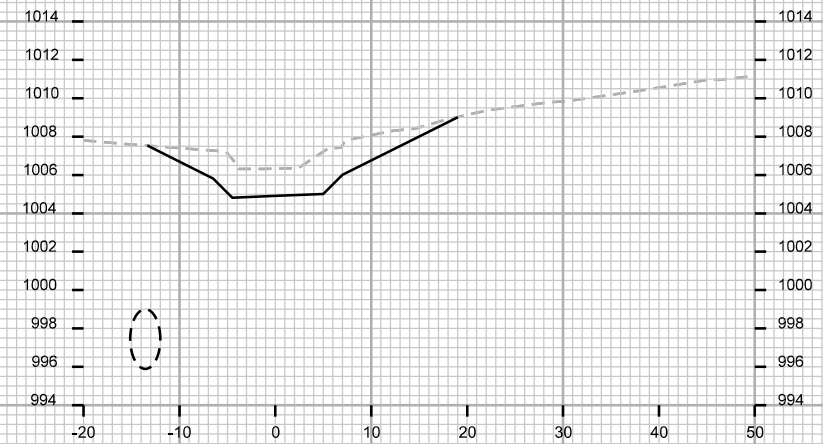
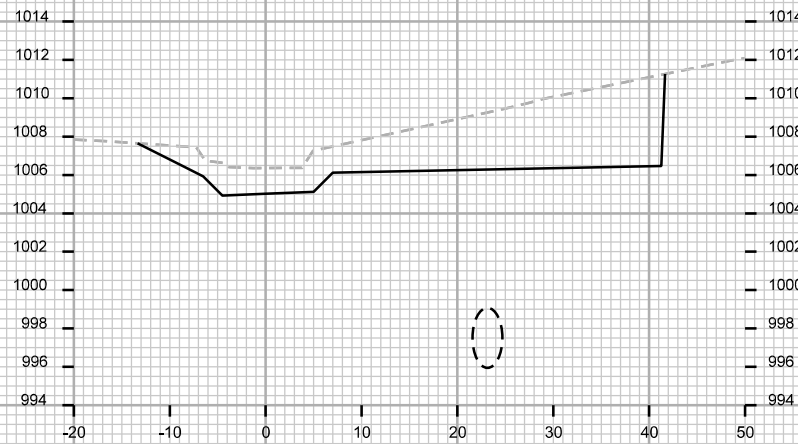
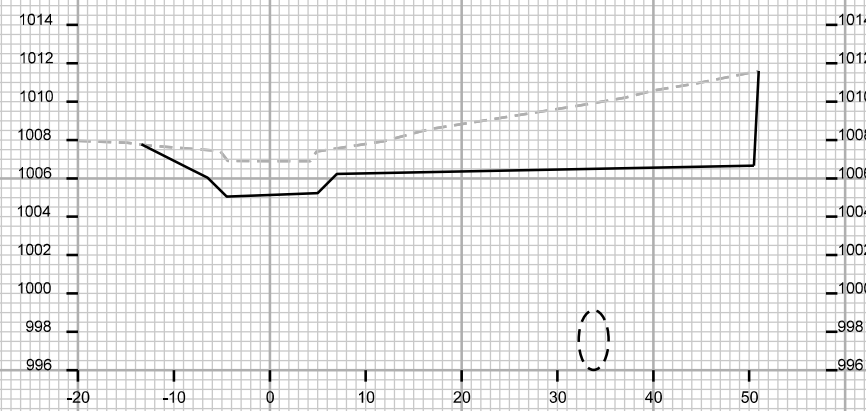
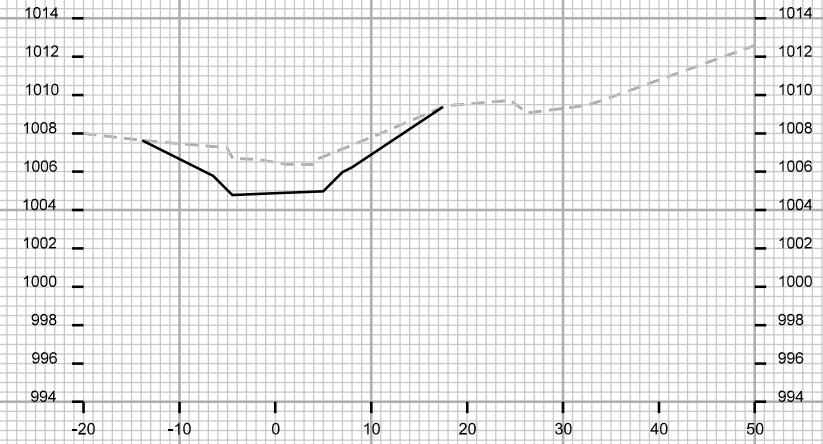
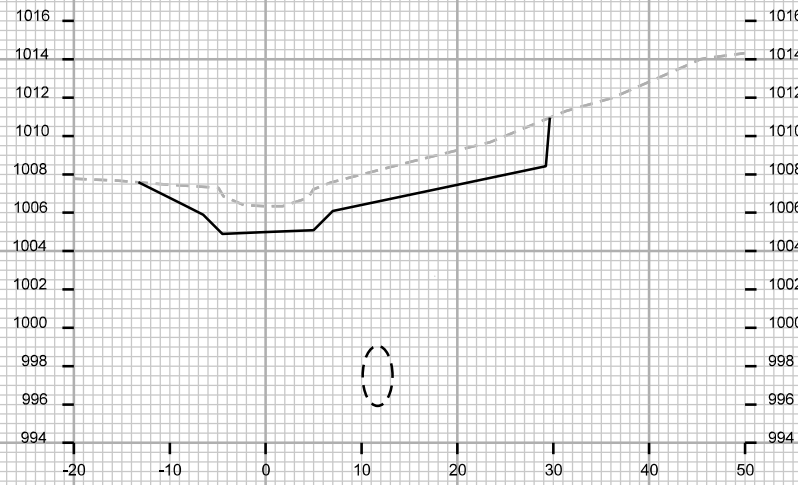
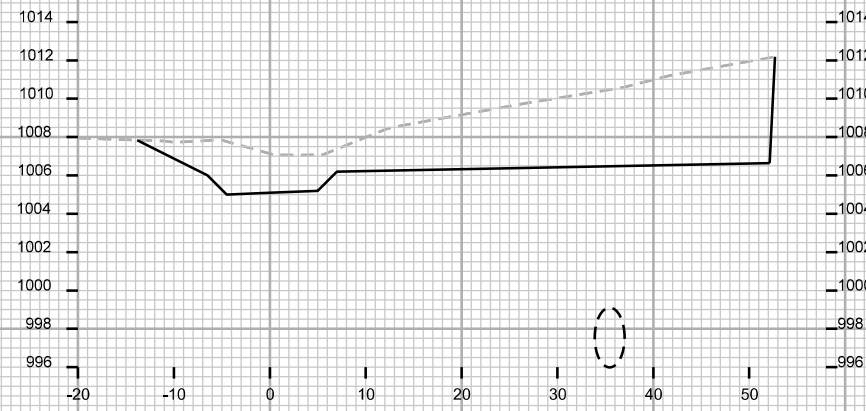
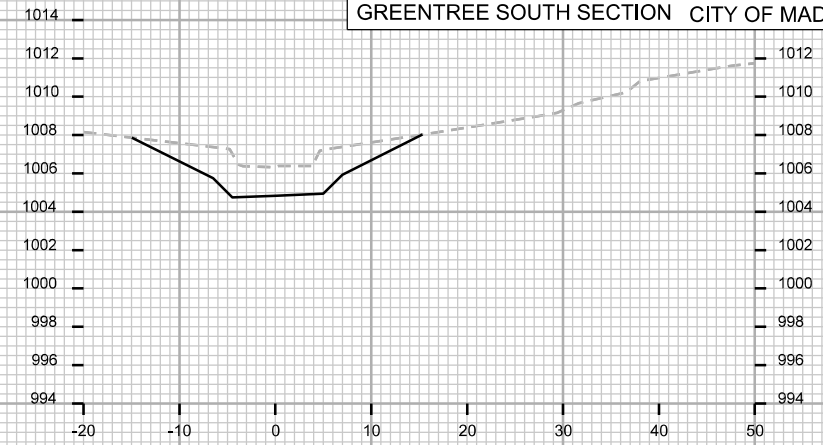
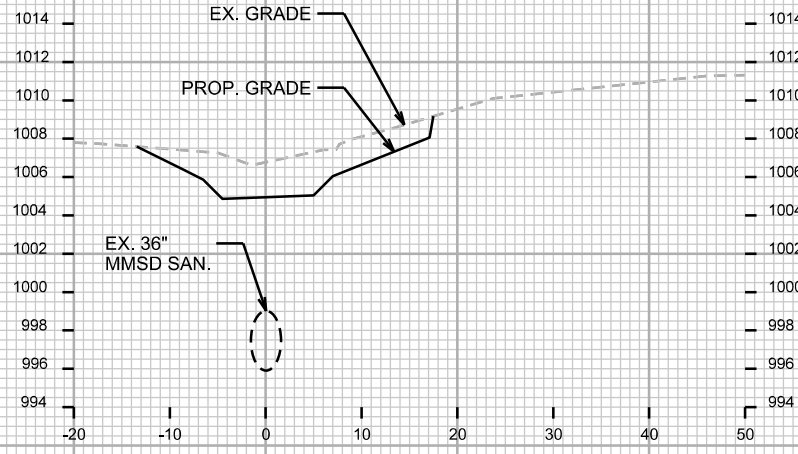
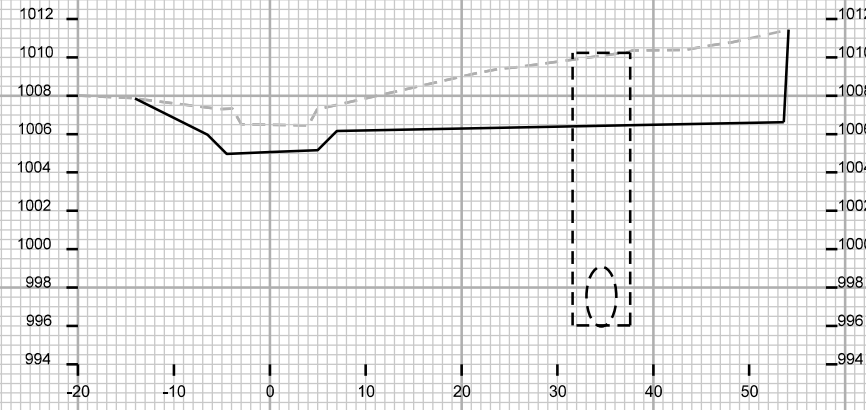
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GREENTREE SOUTH SECTION CITY OF MADISON

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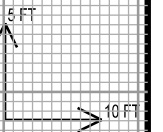
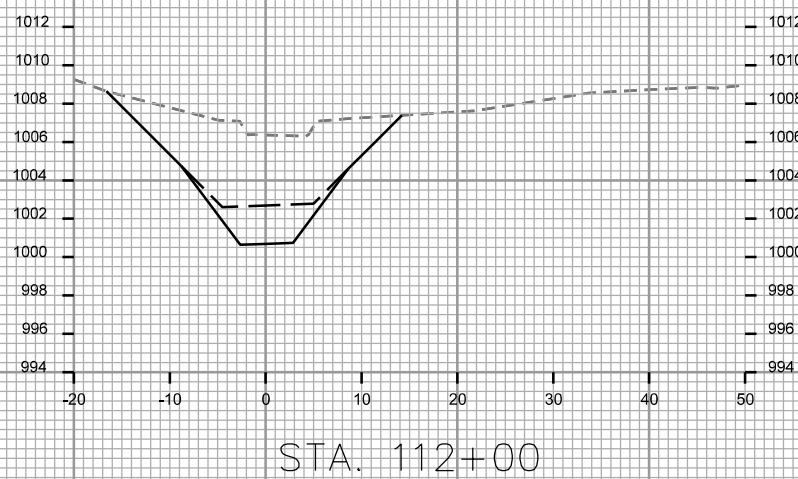
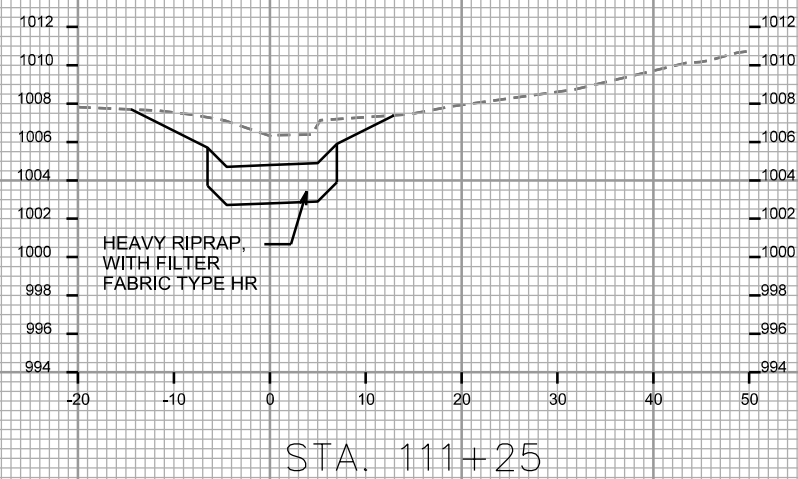
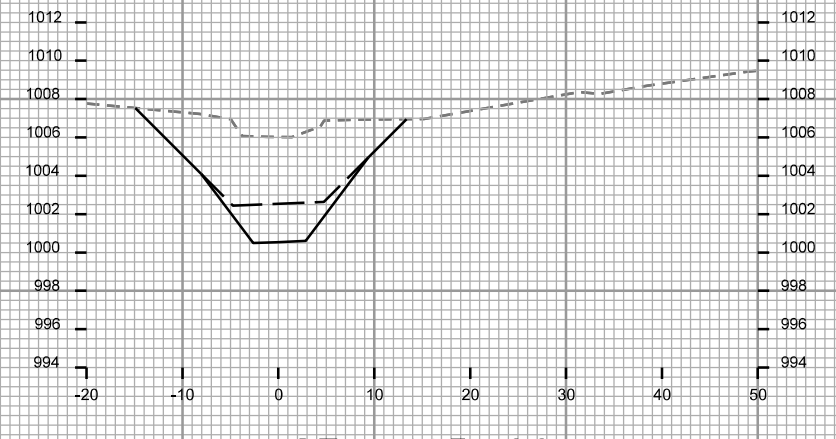
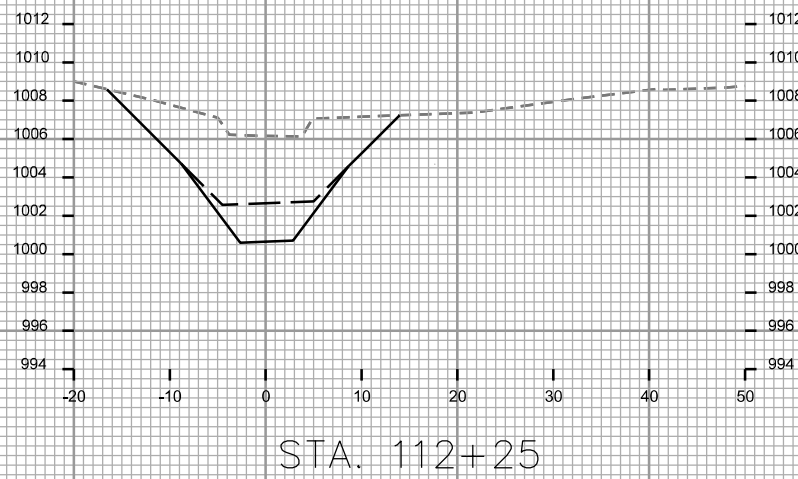
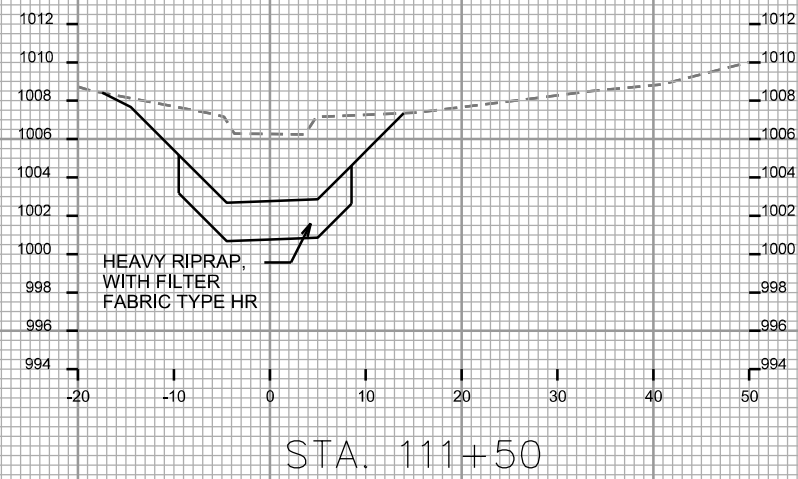
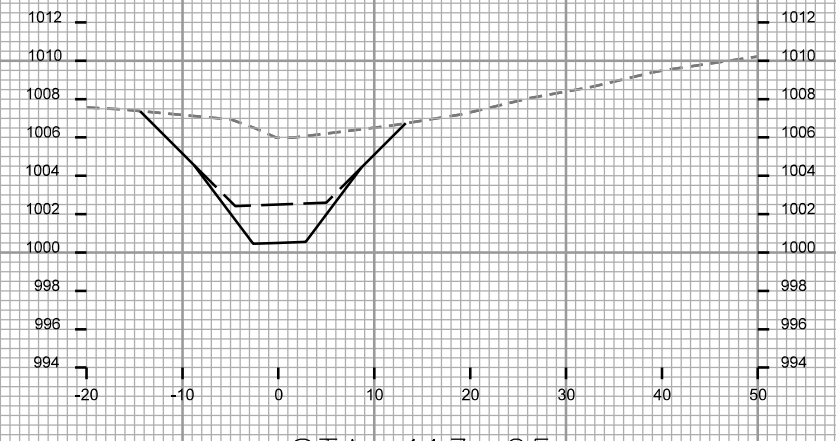
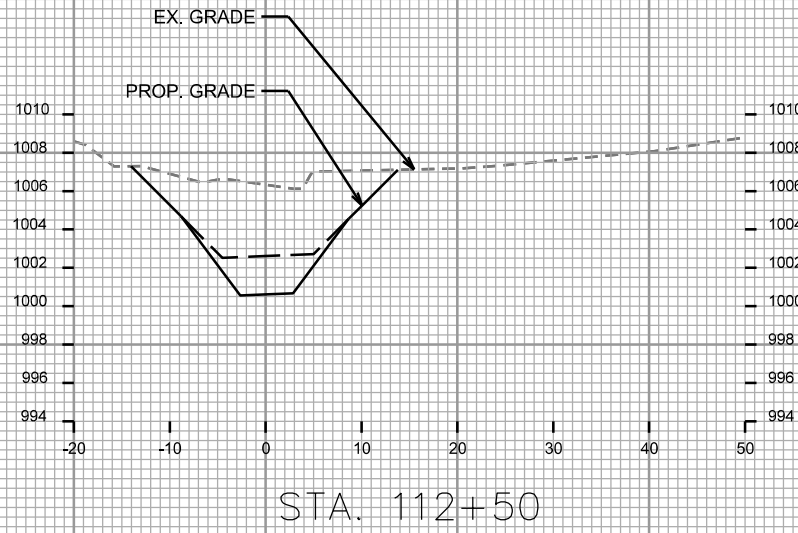
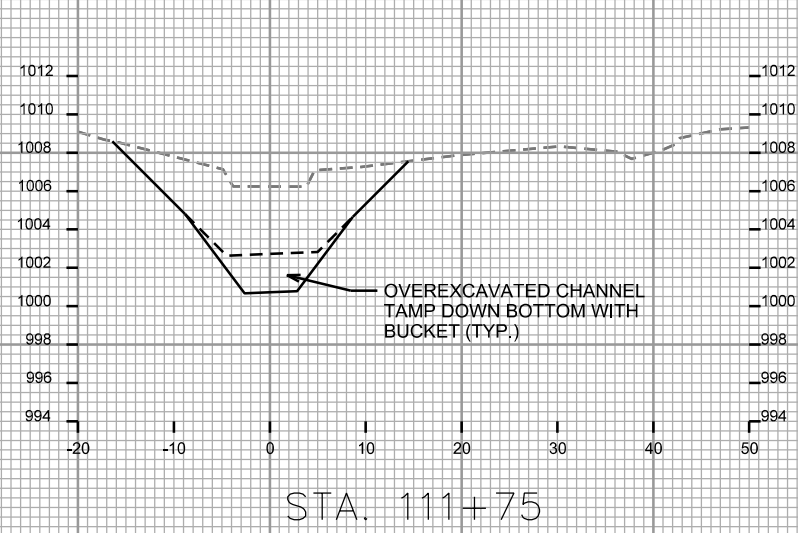
PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON - STREETS DIVISION



CROSS SECTIONS  
GREENTREE SOUTH SECTION CITY OF MADISON



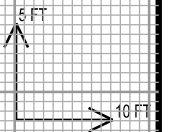
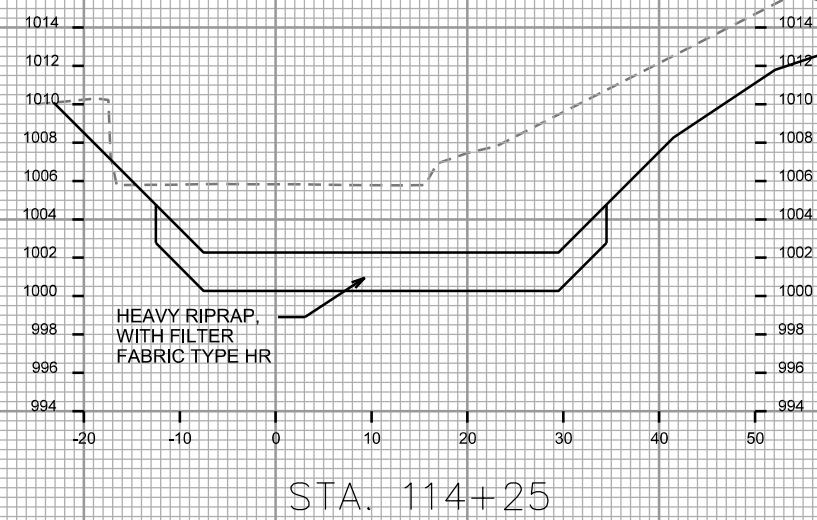
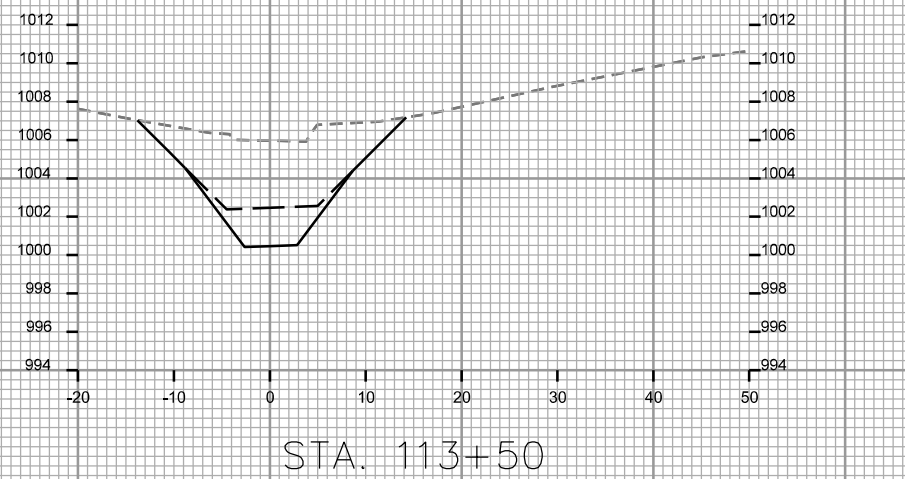
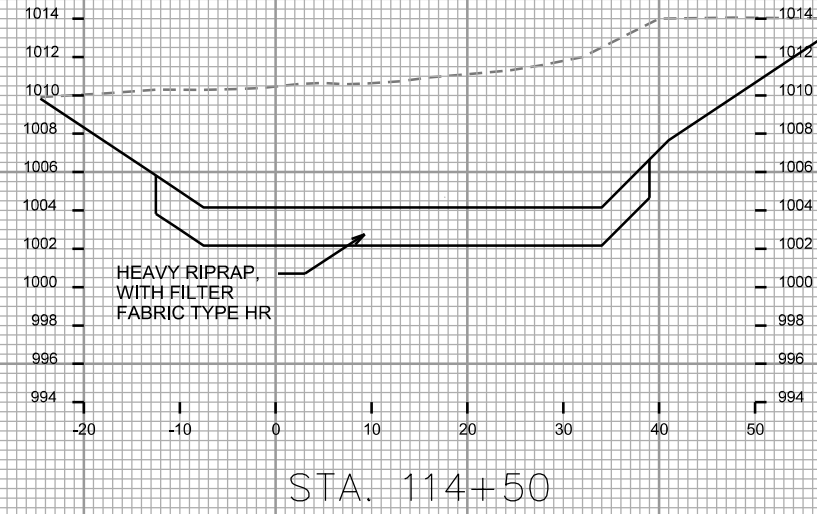
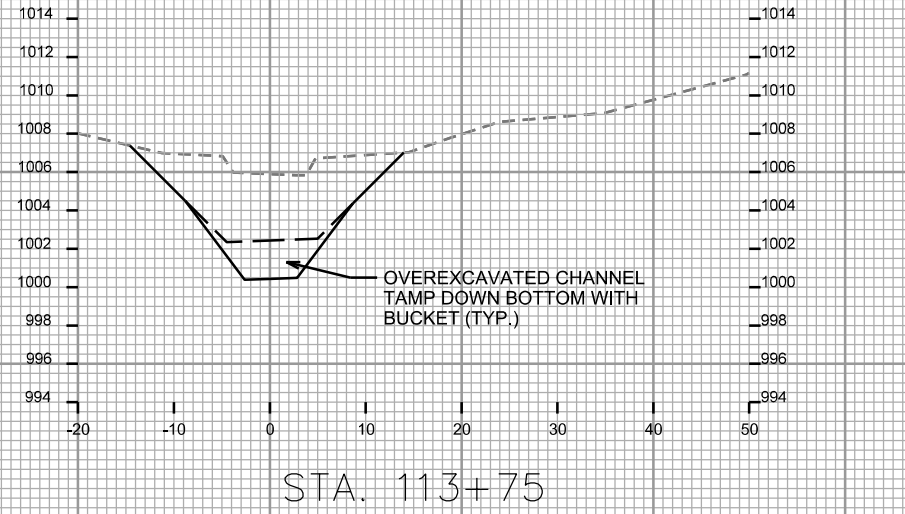
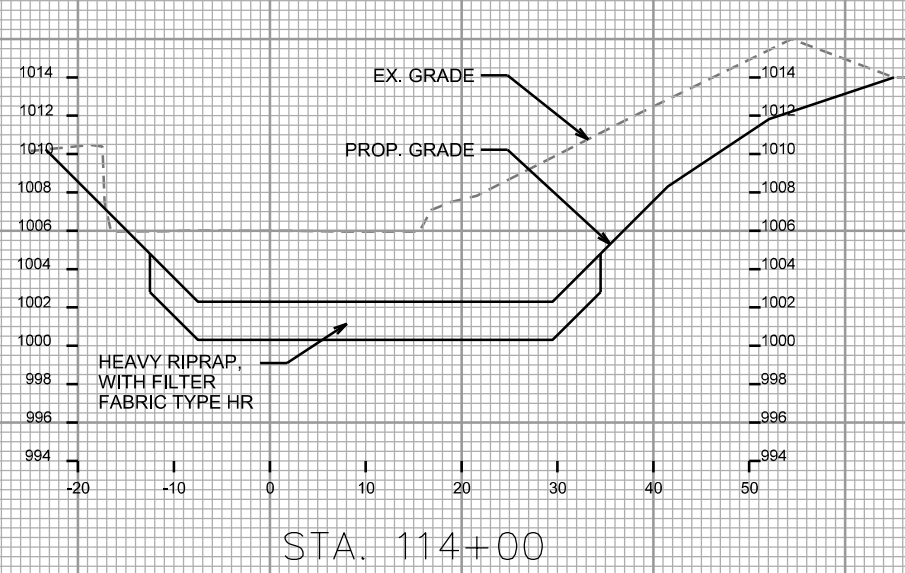
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ORIGINATOR: CITY OF MADISON - STREETS DIVISION

CROSS SECTIONS  
GREENTREE SOUTH SECTION CITY OF MADISON



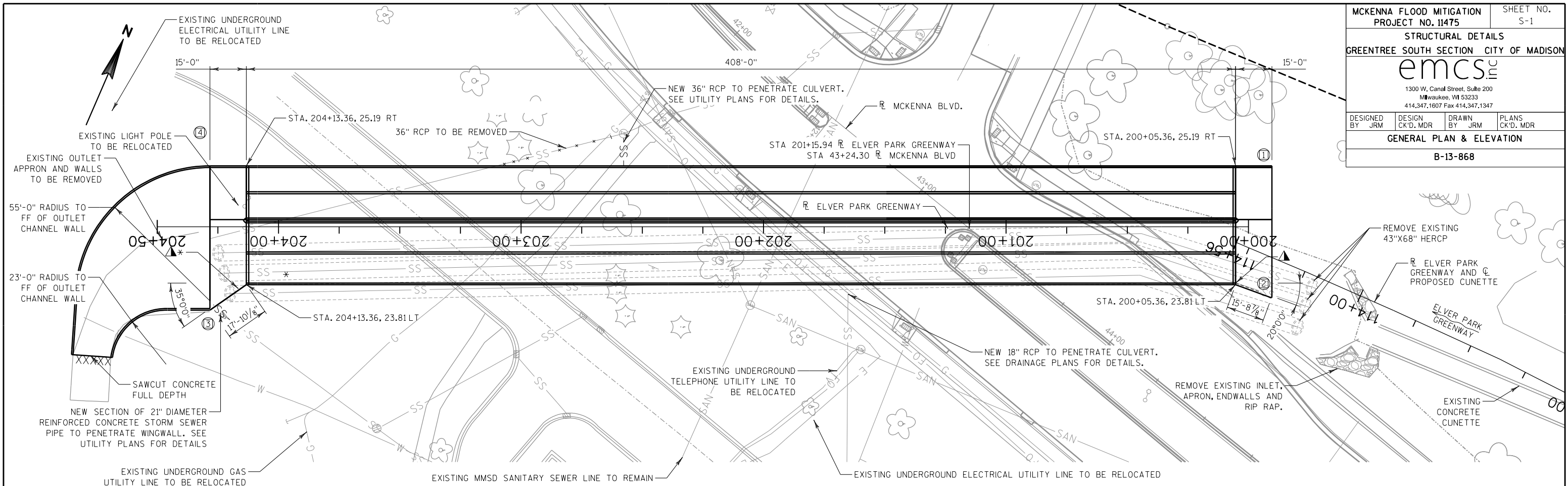
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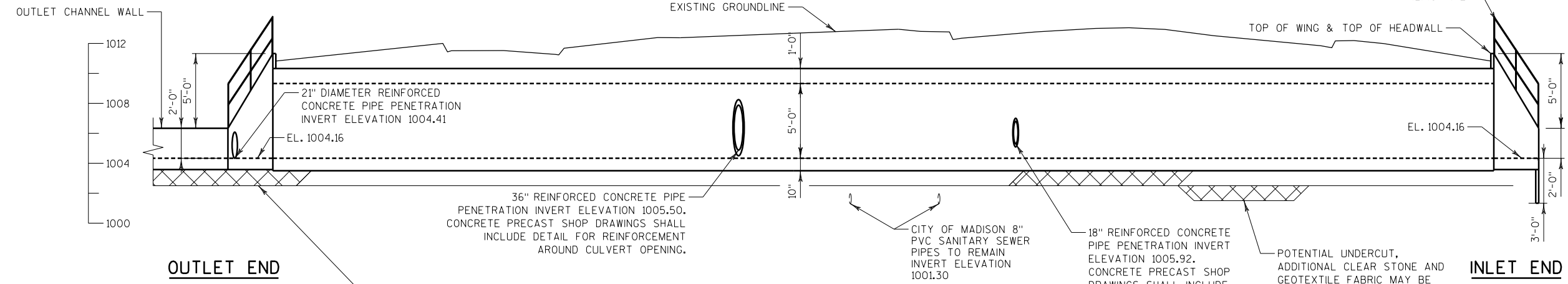
ORIGINATOR: CITY OF MADISON - STREETS DIVISION





**PLAN**

(FOUR CELL BOX CULVERT)



**ELEVATION**

SCALE 1H:5V  
 ELEVATION TAKEN ALONG R OF ELVER PARK GREENWAY

**LIST OF DRAWINGS**

1. GENERAL PLAN & ELEVATION
2. CROSS SECTION & QUANTITIES
3. CONSTRUCTION STAGING DETAILS
4. APRON DETAILS
5. WINGWALL DETAILS
6. OUTLET SLAB DETAILS
7. RAILING PIPE DETAILS

**LEGEND**

- (X) DENOTES WINGWALL NUMBER
- \* FOR NAME PLATE LOCATION, SEE "BOX CULVERT DETAIL" SHEET.
- ▲ FOR CORNER DETAILS SEE "APRON DETAILS" SHEET.

**DESIGN DATA**

**LIVE LOAD:**  
 DESIGN LOADING: HL-93  
**EARTH LOAD:**  
 DESIGN FOR FILL HEIGHT RANGE OF 1.0 TO 3.0 FEET.  
**MATERIAL PROPERTIES:**  
 CONCRETE MASONRY CAST-IN-PLACE  $f'_c = 3.5$  KSI  
 CONCRETE MASONRY PRECAST  $f'_c = 4.0$  KSI  
 BAR STEEL REINFORCEMENT  $f_y = 60$  KSI

**SOIL DATA**

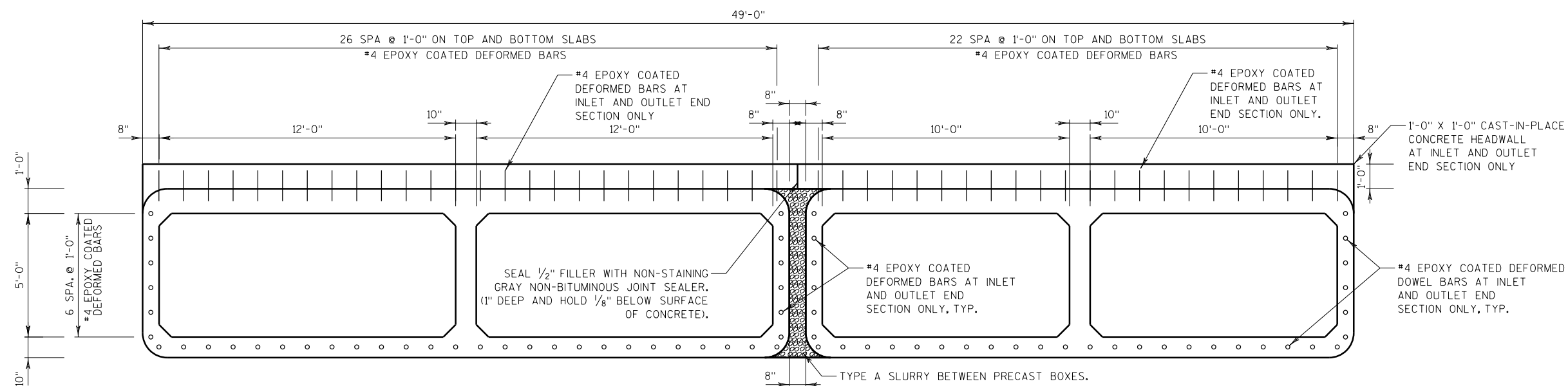
DRY UNIT WEIGHT OF SOIL  $\gamma = 120$  LBS/FT<sup>3</sup>  
 $K_0 = 0.5$  FOR AT REST CONDITIONS  
 $\phi = 30^\circ$   
 LL SURCHARGE = 2 FT  
 MAX FACTORED BEARING RESISTANCE = 2,000 PSF

**GENERAL NOTES**

- DRAWINGS SHALL NOT BE SCALED.
- ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED.
- ALL STATIONS AND ALL ELEVATIONS ARE IN FEET.
- REMOVAL OF EXISTING INLET AND OUTLET WILL BE PAID FOR UNDER BID ITEM "REMOVE EXISTING 43" X 68" HERCP WINGWALL". SEE DRAINAGE PLANS FOR DETAILS.
- REMOVAL OF EXISTING OUTLET APRON SHALL BE PAID FOR UNDER ITEM "REMOVE EXISTING 43" X 68" HERCP CONCRETE SLAB". SEE DRAINAGE PLANS FOR DETAILS.
- ALL REINFORCEMENT STEEL SHALL BE EPOXY COATED.
- THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.
- ALL WELDED WIRE FABRIC SHALL BE UNCOATED.
- ALL CONCRETE EDGES TO BE BEVELED  $\frac{3}{4}$ " UNLESS NOTED OTHERWISE.
- SEE R-13-337 PLANS FOR WORK EAST OF STATION 114+30.



MCKENNA FLOOD MITIGATION PROJECT NO. 11475		SHEET NO. S-2	
STRUCTURAL DETAILS			
GREENTREE SOUTH SECTION CITY OF MADISON			
emcs inc 1300 W. Canal Street, Suite 200 Waukesha, WI 53233 414.347.1607 Fax 414.347.1347			
DESIGNED BY JRM	DESIGN CK'D. MDR	DRAWN BY JRM	PLANS CK'D. MDR
CROSS SECTION & QUANTITIES			
B-13-868			



**SECTION THRU PRECAST BOX**  
LOOKING UPSTATION

**GENERAL NOTES**

MEMBER THICKNESSES SHOWN ON THIS PLAN ARE BASED ON ENGINEERING JUDGEMENT. CONTRACTOR SHALL HAVE A REGISTERED ENGINEER DESIGN THE PRECAST BOX CULVERTS AND PROVIDE SEALED DRAWINGS TO THE CITY OF MADISON FOR APPROVAL.

DETAILS FOR MATERIALS, FABRICATION, CONSTRUCTION AND DESIGN OF PRECAST BOX CULVERTS NOT SHOWN OR STATED ON THESE PLANS SHALL BE IN ACCORDANCE WITH THE CURRENT ASTM SPECIFICATION, C1577; AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS; EXCEPT THAT THE CONCRETE MIXTURE SHALL CONTAIN NOT LESS THAN 565 LBS. OF CEMENTITIOUS MATERIALS PER CUBIC YARD.

THE DESIGN OF PRECAST BOX CULVERTS WITH ALL FILL HEIGHTS SHALL BE AS STATED IN ASTM C1577.

NOT MORE THAN FOUR (4) HOLES MAY BE CAST, DRILLED OR OTHERWISE NEATLY MADE IN THE SHELL OF EACH PIECE OF BOX SECTION FOR HANDLING. THE HOLES SHALL BE TAPERED UNLESS DRILLED. HOLES SHALL BE FILLED WITH PORTLAND CEMENT MORTAR EXCEPT TAPERED HOLES MAY BE FILLED WITH CONCRETE PLUGS SECURED WITH PORTLAND CEMENT MORTAR OR OTHER APPROVED ADHESIVE.

THE JOINT ON THE BOTTOM OF THE CULVERT AND THE SIDES OF THE CULVERT FROM THE BOTTOM TO A POINT 1'-0" FROM THE CEILING SHALL BE SEALED WITH A PREFORMED MASTIC. PREFORMED MASTIC MUST CONFORM TO AASHTO MATERIALS, SPECIFICATION M198, TYPE B. A 2'-0" STRIP OF GEOTEXTILE TYPE DF SCHEDULE A SHALL BE PLACED OVER THE JOINTS ON THE TOP AND SIDES OF THE CULVERT. THE GEOTEXTILE SHALL CONFORM TO WISDOT STANDARD SPECIFICATION 645.22.4. (FABRIC NOT REQUIRED OVER INSIDE WALL JOINTS OF MULTICELL INSTALLATION.)

IF MEMBER THICKNESSES SHOWN ON THIS PLAN REQUIRE MODIFICATION, ADJUST WINGWALL, HEADWALL, APRON, AND REINFORCEMENT DIMENSIONS AS NECESSARY.

#4 EPOXY COATED DEFORMED BARS TO BE PLACED IN END SECTIONS DURING FABRICATION OF THE BOX CULVERT. ALL DOWEL BARS SHALL BE INCIDENTAL TO ITEMS "DUAL CELL 10' X 5' REINFORCED CONCRETE BOX CULVERTS" AND "DUAL CELL 12' X 5' REINFORCED CONCRETE BOX CULVERTS".

THE UPPER LIMITS OF "EXCAVATION CUT" FOR B-13-868 SHALL BE THE EXISTING GROUNDLINE.

ALL SPACES EXCAVATED AND NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH "SELECT FILL" TO THE TOP OF THE BOX WITHIN THE LENGTH OF THE BOX.

THE BACKFILL QUANTITIES ARE BASED ON THE PAY LIMITS SHOWN ON THE PLANS AND MAY NOT REFLECT ACTUAL PLACED QUANTITIES.

"SELECT FILL" REQUIRED ON THE BOX CULVERT SIDES AND BEHIND APRON WINGS FOR 3 FEET. BACKFILL PLACED BEYOND PAY LIMITS OR EXCEEDING PLAN QUANTITIES SHALL BE INCIDENTAL TO "EXCAVATION CUT".

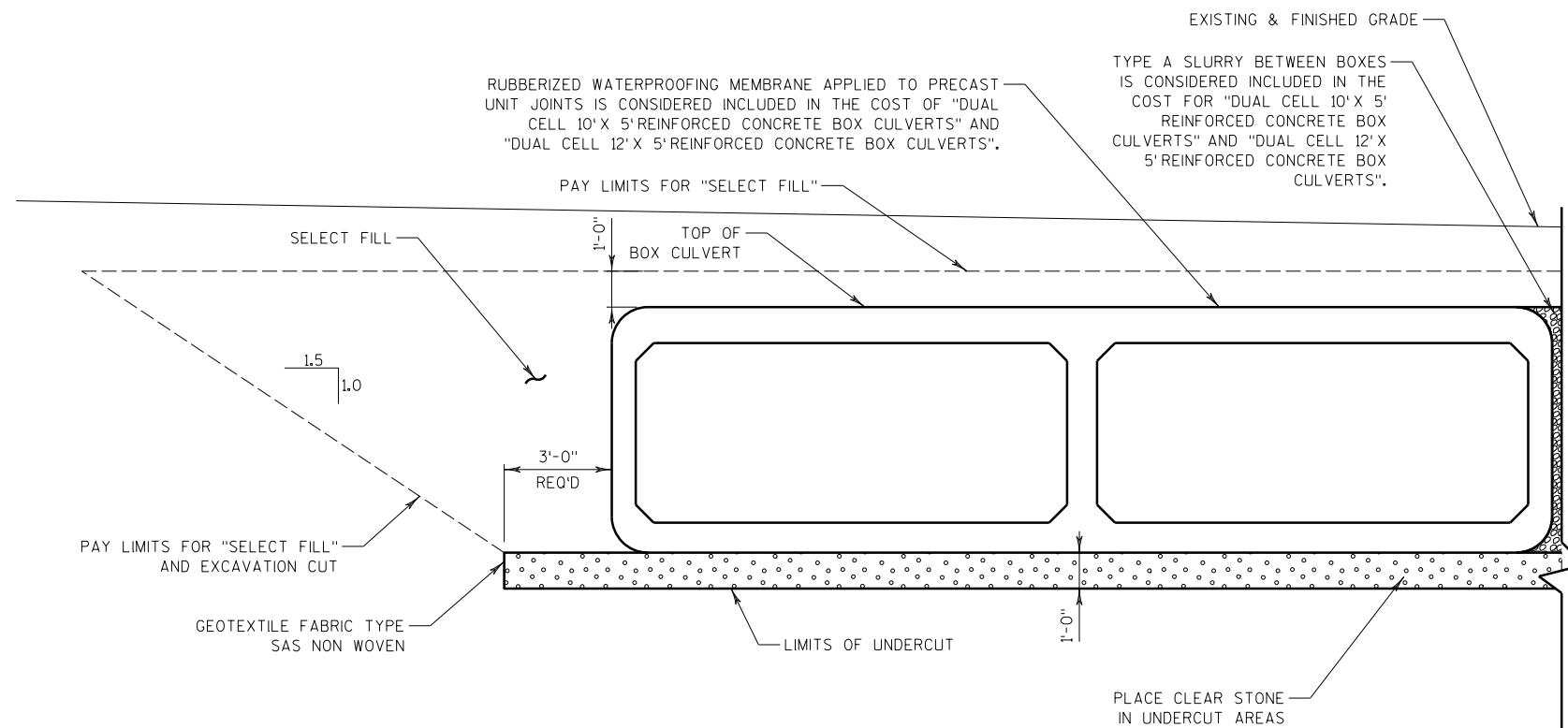
DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE CITY OF MADISON STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.

UNLESS OTHERWISE SPECIFIED, CONTRACTION JOINTS SHALL BE NORMAL TO THE CENTERLINE.

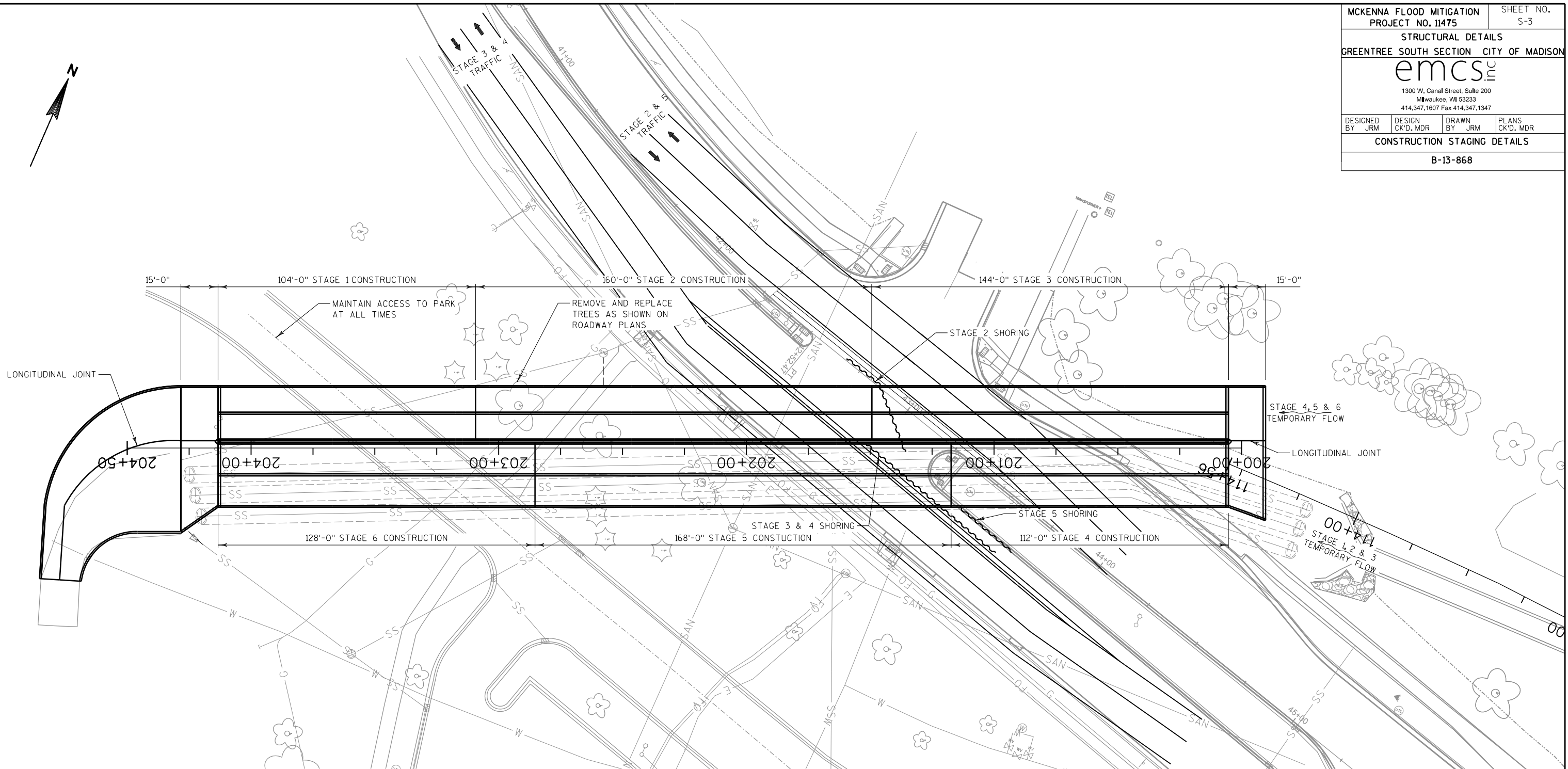
DOWEL BARS SHALL BE INSTALLED PARALLEL TO THE PAVEMENT CENTERLINE AND PAVEMENT SURFACE.

CONSTRUCTION JOINTS SHALL BE A MINIMUM OF 4 FEET FROM THE NEAREST CONTRACTION JOINT AND ALIGNED EITHER PARALLEL TO CONTRACTION JOINTS OR AT 90 DEGREES TO THE CENTERLINE.

APPLY A THIN UNIFORM COATING OF SURFACE TREATMENT TO THE FREE END OF THE DOWEL BARS TO PREVENT BONDING.



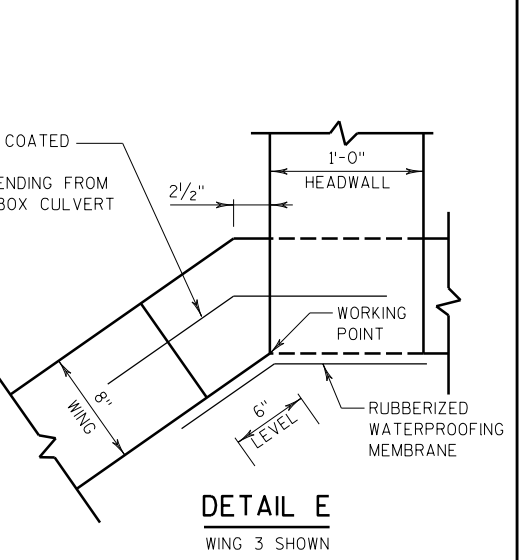
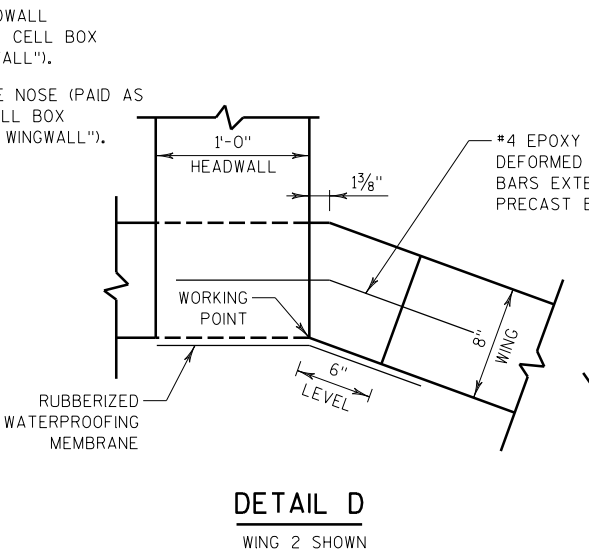
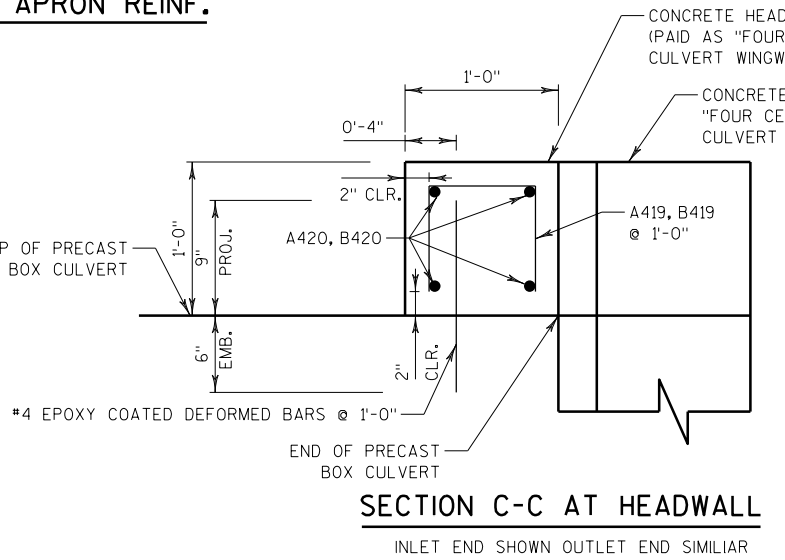
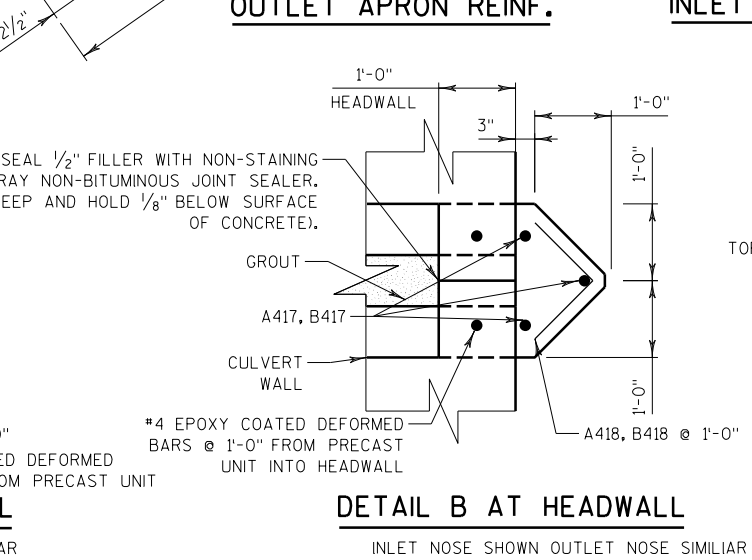
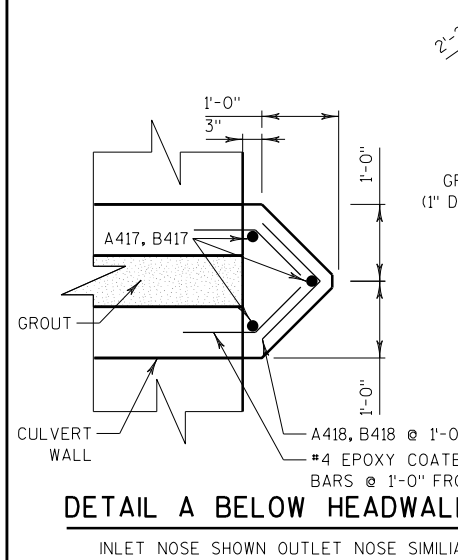
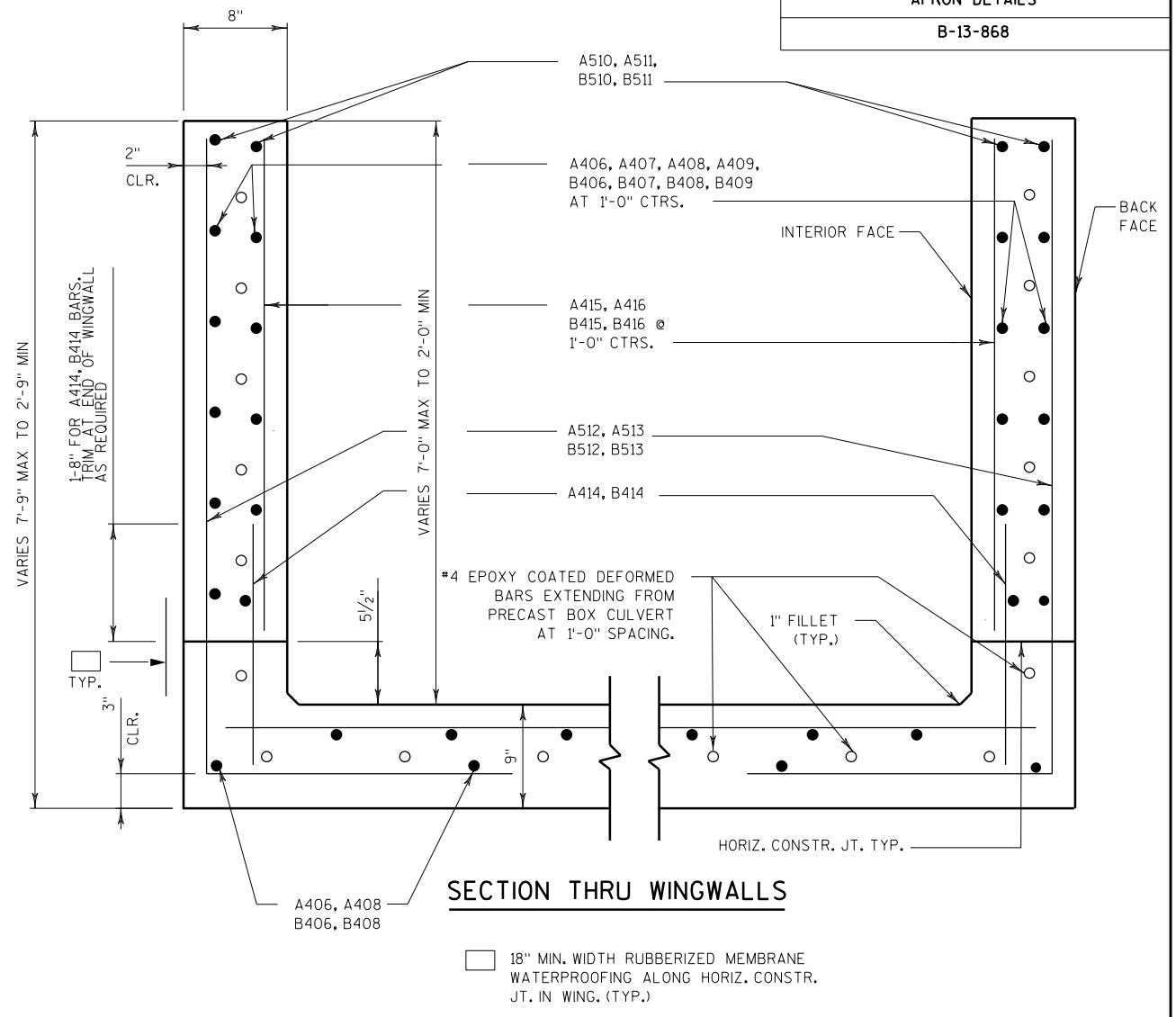
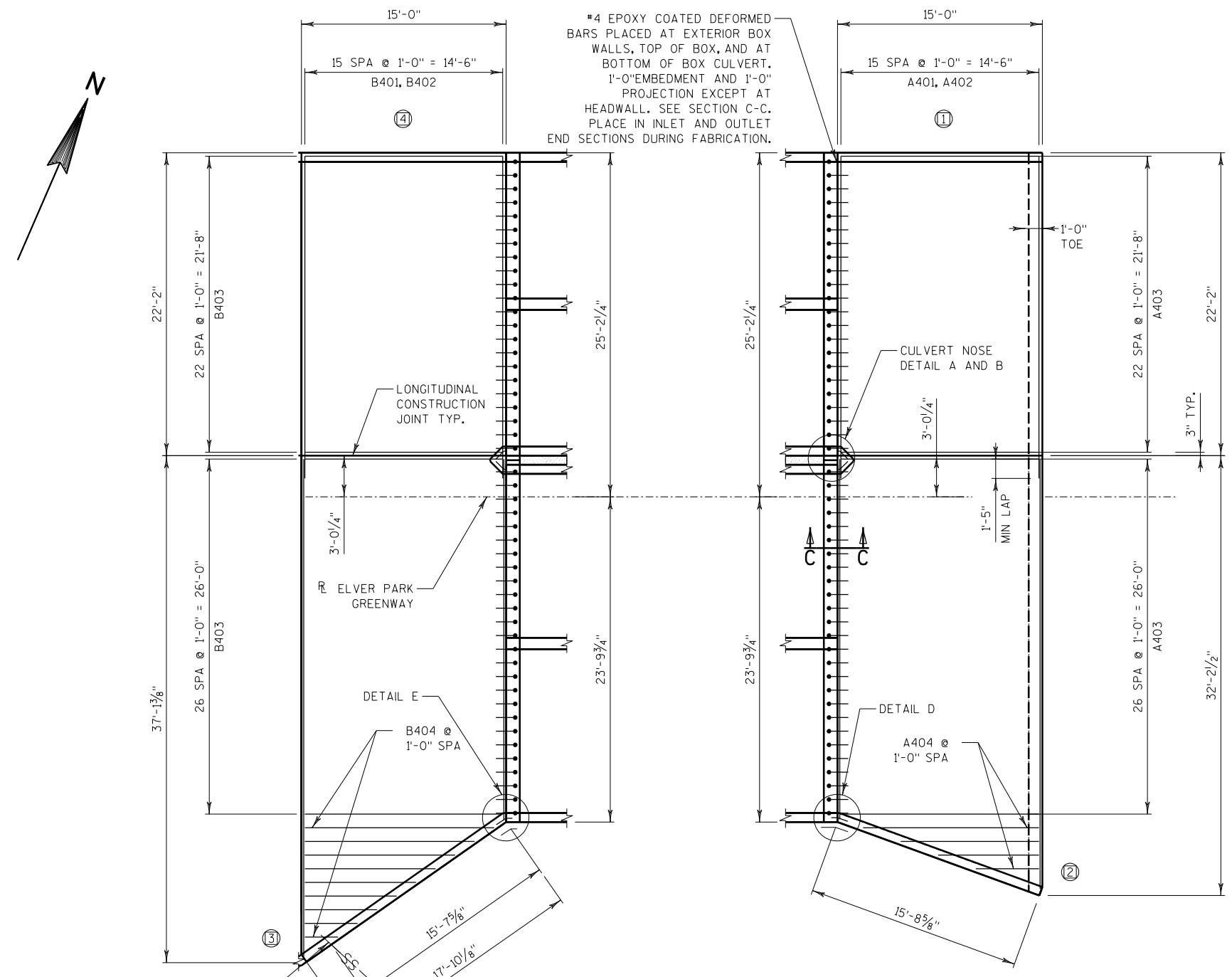
**PRECAST BOX BACKFILL DETAILS**  
LEFT SIDE SHOWN, RIGHT SIDE SIMILAR

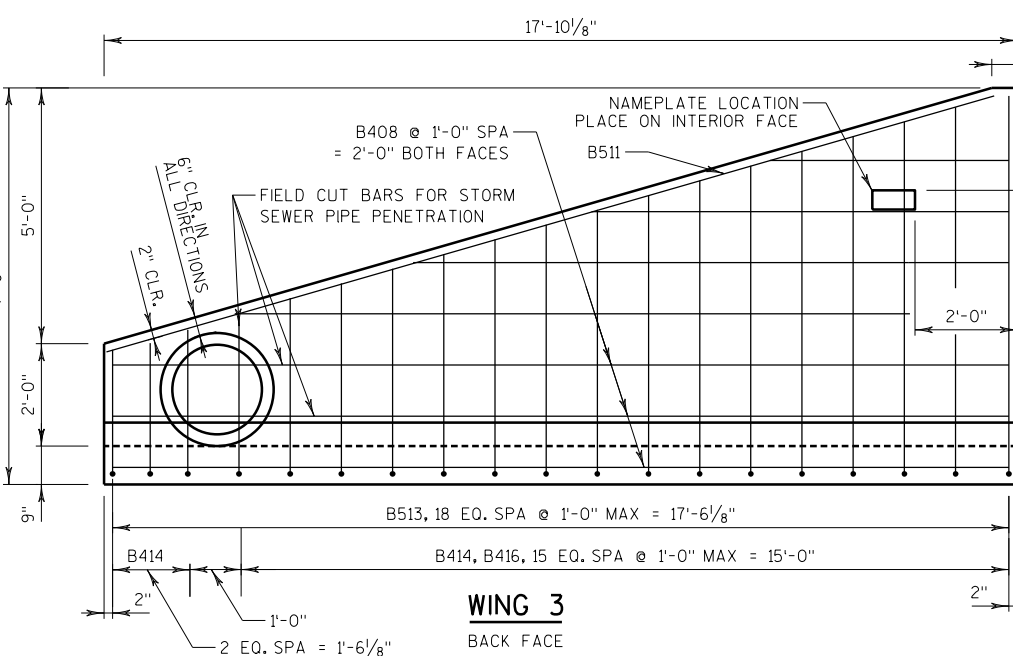
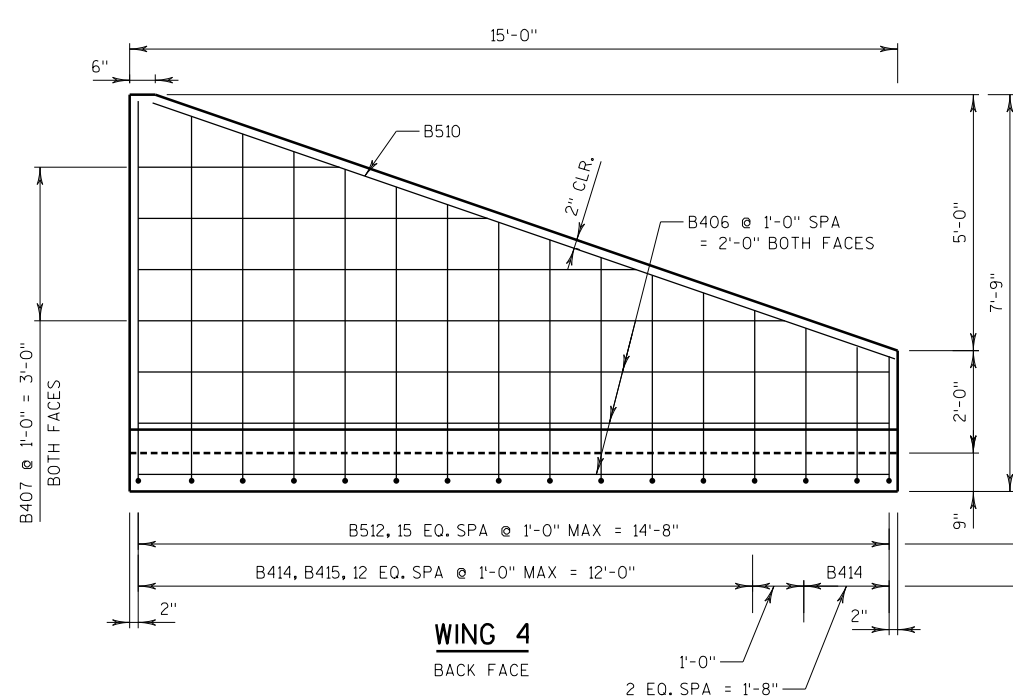


**STAGED CONSTRUCTION PLAN**

**NOTES**

1. FOR TRAFFIC STAGING INFORMATION, SEE TRAFFIC CONTROL SHEETS.
2. STAGED CONSTRUCTION PLAN IS A CONCEPT. EARTH RETENTION, STREAM DIVERSION, DEWATERING AND CONSTRUCTION SEQUENCING MEANS AND METHODS ARE THE RESPONSIBILITY OF THE CONTRACTOR. STAGING SUBJECT TO CHANGE PENDING CONTRACTOR'S CONSTRUCTION PLAN AND NOTIFICATION OF ENGINEER.
3. SEE SPECIFICATIONS FOR TEMPORARY WATER FLOWS DURING CONSTRUCTION.
4. CONTRACTOR IS RESPONSIBLE TO ENSURE PRECAST BOX CULVERT UNITS CAN SUPPORT TEMPORARY CONSTRUCTION AND TEMPORARY TRAFFIC LOADING DEMANDS DURING CONSTRUCTION.

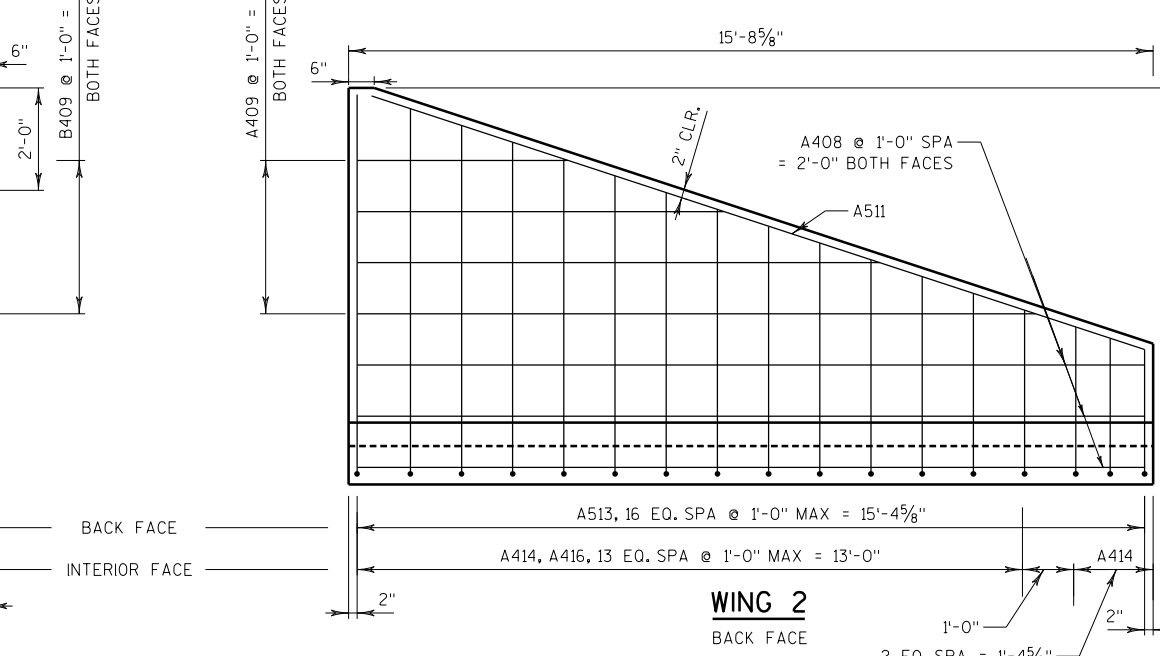
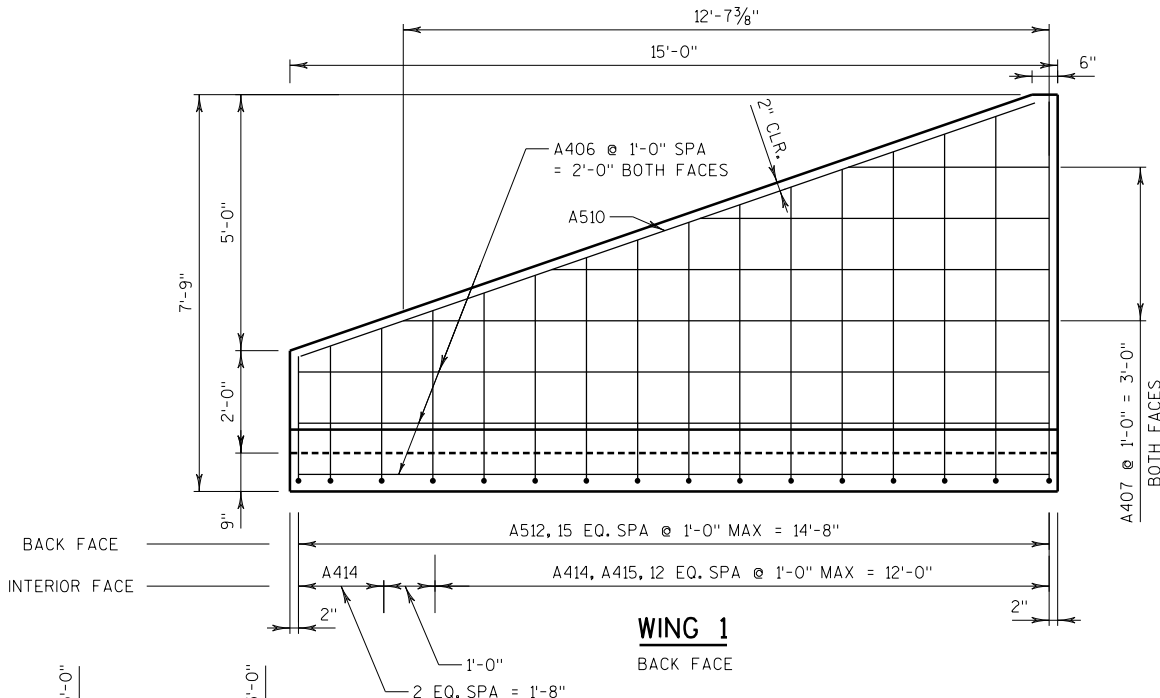




**WING 4**  
BACK FACE

**BILL OF BARS - OUTLET**

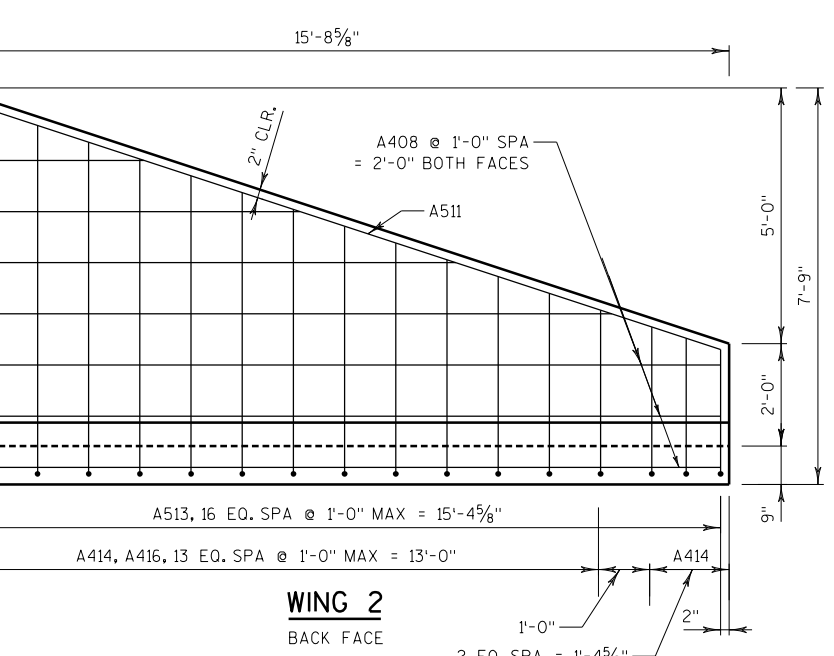
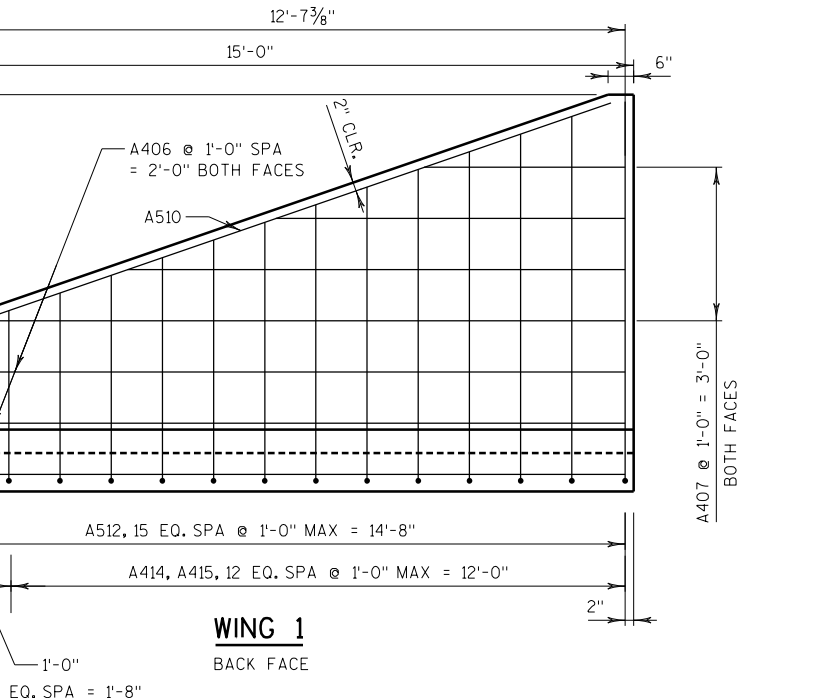
BAR MARK	NO. REQ'D	LENGTH	BENT	BAR SERIES	LOCATION
B401	16	23'-7"			OUTLET APRON LONGITUDINAL STAGE 1
B402	16	31'-6"		X	OUTLET APRON LONGITUDINAL STAGE 2
B403	50	14'-6"			OUTLET APRON TRANSVERSE
B404	9	8'-2"		X	OUTLET APRON TRANSVERSE
B406	6	14'-8"			LONG. AT WING 4
B407	8	8'-3"		X	LONG. AT WING 4 TOP
B408	6	17'-6"			LONG. AT WING 3
B409	8	9'-10"		X	LONG. AT WING 3 TOP
B510	2	15'-0"			WINGWALL 4 DIAGONAL TOP
B511	2	18'-0"			WINGWALL 3 DIAGONAL TOP
B512	16	10'-10"	X	X	WINGWALL 4 VERT. B.F.
B513	19	10'-10"	X	X	WINGWALL 3 VERT. B.F.
B414	35	2'-8"			WINGWALL 3 & 4 VERT. I.F.
B415	13	4'-4"		X	WINGWALL 4 VERT. I.F.
B416	16	4'-2"		X	WINGWALL 3 VERT. I.F.
B417	3	6'-8"			OUTLET NOSE VERT.
B418	8	1'-11"	X		OUTLET NOSE HORIZ.
B419	56	2'-1"	X		OUTLET HEADERS TIES
B420	4	26'-0"			OUTLET HEADERS LONGITUDINAL
B421	4	22'-0"			OUTLET HEADERS LONGITUDINAL



**WING 1**  
BACK FACE

**BAR SERIES TABLE - OUTLET**

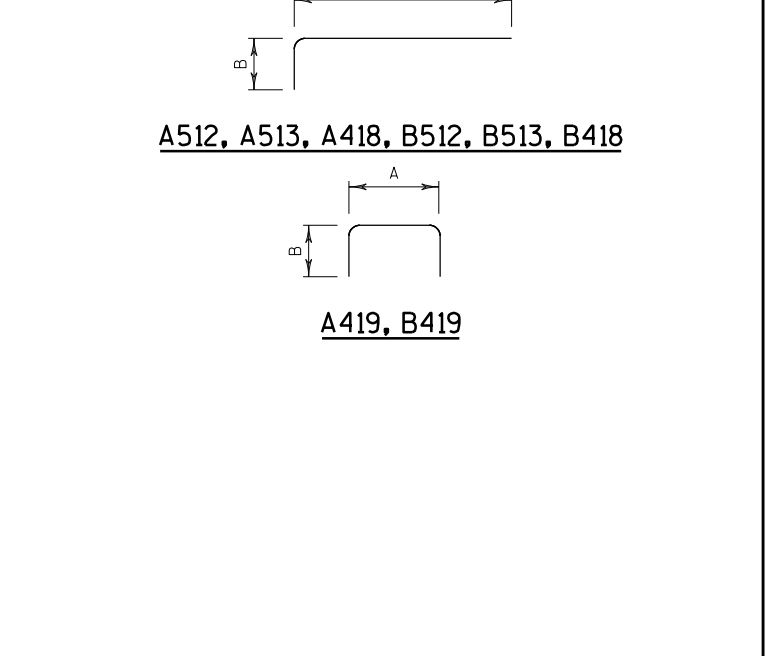
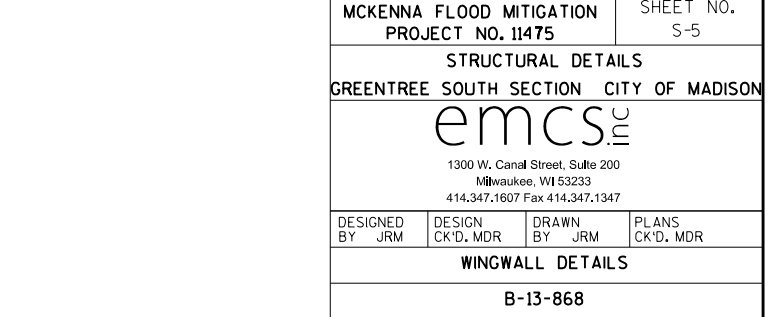
BAR MARK	NO. REQ'D.	LENGTHS FOR EACH SERIES
B402	1 SERIES OF 16	26'-5" TO 36'-5"
B404	1 SERIES OF 9	2'-5" TO 13'-10"
B407	2 SERIES OF 4	3'-11" TO 12'-7"
B409	2 SERIES OF 4	4'-7" TO 15'-0"
B512	1 SERIES OF 16	8'-4" TO 13'-4"
B513	1 SERIES OF 19	8'-4" TO 13'-4"
B415	1 SERIES OF 13	2'-4" TO 6'-4"
B416	1 SERIES OF 16	2'-0" TO 6'-4"



**WING 2**  
BACK FACE

**BILL OF BARS - INLET**

BAR MARK	NO. REQ'D	LENGTH	BENT	BAR SERIES	LOCATION
A401	16	23'-7"			INLET APRON LONGITUDINAL STAGE 1
A402	16	28'-11"		X	INLET APRON LONGITUDINAL STAGE 2
A403	50	14'-6"			INLET APRON TRANSVERSE
A404	4	8'-9"		X	INLET APRON TRANSVERSE
A406	6	14'-8"			LONG. AT WING 1
A407	8	8'-4"		X	LONG. AT WING 1 TOP
A408	6	15'-5"			LONG. AT WING 2
A409	8	8'-8"		X	LONG. AT WING 2 TOP
A510	2	15'-0"			WINGWALL 1 DIAGONAL
A511	2	15'-11"			WINGWALL 2 DIAGONAL
A512	16	10'-10"	X	X	WINGWALL 1 VERT. B.F.
A513	17	10'-10"	X	X	WINGWALL 2 VERT. B.F.
A414	33	2'-12"			WINGWALL 1 & 2 VERT. I.F.
A415	13	4'-4"		X	WINGWALL 1 VERT. I.F.
A416	14	4'-3"		X	WINGWALL 2 VERT. I.F.
A417	3	6'-8"			INLET NOSE VERT.
A418	8	1'-11"	X		INLET NOSE HORIZ.
A419	56	2'-1"	X		INLET HEADERS TIES
A420	4	26'-0"			INLET HEADERS LONGITUDINAL
A421	4	22'-0"			INLET HEADERS LONGITUDINAL
A422	33	3'-6"	X		INLET TOE VERTICAL
A423	2	31'-11"			INLET TOE LONGITUDINAL STAGE 2
A424	2	23'-7"			INLET TOE LONGITUDINAL STAGE 1



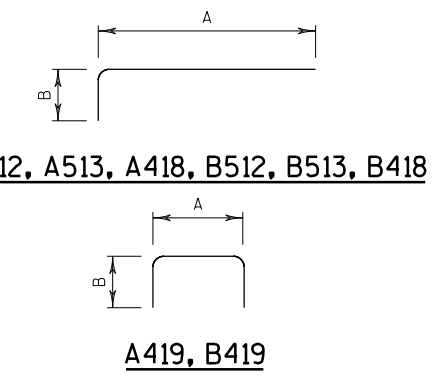
**WING 3**  
BACK FACE

**BAR SERIES TABLE - INLET**

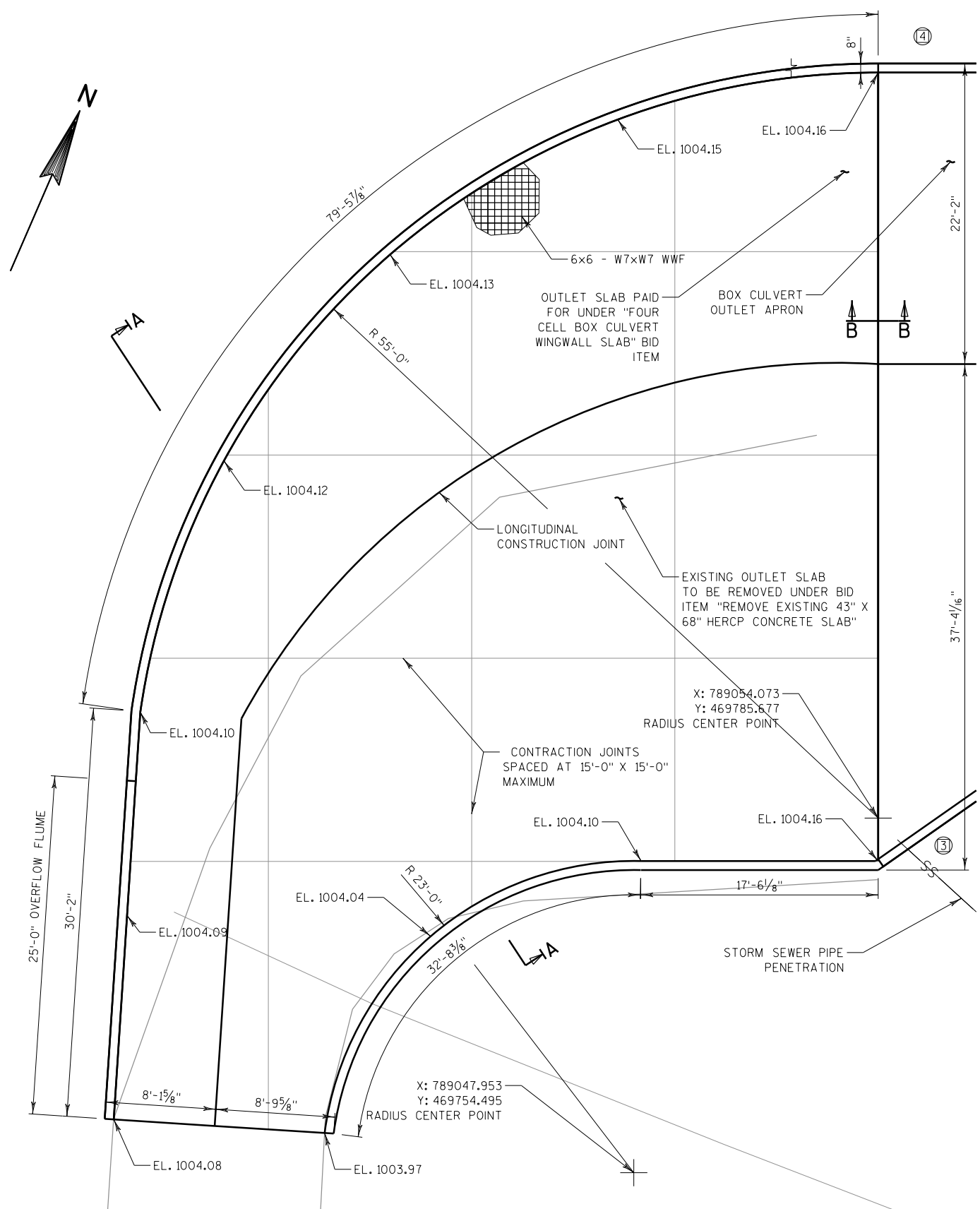
BAR MARK	NO. REQ'D.	LENGTHS FOR EACH SERIES
A402	1 SERIES OF 16	26'-5" TO 31'-5"
A404	1 SERIES OF 4	4'-8" TO 12'-10"
A407	2 SERIES OF 4	3'-11" TO 12'-7"
A409	2 SERIES OF 4	4'-1" TO 13'-3"
A512	1 SERIES OF 16	8'-4" TO 13'-4"
A513	1 SERIES OF 17	8'-4" TO 13'-4"
A415	1 SERIES OF 13	2'-4" TO 6'-4"
A416	1 SERIES OF 14	2'-2" TO 4'-3"

**BAR BEND DIAGRAMS**

BAR MARK	'A'	'B'
A512	2'-4" TO 7'-4"	6'-1"
A513	2'-4" TO 7'-4"	6'-1"
A418	1'-0"	1'-0"
A419	0'-8"	0'-9"
A422	1'-0"	2'-7"
B512	2'-4" TO 7'-4"	6'-1"
B418	1'-0"	1'-0"
B419	0'-8"	0'-9"

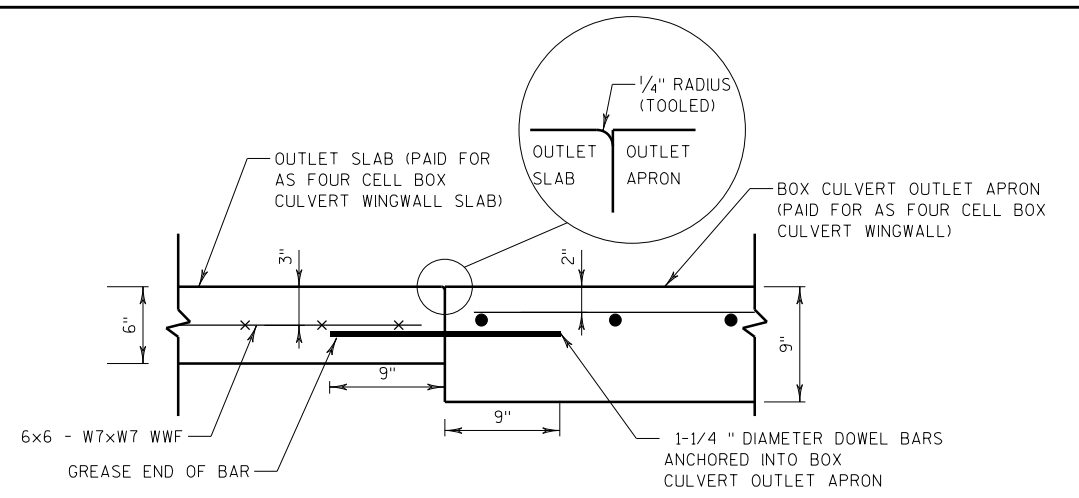


**NOTE**  
 ALL WING ELEVATION VIEWS SHOW BACK FACE REINFORCING ONLY. INTERIOR FACE REINFORCING NOT SHOWN FOR CLAIRTY.

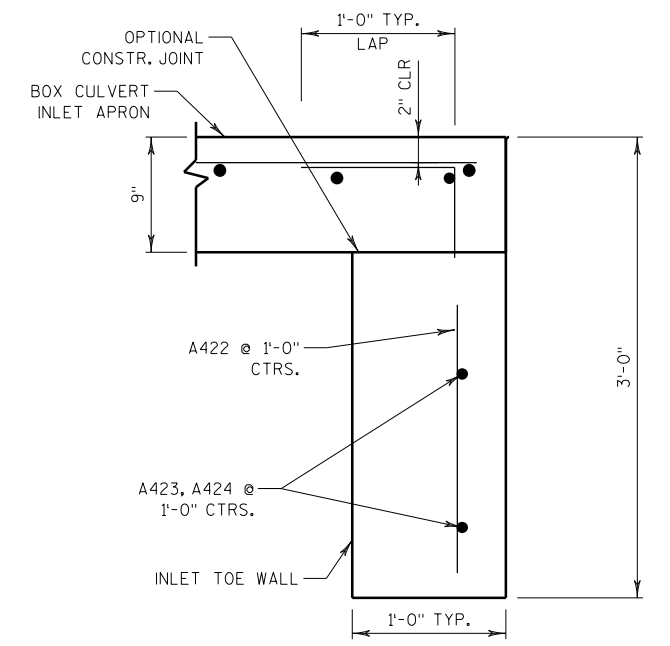


**OUTLET PLAN**

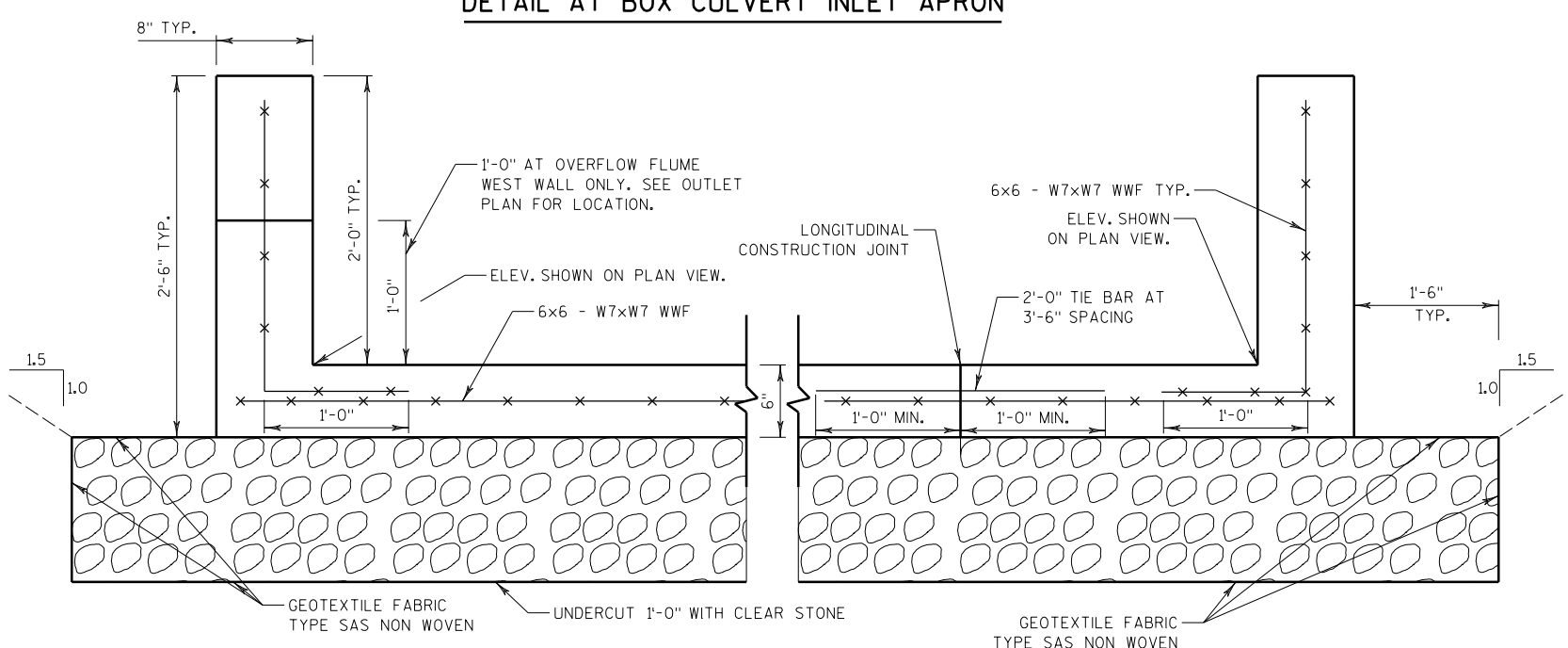
(X) DENOTES WINGWALL NUMBER



**SECTION B-B THRU OUTLET SLAB & BOX CULVERT OUTLET APRON**

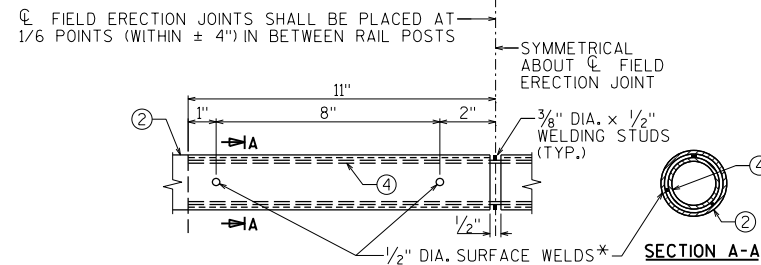
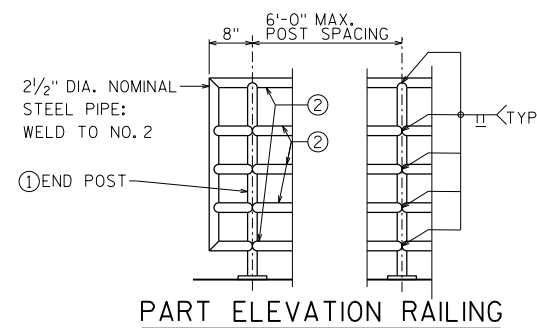


**DETAIL AT BOX CULVERT INLET APRON**



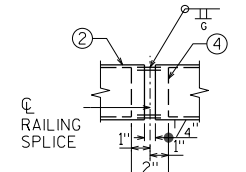
**SECTION A-A THRU OUTLET SLAB & WALLS**

MCKENNA FLOOD MITIGATION PROJECT NO. 11475		SHEET NO. S-7	
STRUCTURAL DETAILS			
GREENTREE SOUTH SECTION CITY OF MADISON			
<b>emcs inc</b>			
1300 W. Canal Street, Suite 200 Milwaukee, WI 53233 414.347.1607 Fax 414.347.1347			
DESIGNED BY JRM	DESIGN CK'D. MDR	DRAWN BY JRM	PLANS CK'D. MDR
<b>RAILING PIPE DETAILS</b>			
<b>B-13-868</b>			



**FIELD ERECTION JOINT DETAIL**

\*MIN. 5/8" FLAT SURFACE DIA. PUNCHINGS OR STUDS MAY BE USED AS AN ALTERNATE.



**SHOP RAILING SPLICE DETAIL**

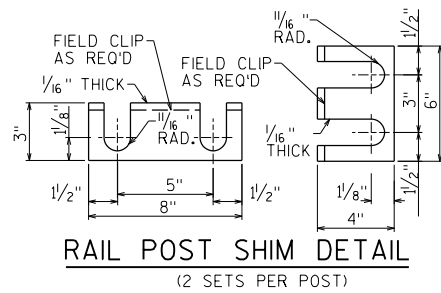
(LOCATION MUST BE SHOWN ON THE SHOP DRAWINGS)

**LEGEND**

- ① 2" DIAMETER STEEL PIPE FOR POSTS. POSTS ARE TO BE SET VERTICAL: WELD TO NO. 5.
- ② 2" DIAMETER STEEL PIPE FOR RAILS: WELD TO NO. 1.
- ③ NOT USED
- ④ 1-1/2" DIAMETER PIPE SLEEVE x 1'-10" LONG PROVIDE 1/2" DIA. SURFACE WELDS ON ALL SIDES AS SHOWN. GRIND WELDS TO FIT FREE INTO I.D. OF NO. 2. PROVIDE 3/8" DIA. x 1/2" WELDING STUDS ON TOP AND BOTTOM SURFACES AT CENTERLINE.
- ⑤ PLATE 5/8" X 6" X 8" WITH 3/4" X 1/2" SLOTTED HOLES
- ⑥ 5/8" DIA. ADHESIVE ANCHOR, 6" MIN. EMBEDMENT (EPOXY ANCHORED) MIN. PULLOUT OF 10 KIPS. THREADED LENGTH OF ANCHOR, WASHER, AND NUT SHALL BE GALVANIZED. (4 REQ'D. PER POST).

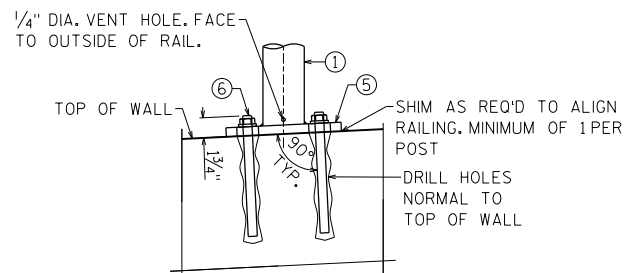
**NOTES**

- BID ITEM SHALL BE "SIDEWALK RAILING PIPE", WHICH INCLUDES ALL ITEMS SHOWN, GALVANIZING, PAINTING, AND ERECTION.
- RAILING SHALL BE FABRICATED IN LENGTHS NOT MORE THAN 3 POSTS.
- FIELD ERECTION JOINTS MUST BE PLACED IN BETWEEN RAIL POSTS WHERE THERE IS ALSO A CONCRETE EXPANSION JOINT IN BETWEEN RAIL POSTS.
- POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.
- ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS AND STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING BY S.S.P.C. SPECIFICATIONS. AFTER GALVANIZING PAINT RAILING ASSEMBLIES WITH A TWO COAT SYSTEM SPECIFICALLY INTENDED FOR PAINTING OF GALVANIZED SURFACES. THE FINISH COLOR SHALL BE FEDERAL COLOR NO. 27038 BLACK.
- ALL MATERIALS USED IN FABRICATION SHALL BE MADE FROM MATERIALS CONFORMING TO A.S.T.M. DESIGNATION A500 GRADE B UNLESS NOTED OTHERWISE.
- STEEL SHALL BE PROVIDED AND USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT, AND SHALL BE GALVANIZED.
- FILL BOLT SLOT OPENINGS IN SHIMS AND PLATE NO. 1 AND CAULK AROUND PERIMETER OF PLATE NO. 1 WITH NON-STAINING BLACK NON-BITUMINOUS JOINT SEALER.
- ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING SET TO NORMAL GRADE.
- VENT HOLES SHALL BE DRILLED IN MEMBERS AS REQUIRED TO FACILITATE GALVANIZING AND DRAINAGE. DRILL DRAIN HOLES PRIOR TO GALVANIZING.
- PAINT TOUCH-UP TO BE DONE AT COMPLETION OF STEEL RAILING INSTALLATION TO THE SATISFACTION OF THE ENGINEER AT NO EXTRA COST.

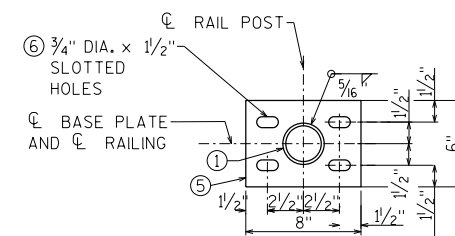


**RAIL POST SHIM DETAIL**

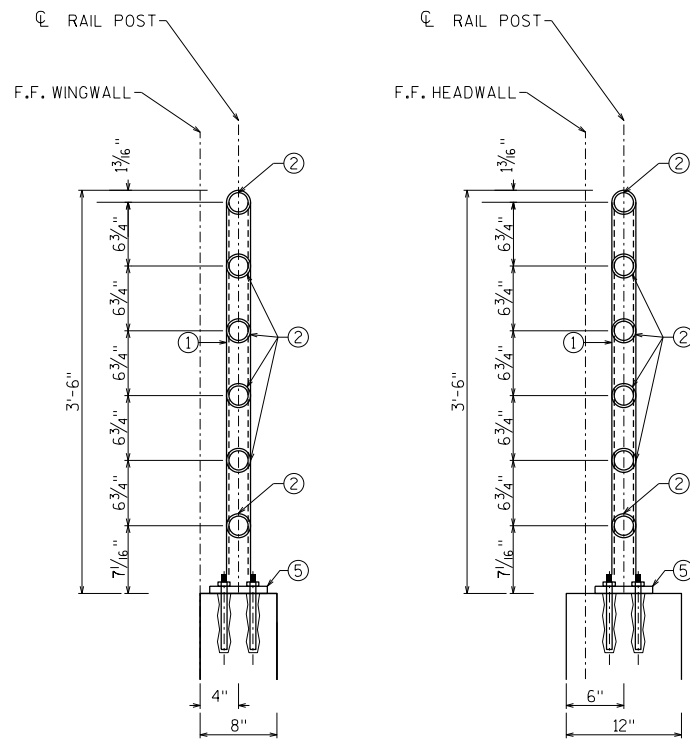
(2 SETS PER POST)



**ANCHOR BOLTS FOR RAIL POST**

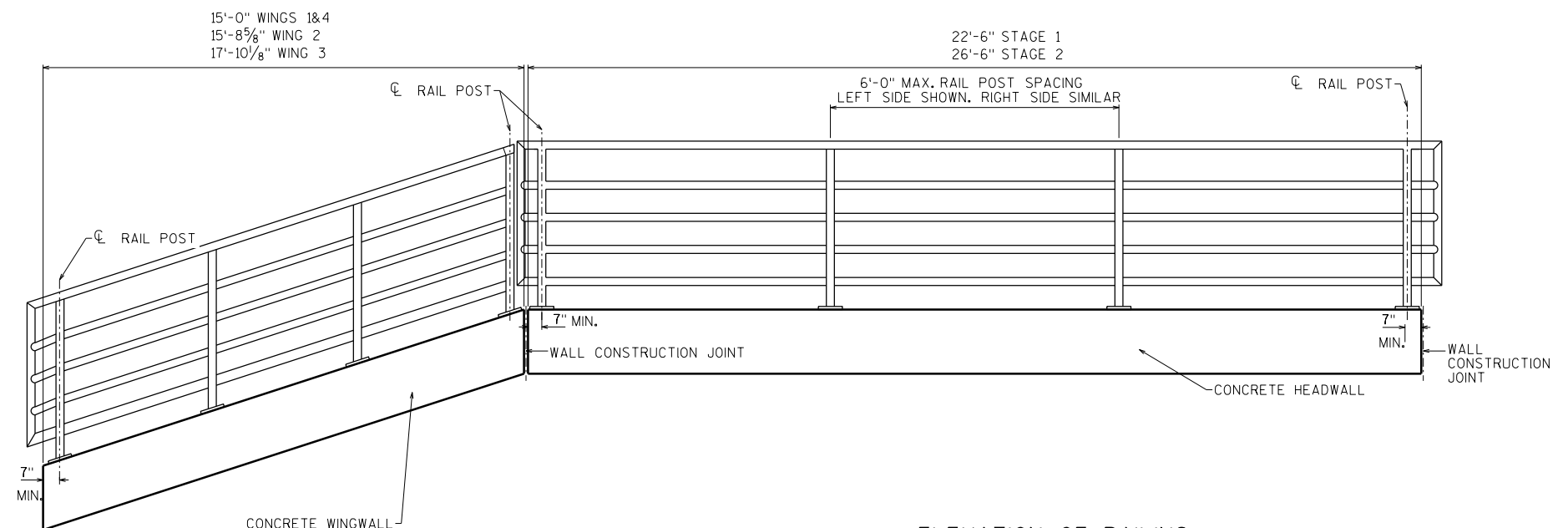


**RAIL POST BASE DETAIL**



**SECTION THRU WINGWALL**

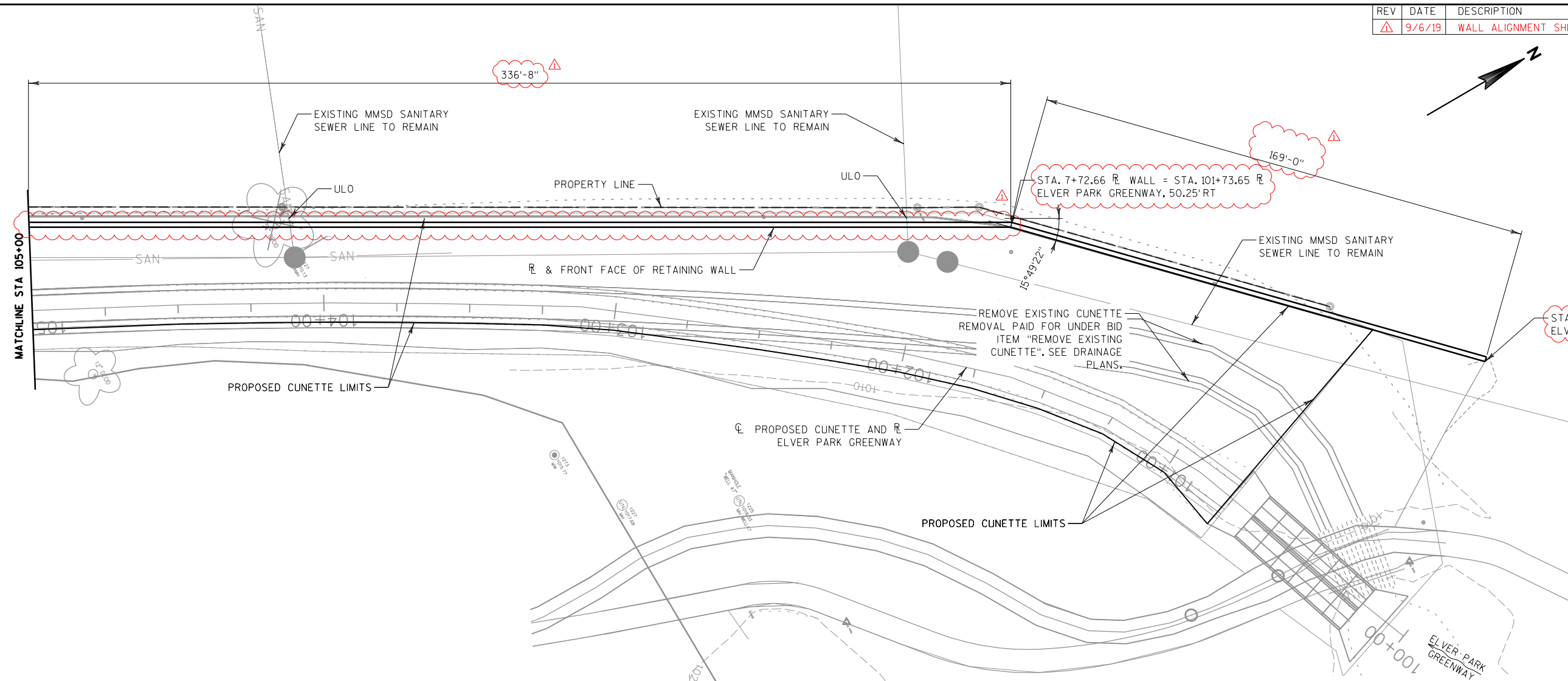
**SECTION THRU HEADWALL**



**ELEVATION OF RAILING**

LEFT SIDE SHOWN. RIGHT SIDE SIMILAR

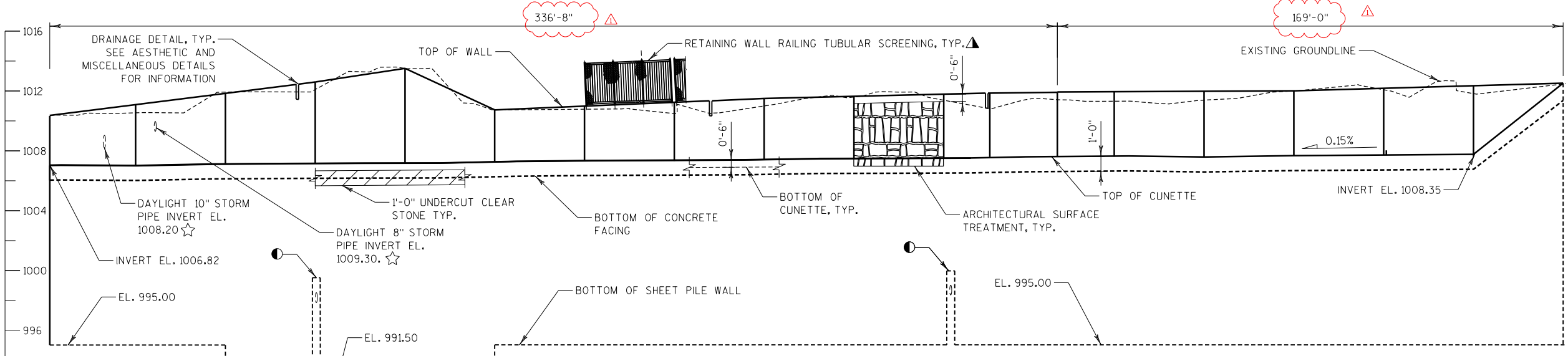
REV	DATE	DESCRIPTION	MCKENNA FLOOD MITIGATION PROJECT NO. 11475	SHEET NO. R-1
Δ	9/6/19	WALL ALIGNMENT SHIFT		
STRUCTURAL DETAILS GREENTREE SOUTH SECTION CITY OF MADISON				
emcs inc 1300 W. Canal Street, Suite 200 Milwaukee, WI 53233 414.347.1607 Fax 414.347.1347				
DESIGNED BY	JRM	DESIGN CK'D.	MDR	DRAWN BY
JRM		MDR		JRM
PLANS CK'D.		MDR		
GENERAL PLAN & ELEVATION 1				
R-13-337				



**PLAN**  
(SHEET PILE RETAINING WALL WITH CONCRETE FACING)



- LIST OF DRAWINGS**
1. GENERAL PLAN & ELEVATION 1
  2. GENERAL PLAN & ELEVATION 2
  3. CROSS SECTION & STAGING DETAILS
  4. RETAINING WALL DETAILS
  5. AESTHETIC AND MISCELLANEOUS DETAILS
  6. RETAINING WALL RAILING TUBULAR SCREENING DETAILS



**UNFOLDED ELEVATION**

SCALE 1H:5V  
WALL ELEVATION TAKEN ALONG R OF ELVER PARK GREENWAY

**SOIL DATA**

DRY UNIT WEIGHT OF SOIL  $\gamma = 120 \text{ LBS/FT}^3$   
 MAX FACTORED BEARING PRESSURE = 2,000 PSF  
 $K_0 = 0.3$   
 $K_p = 3.25$   
 $K_0 = 0.47$  FOR AT REST CONDITIONS  
 $\phi = 30^\circ$

**GENERAL NOTES**

- DRAWINGS SHALL NOT BE SCALED.
- ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED.
- ALL STATIONS AND ALL ELEVATIONS ARE IN FEET.
- ALL REINFORCING BARS SHALL BE EPOXY COATED.
- THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.
- ALL WELDED WIRE FABRIC SHALL BE UNCOATED.
- ALL CONCRETE EDGES TO BE BEVELED  $\frac{3}{4}$ " UNLESS NOTED OTHERWISE.
- REMOVING EXISTING CUNETTE WILL BE PAID FOR UNDER BID ITEM "REMOVE EXISTING CUNETTE". SEE DRAINAGE PLANS.
- WALL JOINTS ARE SHOWN AT 30'-0" SPACING, HOWEVER, JOINTS SHOULD COINCIDE WITH STEEL SHEET PILE JOINTS. THE WALL JOINTS SHOULD ALSO COINCIDE WITH THE TUBULAR SCREENING RAILING POST MAX SPACING AND RAIL POST OFFSETS. THE MAXIMUM SPACING OF JOINTS SHALL BE 50'-0" .

**DESIGN DATA**

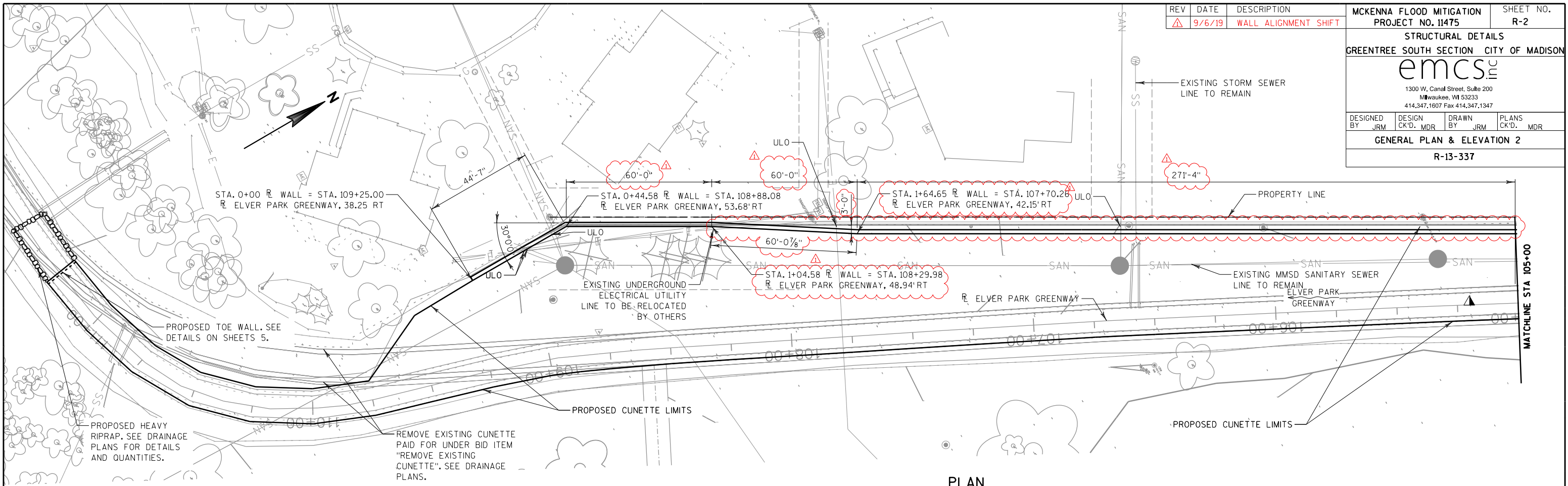
**MATERIAL PROPERTIES:**  
 CONCRETE MASONRY  $f'_c = 3.5 \text{ KSI}$   
 BAR STEEL REINFORCEMENT  $f_y = 60 \text{ KSI}$   
 STEEL SHEET PILING  $f_y = 50 \text{ KSI}$

**LEGEND**

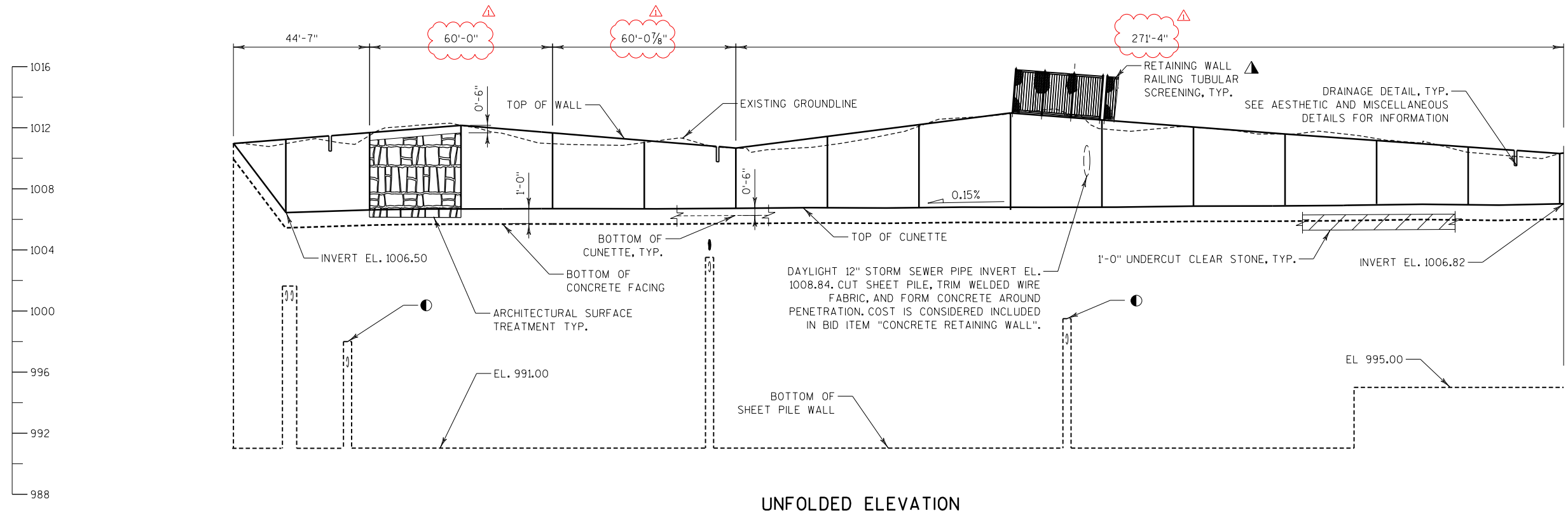
- SHEET PILE WALL TO BE INSTALLED 1'-0" CLEAR OF MMSD FACILITIES AS SHOWN IN THE PLANS
- ▲ SEE "RETAINING WALL RAILING TUBULAR SCREENING DETAILS" SHEET FOR DETAILS.
- ☆ CUT SHEET PILE, TRIM WELDED WIRE FABRIC, AND FORM CONCRETE AROUND PENETRATION. COST IS CONSIDERED INCLUDED IN BID ITEM "CONCRETE RETAINING WALL".



REV	DATE	DESCRIPTION	MCKENNA FLOOD MITIGATION PROJECT NO. 11475	SHEET NO. R-2
Δ	9/6/19	WALL ALIGNMENT SHIFT		
STRUCTURAL DETAILS				
GREENTREE SOUTH SECTION CITY OF MADISON				
emcs inc				
1300 W. Canal Street, Suite 200 Milwaukee, WI 53233 414.347.1607 Fax 414.347.1347				
DESIGNED BY	DESIGN CK'D.	DRAWN BY	PLANS CK'D.	
JRM	MDR	JRM	MDR	
GENERAL PLAN & ELEVATION 2				
R-13-337				



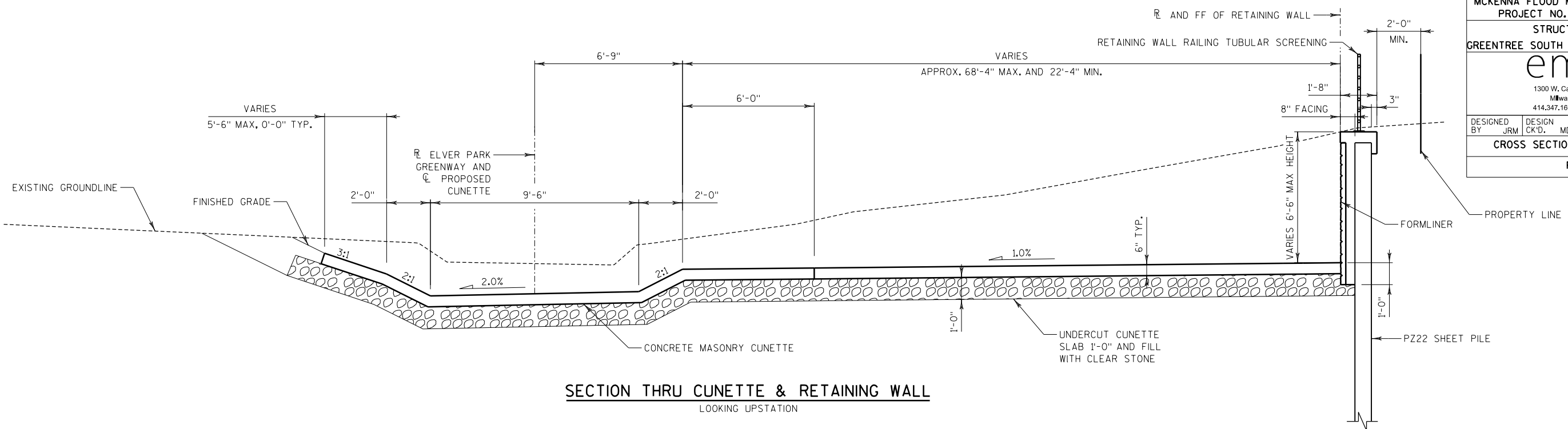
**PLAN**  
(SHEET PILE RETAINING WALL WITH CONCRETE FACING)



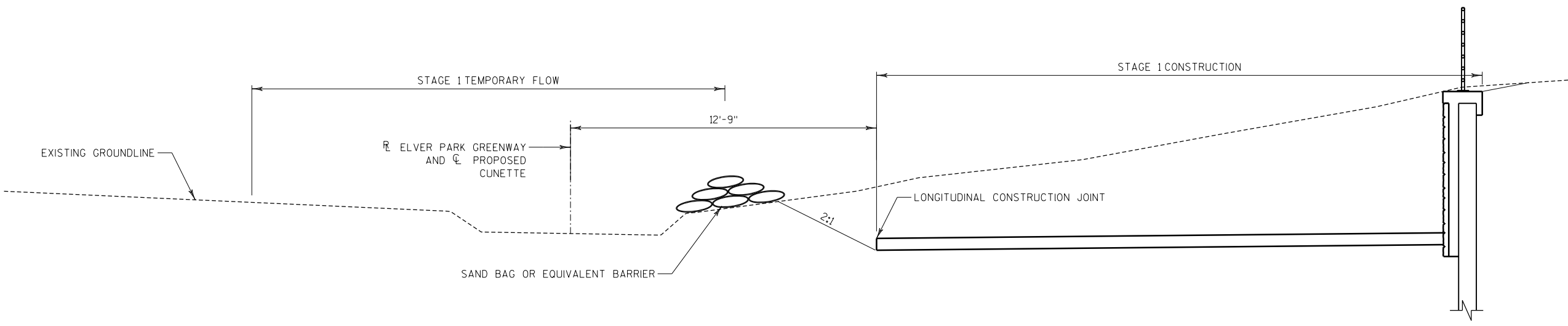
**UNFOLDED ELEVATION**  
SCALE 1/4"=5'  
WALL ELEVATION TAKEN ALONG R/L OF ELVER PARK GREENWAY

**NOTES**  
SEE NOTES FROM SHEET R-1.

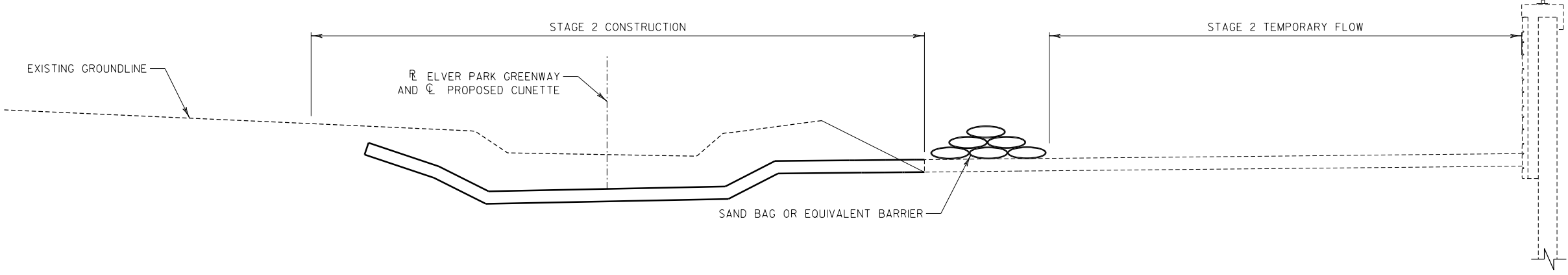
- LEGEND**
- SHEET PILE WALL TO BE INSTALLED 1'-0" CLEAR OF MMSD AND ELECTRICAL FACILITIES AS SHOWN IN THE PLANS
  - ▲ SEE "RETAINING WALL RAILING TUBULAR SCREENING DETAILS" SHEET FOR DETAILS.



**SECTION THRU CUNETTE & RETAINING WALL**  
LOOKING UPSTATION



**STAGE 1 CUNETTE & RETAINING WALL CONSTRUCTION**  
LOOKING UPSTATION



**STAGE 2 CUNETTE & RETAINING WALL CONSTRUCTION**  
LOOKING UPSTATION

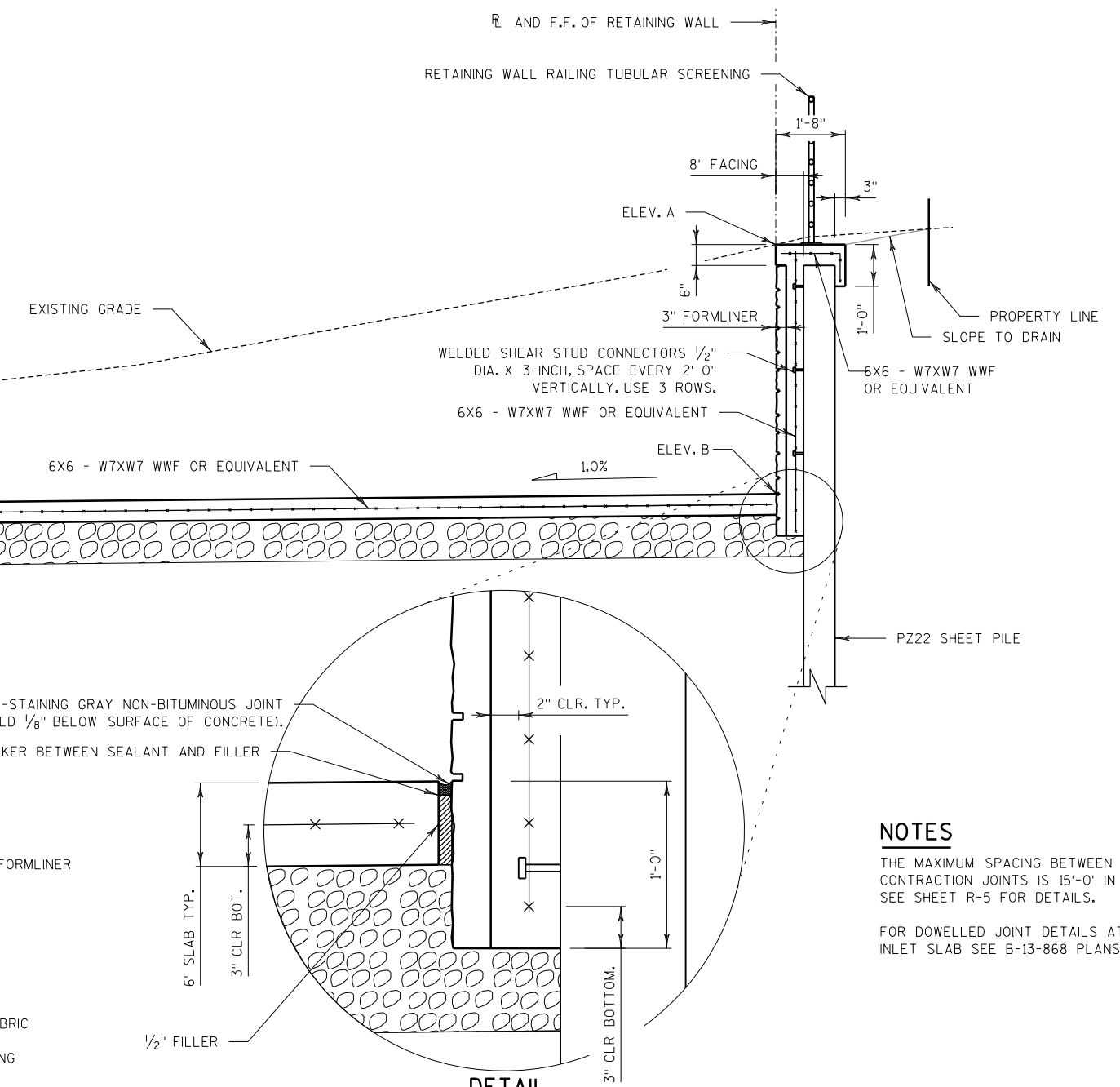
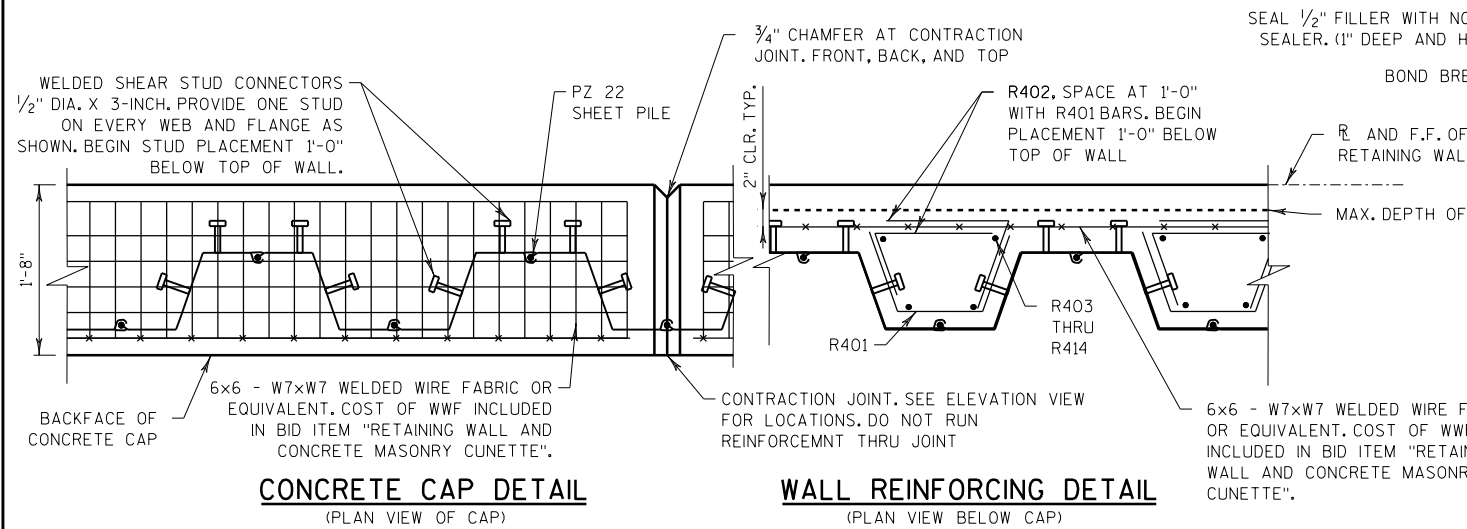
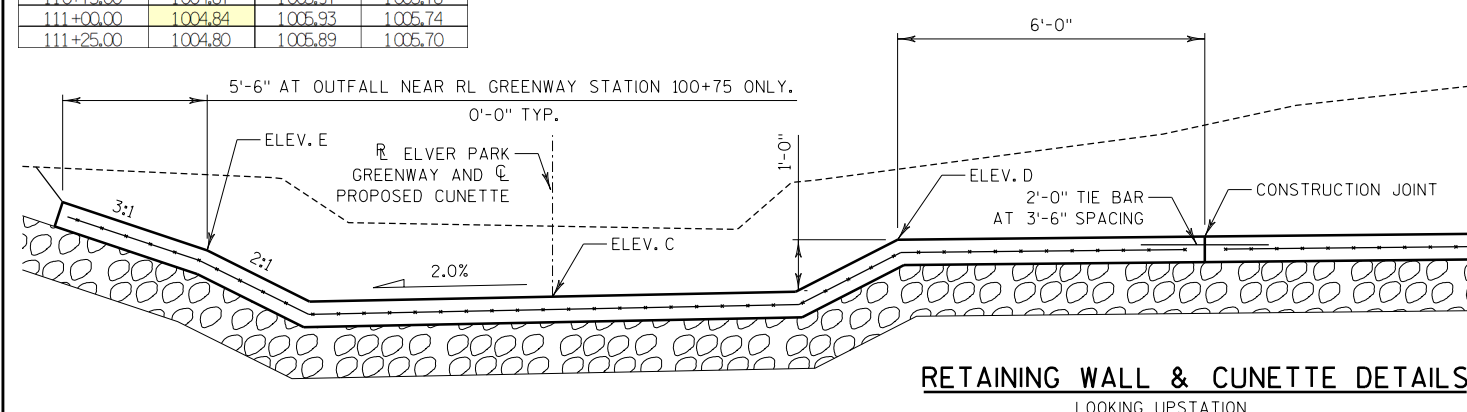
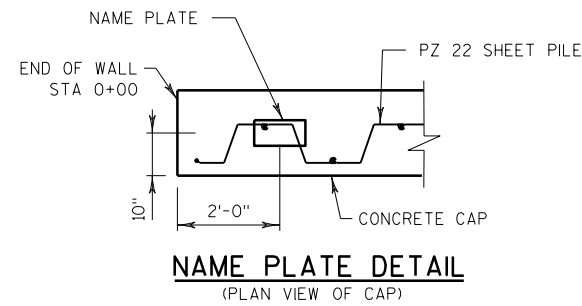
**NOTES**  
EARTH RETENTION, STREAM DIVERSION, DEWATERING AND CONSTRUCTION SEQUENCING MEANS AND METHODS ARE THE RESPONSIBILITY OF THE CONTRACTOR. STAGING SUBJECT TO CHANGE PENDING CONTRACTOR'S CONSTRUCTION PLAN AND NOTIFICATION OF ENGINEER.

**CUNETTE ELEVATIONS**

ELVER PARK GREENWAY STATION	ELEV. C	ELEV. D	ELEV. E
100+66.00	1006.36	1007.46	1007.27
100+75.00	1006.35	1007.44	1007.25
101+00.00	1006.31	1007.41	1007.22
101+25.00	1006.28	1007.37	1007.18
101+50.00	1006.24	1007.33	1007.14
101+75.00	1006.20	1007.30	1007.11
102+00.00	1006.17	1007.26	1007.07
102+25.00	1006.13	1007.22	1007.03
102+50.00	1006.09	1007.19	1007.00
102+75.00	1006.05	1007.15	1006.96
103+00.00	1006.02	1007.12	1006.93
103+25.00	1005.98	1007.08	1006.89
103+50.00	1005.94	1007.04	1006.85
103+75.00	1005.91	1007.00	1006.81
104+00.00	1005.87	1006.97	1006.78
104+25.00	1005.83	1006.93	1006.74
104+50.00	1005.80	1006.89	1006.70
104+75.00	1005.76	1006.85	1006.66
105+00.00	1005.72	1006.82	1006.63
105+25.00	1005.68	1006.78	1006.59
105+50.00	1005.65	1006.74	1006.55
105+75.00	1005.61	1006.71	1006.52
106+00.00	1005.55	1006.65	1006.46
106+25.00	1005.54	1006.63	1006.44
106+50.00	1005.50	1006.60	1006.41
106+75.00	1005.46	1006.56	1006.37
107+00.00	1005.43	1006.52	1006.33
107+25.00	1005.39	1006.48	1006.29
107+50.00	1005.35	1006.45	1006.26
107+75.00	1005.32	1006.41	1006.22
108+00.00	1005.28	1006.38	1006.19
108+25.00	1005.24	1006.34	1006.15
108+50.00	1005.20	1006.30	1006.11
108+75.00	1005.17	1006.26	1006.07
109+00.00	1005.13	1006.23	1006.04
109+25.00	1005.09	1006.19	1006.00
109+50.00	1005.05	1006.15	1005.96
109+75.00	1005.02	1006.11	1005.92
110+00.00	1004.98	1006.08	1005.89
110+25.00	1004.95	1006.04	1005.85
110+50.00	1004.91	1006.00	1005.81
110+75.00	1004.87	1005.97	1005.78
111+00.00	1004.84	1005.93	1005.74
111+25.00	1004.80	1005.89	1005.70

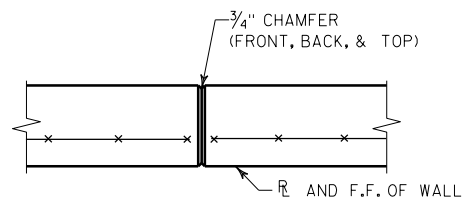
**RETAINING WALL ELEVATIONS**

WALL STATION	EASTING	NORTHING	ELVER PARK GREENWAY STATION	ELVER PARK GREENWAY OFFSET	ELEV. A	ELEV. B	EXPOSED HEIGHT
0+00.00	789851.83	470114.31	109+25.00	38.25	1010.97	1006.51	4.46
0+17.00	789851.90	470131.31	109+08.91	43.71	1011.24	1006.58	4.66
0+44.58	789852.02	470158.89	108+88.08	53.68	1011.68	1006.71	4.97
0+74.58	789867.14	470184.81	108+59.76	50.91	1012.16	1006.73	5.43
1+04.58	789882.25	470210.72	108+30.19	48.94	1011.66	1006.75	4.91
1+34.58	789898.66	470235.88	108+00.14	45.55	1011.17	1006.76	4.41
1+64.65	789915.07	470261.04	107+70.26	42.15	1010.67	1006.77	3.90
1+94.65	789930.18	470286.96	107+40.49	40.23	1011.44	1006.80	4.64
2+24.65	789945.29	470312.87	107+10.54	38.44	1012.20	1006.82	5.38
2+54.65	789960.41	470338.79	106+80.60	36.65	1012.96	1006.85	6.11
2+84.65	789975.52	470364.70	106+51.17	35.13	1012.51	1006.88	5.63
3+14.65	789990.63	470390.62	106+21.20	33.78	1012.05	1006.91	5.14
3+44.65	790005.74	470416.54	105+91.27	32.43	1011.59	1006.94	4.65
3+74.65	790020.86	470442.45	105+61.30	31.12	1011.16	1006.97	4.19
4+04.65	790035.97	470468.37	105+31.50	29.84	1010.73	1007.00	3.73
4+34.65	790051.08	470494.28	105+01.52	28.70	1010.31	1007.04	3.27
4+64.65	790066.20	470520.20	104+71.54	27.56	1011.07	1007.07	4.00
4+94.65	790073.75	470533.15	104+56.55	26.99	1011.44	1007.09	4.35
4+94.65	790081.31	470546.11	104+42.29	26.52	1011.82	1007.10	4.72
5+24.65	790096.42	470572.03	104+12.29	26.20	1012.47	1007.14	5.33
5+54.65	790111.54	470597.94	103+82.74	26.13	1013.48	1007.19	6.29
5+84.65	790126.65	470623.86	103+53.12	26.42	1010.71	1007.23	3.48
6+14.65	790141.76	470649.77	103+23.22	27.09	1010.97	1007.28	3.69
6+44.65	790156.87	470675.69	102+96.20	29.58	1011.22	1007.35	3.87
6+74.65	790171.99	470701.60	102+66.70	33.47	1011.47	1007.43	4.04
7+04.65	790187.10	470727.52	102+37.18	37.61	1011.62	1007.52	4.10
7+34.65	790202.21	470753.43	102+08.49	42.44	1011.76	1007.61	4.15
7+50.08	790209.98	470766.75	101+95.70	45.22	1011.84	1007.65	4.19
7+72.66	790221.36	470786.26	101+73.65	50.25	1011.89	1007.74	4.15
7+91.66	790235.04	470799.44	101+52.50	49.75	1011.92	1007.75	4.17
8+21.66	790256.65	470820.25	101+32.66	52.75	1011.95	1007.82	4.13
8+51.66	790278.25	470841.07	101+13.25	58.92	1011.98	1007.91	4.07
8+81.66	790299.86	470861.88	100+93.30	67.33	1012.15	1008.03	4.12
9+11.66	790321.47	470882.69	100+64.57	79.37	1012.33	1008.19	4.14
9+41.66	790343.07	470903.50	100+37.00	91.00	1012.50	1008.35	4.15



**NOTES**  
 THE MAXIMUM SPACING BETWEEN SAWCUT CONTRACTION JOINTS IS 15'-0" IN BOTH DIRECTIONS. SEE SHEET R-5 FOR DETAILS.  
 FOR DOWELLED JOINT DETAILS AT BOX CULVERT INLET SLAB SEE B-13-868 PLANS.

REV	DATE	DESCRIPTION	MCKENNA FLOOD MITIGATION PROJECT NO. 11475	SHEET NO. R-4
Δ	9/6/19	WALL ALIGNMENT SHIFT		
STRUCTURAL DETAILS				
GREENTREE SOUTH SECTION CITY OF MADISON				
emcs inc				
1300 W. Canal Street, Suite 200 Milwaukee, WI 53233 414.347.1607 Fax 414.347.1347				
DESIGNED BY	JRM	DESIGN CK'D.	MDR	DRAWN BY
				JRM
				PLANS CK'D.
				MDR
RETAINING WALL DETAILS				
R-13-337				

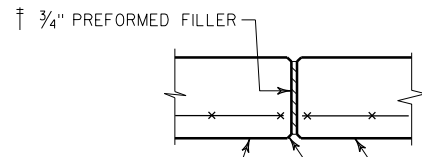


### WALL CONTRACTION JOINT

DO NOT RUN BAR STEEL THRU JOINT

MAXIMUM SPACING OF JOINTS SHALL BE 12'-0" AND MUST LINE UP WITH THE STEEL SHEET PILE JOINTS.

ALL CONTRACTION JOINTS TO EXTEND THE FULL DEPTH OF COPING.



### WALL EXPANSION JOINT

DO NOT RUN BAR STEEL THRU JOINT

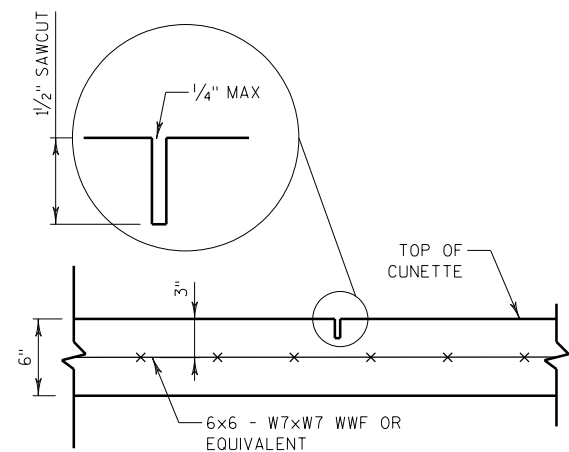
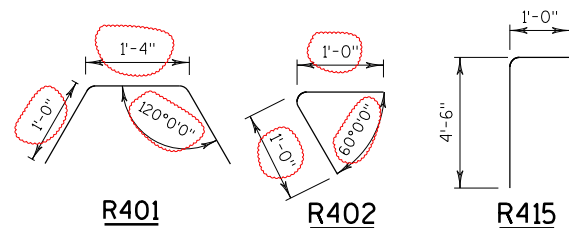
† WALL JOINTS ARE SHOWN AT 30'-0" SPACING, HOWEVER, JOINTS SHOULD COINCIDE WITH STEEL SHEET PILE JOINTS. THE WALL JOINTS SHOULD ALSO COINCIDE WITH THE TUBULAR SCREENING RAILING POST MAX SPACING AND RAIL POST OFFSETS. THE MAXIMUM SPACING OF JOINTS SHALL BE 50'-0" .

SEAL ALL EXPOSED HORIZ. AND VERT. SURFACES OF PREFORMED FILLER WITH A NON-STAINING, GREY, NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONC.)

### BILL OF BARS

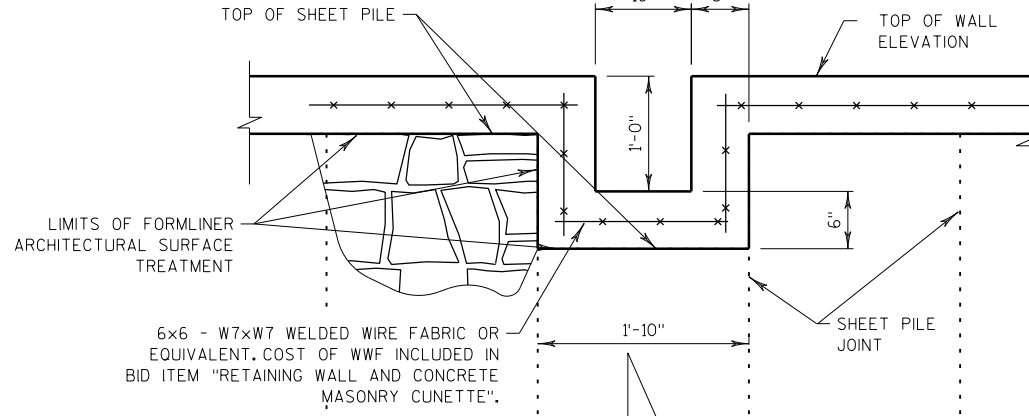
BAR MARK	COAT	NO.	LENGTH	BENT	LOCATION
R401	X	1135	3'-2"	X	SHEET PILE HORIZ. STIRRUP
R402	X	2270	1'-11"	X	SHEET PILE HORIZ. STIRRUP
R403	X	72	3'-0"		SHEET PILE VERTICAL
R404	X	72	4'-1"		SHEET PILE VERTICAL
R405	X	90	4'-4"		SHEET PILE VERTICAL
R406	X	396	4'-7"		SHEET PILE VERTICAL
R407	X	72	4'-10"		SHEET PILE VERTICAL
R408	X	144	5'-1"		SHEET PILE VERTICAL
R409	X	72	5'-4"		SHEET PILE VERTICAL
R410	X	36	5'-7"		SHEET PILE VERTICAL
R411	X	108	5'-10"		SHEET PILE VERTICAL
R412	X	36	6'-1"		SHEET PILE VERTICAL
R413	X	36	6'-4"		SHEET PILE VERTICAL
R414	X	36	6'-7"		SHEET PILE VERTICAL
R415	X	15	5'-5"	X	TOE WALL VERTICAL
R416	X	5	14'-0"		TOE WALL LONGITUDINAL

### BAR BENDS



### SAWCUT CONTRACTION JOINT

SAWCUT CONTRACTION JOINTS AT 15'-0" MAX SPACING IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS



### DRAINAGE DETAIL

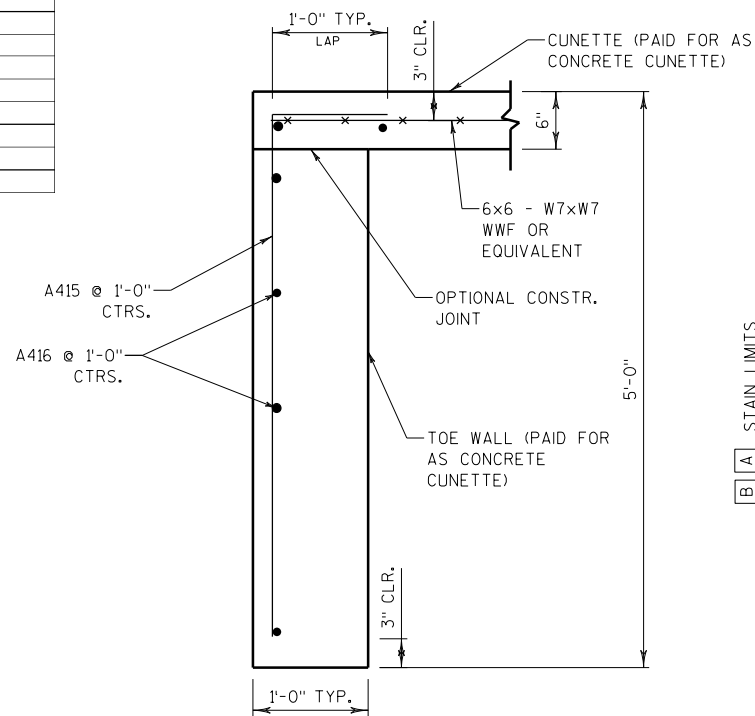
(ELEVATION VIEW AT TOP OF CAP)

PLACE AT EXISTING LOW SWALES AT THE DIRECTION OF THE FIELD ENGINEER TO ALLOW FOR DRAINAGE.

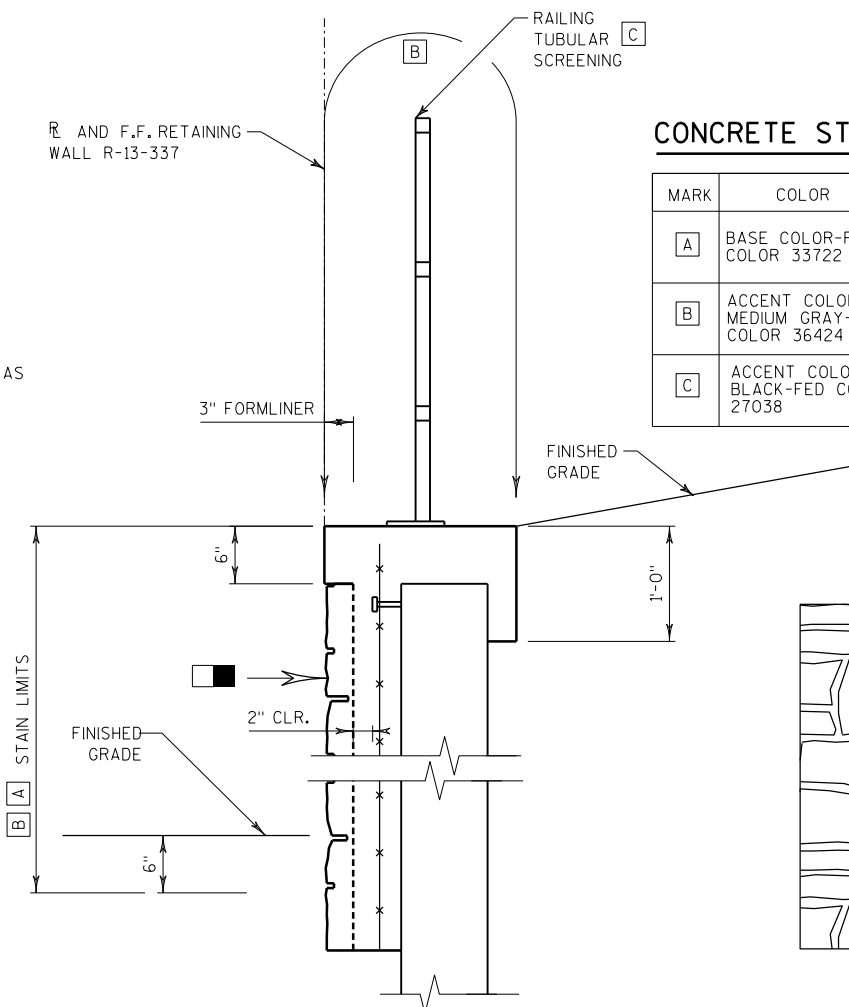
SPACE RAIL POSTS A MIN. 7" FROM EDGE OF DRAINAGE DETAIL. SEE RETAINING WALL RAILING TUBULAR SCREENING SHEET FOR POST ANCHORAGE DETAILS.

### CONCRETE STAINING SCHEDULE

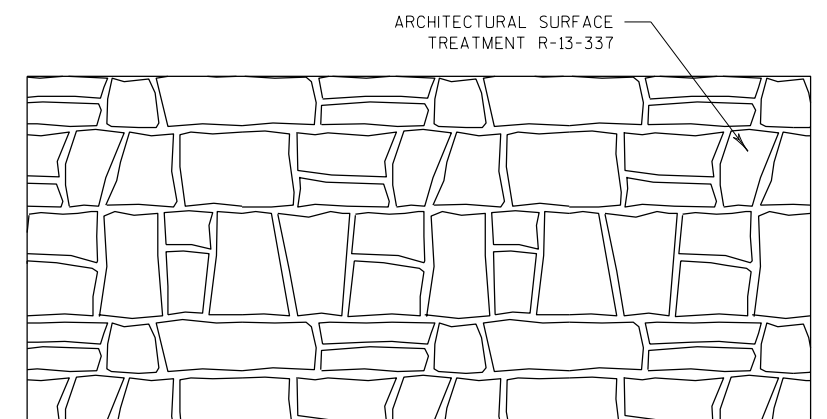
MARK	COLOR	LOCATION	NOTES
A	BASE COLOR-FED COLOR 33722	RAISED AREAS (STONE)	EXPOSED FACES TO 0'-6" BELOW FINAL GRADE
B	ACCENT COLOR MEDIUM GRAY-FED COLOR 36424	DEPRESSED AREAS (GROUT) COPING	EXPOSED FACES TO 0'-6" BELOW FINAL GRADE FACE, TOP, AND UNDERSIDE
C	ACCENT COLOR BLACK-FED COLOR 27038	RAILING TUBULAR SCREENING	TWO-COAT FOR SPECIFIC USE WITH GALVANIZED STEEL



### DETAIL AT CUNETTE TOE WALL



### FORMLINER AND STAINING DETAILS AT WALL



### RUSTIC ASHLAR PATTERN

FORMLINER THICKNESS = 3"  
SIZE = 8" TO 32"  
MAX. RELIEF = 2"

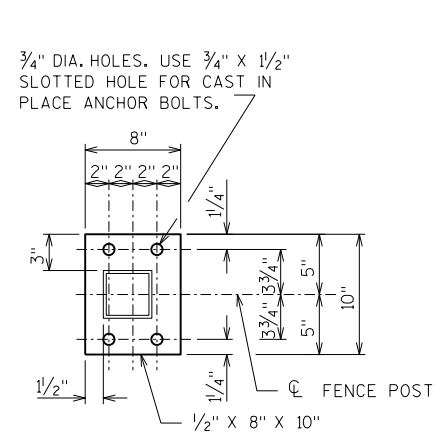
### NOTES

EXPOSED FACE TO BE STAINED 0'-6" (MIN) BELOW FINISHED GRADE. PAY LIMIT IS 0'-6" BELOW FINISHED GRADE (FF).

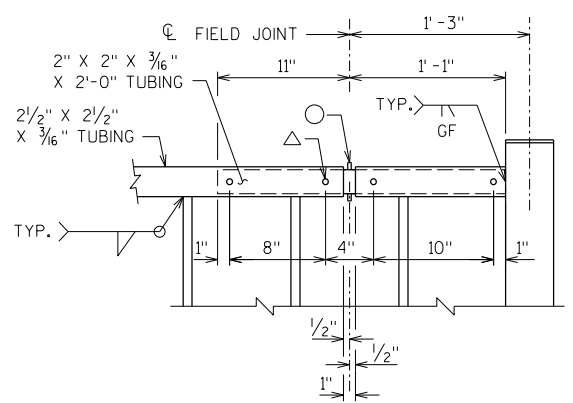
AESTHETIC PANEL PATTERN SHALL BE PLACED AS SHOWN ON GENERAL PLAN AND ELEVATION SHEET.

PROVIDE FORMLINER ARCHITECTURAL SURFACE TREATMENT USING RUSTIC ASHLAR PATTERN. ARCHITECTURAL SURFACE TREATMENT TO EXTEND VERTICALLY FROM 6" COPING AT TOP OF WALL TO A MINIMUM OF 0'-6" BELOW TOP OF CUNETTE SLAB ELEVATION AND EXTEND HORIZONTALLY FULL LENGTH OF EXPOSED WALL FACE.

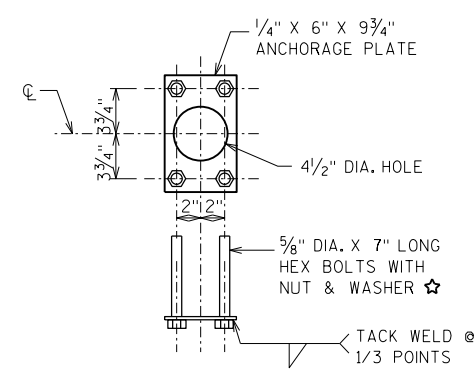
PLACE REINFORCEMENT WITH MINIMUM 2" OF CLEAR COVER UNLESS NOTED OTHERWISE.



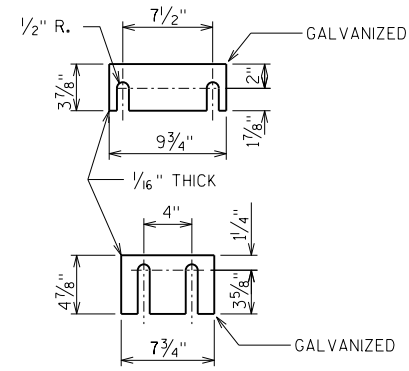
**BASE PLATE**



**RAILING EXPANSION JOINT DETAIL**



**ANCHORAGE DETAIL**



**SHIM PLATE DETAILS**

**NOTES**

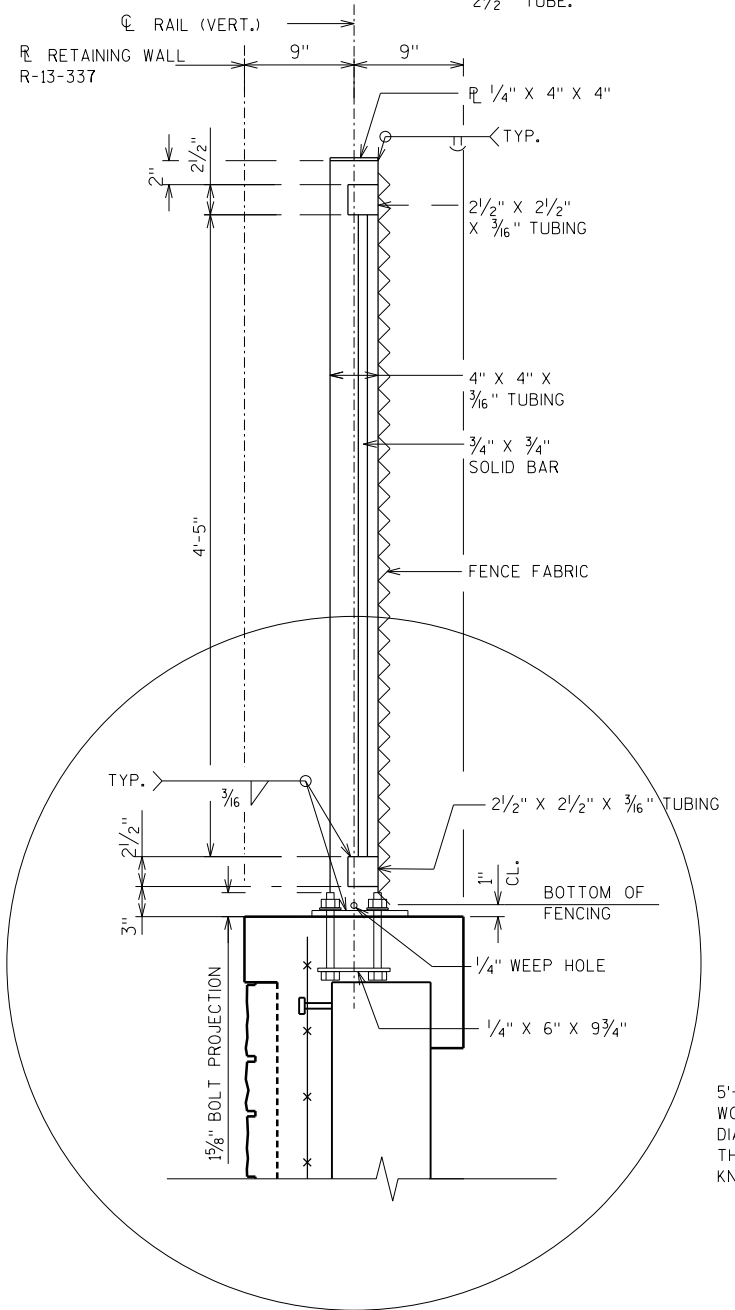
- POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.
- STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. PLATES, ANGLES, BARS AND SHIMS SHALL CONFORM TO ASTM A709, GRADE 36. FENCE FABRIC SHALL CONFORM TO F668, CLASS 2B.
- ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET POSTS NORMAL TO GRADE.
- ALL POST SPACINGS ARE TAKEN HORIZONTAL ALONG CENTERLINE OF RAILING AT BASE OF POST.
- STEEL SHIMS SHALL BE PROVIDED & USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT, AND SHALL BE GALVANIZED.
- CAULK AROUND PERIMETER OF BASE PLATES AND FILL PORTION OF SLOTTED HOLES AROUND ANCHOR BOLTS WITH NON-STAINING BLACK NON-BITUMINOUS JOINT SEALER.
- CUT BOTTOM OF POST TO MAKE VERTICAL IN TRANSVERSE DIRECTION.
- ANCHOR BOLTS, NUTS AND WASHERS SHALL BE EITHER STAINLESS STEEL OR ASTM 307. IF 307 IS USED, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.
- ALL RAILING ITEMS SHOWN AND INSTALLATION WILL BE INCLUDED IN BID ITEM "RETAINING WALL RAILING TUBULAR SCREENING".
- RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE NOT MORE THAN 3 POSTS.
- VENT HOLES SHALL BE DRILLED IN MEMBERS AS REQUIRED TO FACILITATE GALVANIZING AND DRAINAGE.
- ALL RAILING MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING THE STEEL RAILING SHALL BE GIVEN A NO. 6 BLAST CLEANING PER SSPC SPECIFICATIONS. PAINT OVER GALVANIZING WITH AN APPROVED TIE COAT AND TOP COAT AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE RAILING SHALL BE PAINTED AMS STD. COLOR NO. 27038, BLACK. FENCE FABRIC AND TIES TO BE VINYL-COATED. COLOR SHALL BE BLACK IN ACCORDANCE WITH ASTM F934.
- THE END OF THE FABRIC SHALL BE ATTACHED TO THE POST BY MEANS OF A TENSION BAR THREADED THROUGH THE END LOOPS OF THE FABRIC AND SECURED TO THE POST WITH CLAMPS & BOLT. THE FABRIC SHALL BE STRETCHED TO REMOVE ALL SLACK.

**LEGEND**

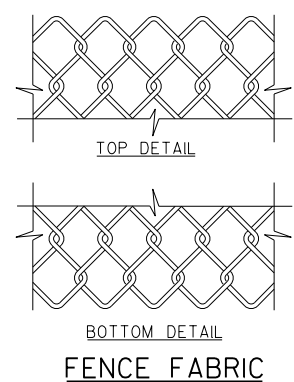
- 5/16" x 3/8" WELDED STUDS
- △ WELD BEAD ON EACH SIDE OF TUBE. GRIND BEADS SO THAT SLEEVE FITS FREELY INSIDE THE 2 1/2" x 2 1/2" TUBE.

☆ ALTERNATIVE ANCHORAGE: ADHESIVE ANCHORS 5/8-INCH, EMBED 5" IN CONCRETE. ADHESIVE ANCHORS SHALL CONFORM TO SECTION 502.2.12 OF WISDOT STANDARD SPECIFICATIONS.

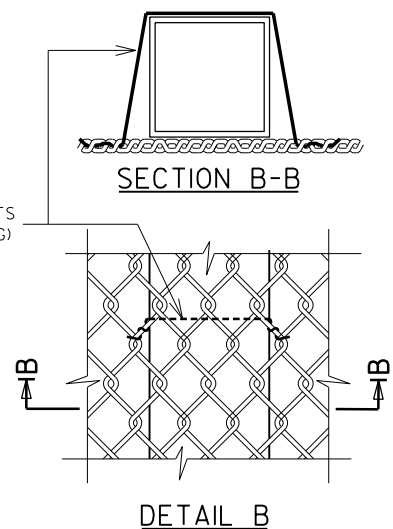
NOTE: ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.



**SECTION THRU RAILING**

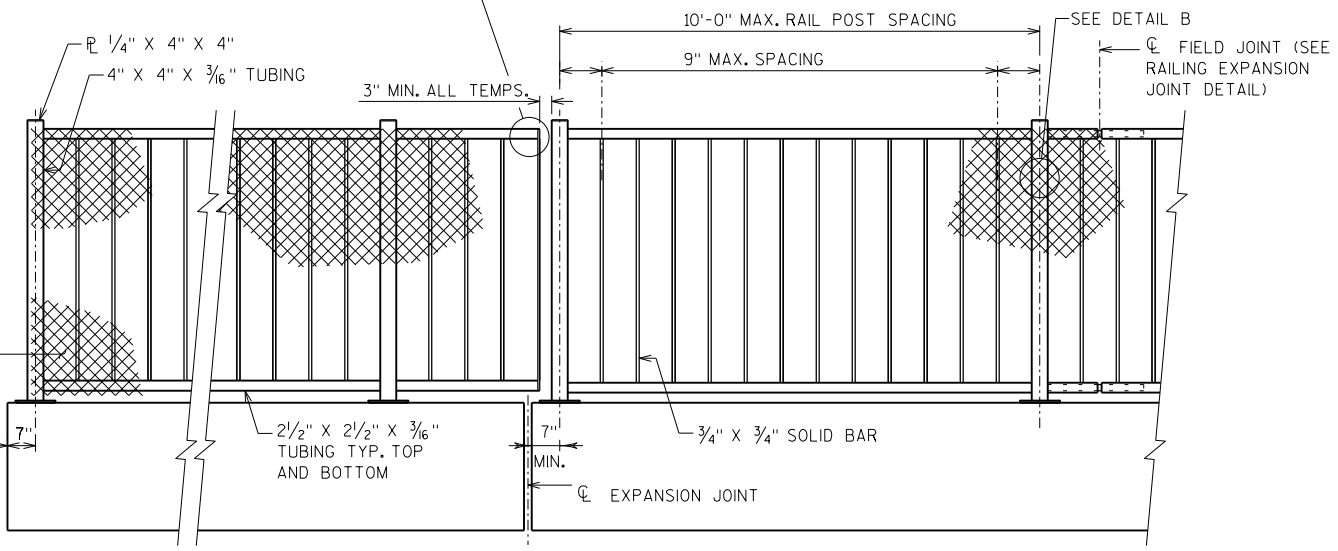


**FENCE FABRIC**

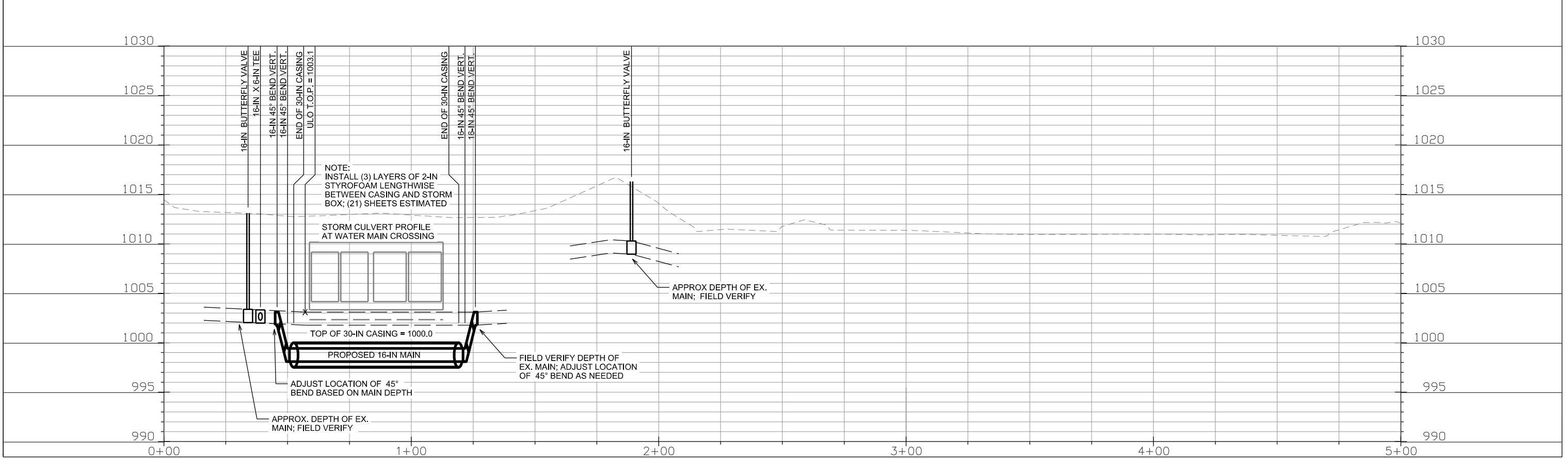
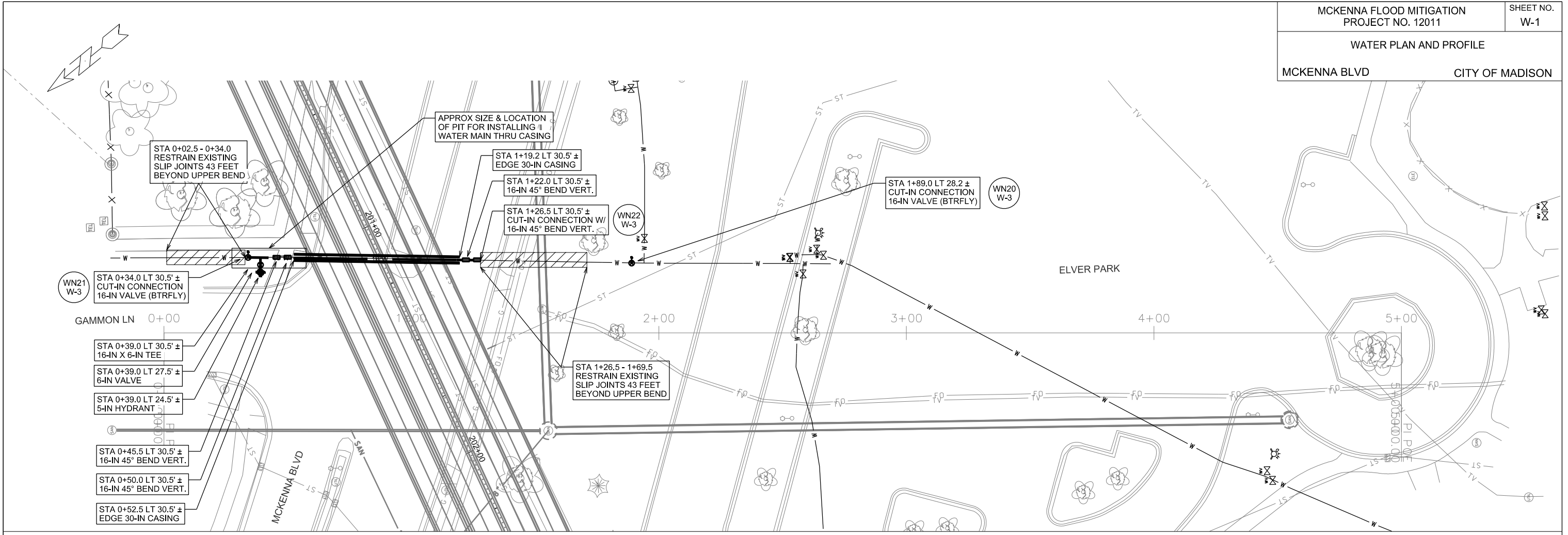


**DETAIL B**

5'-0" VINYL COATED FENCE FABRIC WOVEN OF 9-GAUGE WIRE IN 2" DIAMOND PATTERN MESH WITH BOTH THE TOP AND BOTTOM SELVAGES KNUCKLED.



**INSIDE ELEVATION OF RAILING**

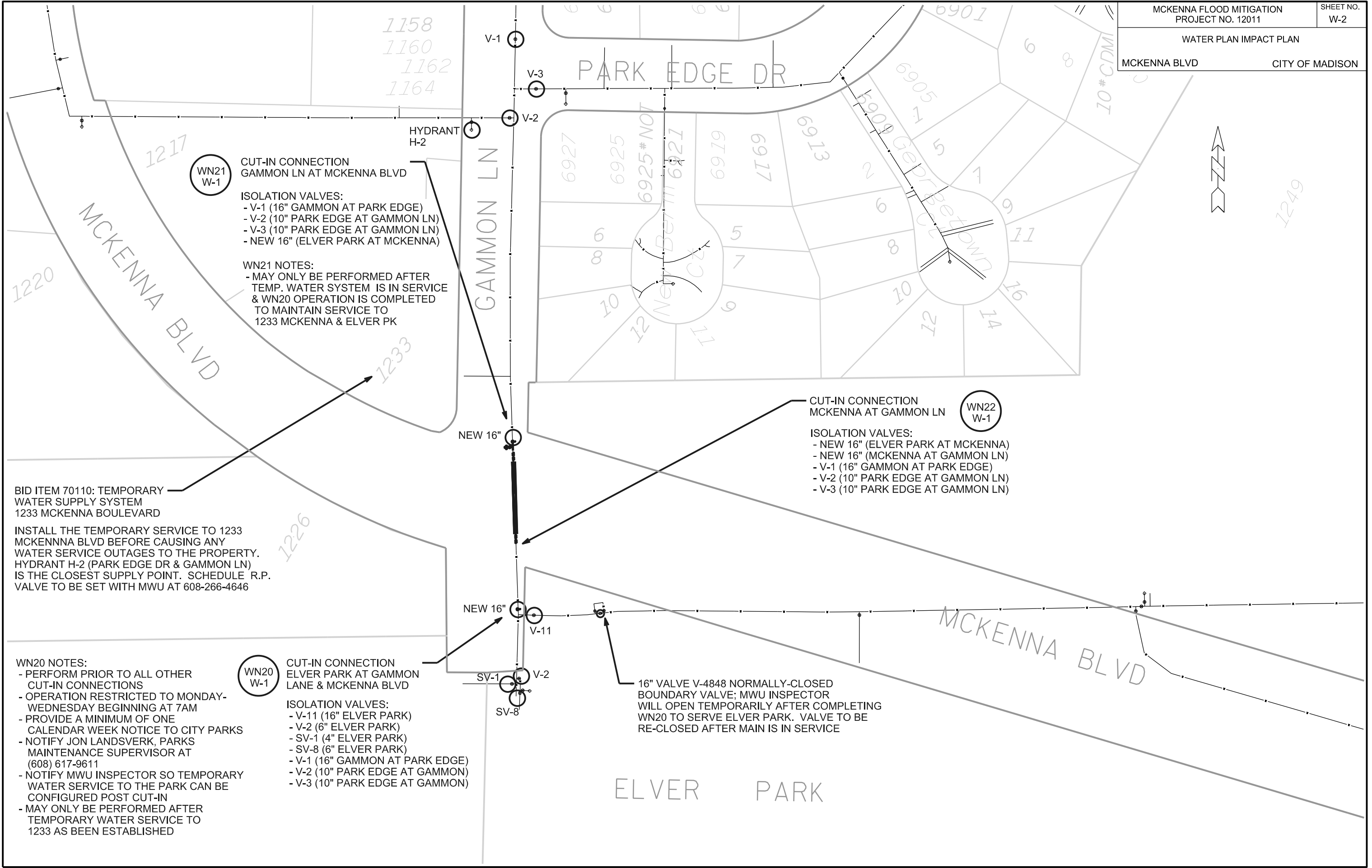


PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION



WN21  
W-1

CUT-IN CONNECTION  
GAMMON LN AT MCKENNA BLVD

ISOLATION VALVES:  
- V-1 (16" GAMMON AT PARK EDGE)  
- V-2 (10" PARK EDGE AT GAMMON LN)  
- V-3 (10" PARK EDGE AT GAMMON LN)  
- NEW 16" (ELVER PARK AT MCKENNA)

WN21 NOTES:  
- MAY ONLY BE PERFORMED AFTER  
TEMP. WATER SYSTEM IS IN SERVICE  
& WN20 OPERATION IS COMPLETED  
TO MAINTAIN SERVICE TO  
1233 MCKENNA & ELVER PK

WN22  
W-1

CUT-IN CONNECTION  
MCKENNA AT GAMMON LN

ISOLATION VALVES:  
- NEW 16" (ELVER PARK AT MCKENNA)  
- NEW 16" (MCKENNA AT GAMMON LN)  
- V-1 (16" GAMMON AT PARK EDGE)  
- V-2 (10" PARK EDGE AT GAMMON LN)  
- V-3 (10" PARK EDGE AT GAMMON LN)

WN20  
W-1

CUT-IN CONNECTION  
ELVER PARK AT GAMMON  
LANE & MCKENNA BLVD

ISOLATION VALVES:  
- V-11 (16" ELVER PARK)  
- V-2 (6" ELVER PARK)  
- SV-1 (4" ELVER PARK)  
- SV-8 (6" ELVER PARK)  
- V-1 (16" GAMMON AT PARK EDGE)  
- V-2 (10" PARK EDGE AT GAMMON)  
- V-3 (10" PARK EDGE AT GAMMON)

BID ITEM 70110: TEMPORARY  
WATER SUPPLY SYSTEM  
1233 MCKENNA BOULEVARD

INSTALL THE TEMPORARY SERVICE TO 1233  
MCKENNA BLVD BEFORE CAUSING ANY  
WATER SERVICE OUTAGES TO THE PROPERTY.  
HYDRANT H-2 (PARK EDGE DR & GAMMON LN)  
IS THE CLOSEST SUPPLY POINT. SCHEDULE R.P.  
VALVE TO BE SET WITH MWU AT 608-266-4646

WN20 NOTES:  
- PERFORM PRIOR TO ALL OTHER  
CUT-IN CONNECTIONS  
- OPERATION RESTRICTED TO MONDAY-  
WEDNESDAY BEGINNING AT 7AM  
- PROVIDE A MINIMUM OF ONE  
CALENDAR WEEK NOTICE TO CITY PARKS  
- NOTIFY JON LANDSVERK, PARKS  
MAINTENANCE SUPERVISOR AT  
(608) 617-9611  
- NOTIFY MWU INSPECTOR SO TEMPORARY  
WATER SERVICE TO THE PARK CAN BE  
CONFIGURED POST CUT-IN  
- MAY ONLY BE PERFORMED AFTER  
TEMPORARY WATER SERVICE TO  
1233 AS BEEN ESTABLISHED

16" VALVE V-4848 NORMALLY-CLOSED  
BOUNDARY VALVE; MWU INSPECTOR  
WILL OPEN TEMPORARILY AFTER COMPLETING  
WN20 TO SERVE ELVER PARK. VALVE TO BE  
RE-CLOSED AFTER MAIN IS IN SERVICE

PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

WATER ESTIMATE OF MATERIALS

MCKENNA BLVD CITY OF MADISON

CONSTRUCTION NOTES:

1. CONSTRUCT NEW WATER MAIN 6.0' BELOW FINISHED GRADE, UNLESS OTHERWISE NOTED. INSULATE MAIN WITH POLYSTYRENE BOARD AT UTILITY CROSSINGS OR OTHER AREAS IDENTIFIED BY ENGINEER AS HAVING INADEQUATE COVER.
2. VERIFY SIZE OF EXISTING WATER SERVICES AND RECONNECT SERVICES AS INDICATED.
3. MINIMIZE DISRUPTION OF SERVICE TO EXISTING CUSTOMERS. NOTIFY PER CONTRACT REQUIREMENTS OF ANY PLANNED WATER OUTAGE.
4. THE EXISTING UTILITIES SHOWN ON THIS PLAN REPRESENT THE BEST INFORMATION AVAILABLE TO THE WATER UTILITY AT THE TIME OF PLAN PREPARATION. CONTRACTOR IS RESPONSIBLE FOR HAVING EACH UTILITY LOCATED PRIOR TO COMMENCING WORK.

- WN1 REPLACE THE EXISTING LEAD SERVICE WITH A NEW COPPER SERVICE.
- WN2 EXTEND AND RECONNECT THE EXISTING COPPER SERVICE TO THE NEW WATER MAIN.
- WN3 EXISTING SERVICE TO BE ABANDONED WHEN THE WATER MAIN IS CUT OFF.
- WN4 DISCONNECT FROM THE OLD WATER MAIN AND RECONNECT THE EXISTING COPPER WATER SERVICE LATERAL TO THE NEW WATER MAIN.
- WN5 RELOCATE THE EXISTING FIRE HYDRANT.
- WN6 ABANDON WATER VALVE ACCESS STRUCTURE.
- WN7 FURNISH AND INSTALL THE NEW TOP SECTION FOR THE WATER ACCESS STRUCTURE.
- WN8 ABANDON THE VALVE BOX.
- WN9 FURNISH THE DITCH, COMPACTION, AND ALL MATERIALS AND LABOR FOR THE INSTALLATION OF NEW SERVICE LATERAL.
- WN10 REMOVE AND SALVAGE EXISTING HYDRANT
- WN11 REPLACE THE EXISTING COPPER SERVICE WITH A COPPER SERVICE
- WN20+ SEE WATER IMPACT PLAN FOR CONNECTION POINT ISOLATION AND WATER SHUT-OFF NOTIFICATION INFORMATION.

ESTIMATE OF MATERIALS SUPPLIED BY CONTRACTOR:

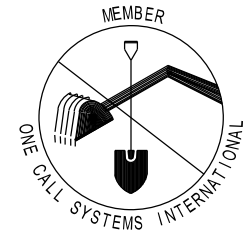
*\* ESTIMATE OF MATERIALS IS FOR INFORMATION ONLY. ENGINEER DOES NOT GUARANTEE ACCURACY OF MATERIAL TAKE-OFF.*

10-FT - 6-IN PIPE	1 - 16-IN X 6-IN TEE
100-FT - 16-IN PIPE	4 - 16-IN 45° BEND
67-FT - 30-IN CASING	1 - 5-IN HYDRANT
1 - 6-IN VALVE & BOX	168-FT - 2-IN STYROFOAM INSULATION
2 - 16-IN VALVE & BOX	135-FT - POLY WRAP

TO OBTAIN LOCATION OF PARTICIPANTS' UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN

CALL DIGGERS HOTLINE  
TOLL FREE  
811 OR 1-800-242-8511  
FAX-A-LOCATE 1-800-338-3860  
TDD (FOR HEARING IMPAIRED) 1-800-542-2289

WIS. STATUTE 182.0175 (1974)  
REQUIRES MIN. OF 3 WORK DAYS  
NOTICE BEFORE YOU EXCAVATE.



DISCLAIMER NOTE:  
UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO COMMENCING WORK.

MATERIALS SUPPLIED BY CITY:

*\* ESTIMATE OF MATERIALS IS FOR INFORMATION ONLY. ENGINEER DOES NOT GUARANTEE ACCURACY OF MATERIAL TAKE-OFF.*

NONE

ESTIMATE OF MATERIALS REUSED:

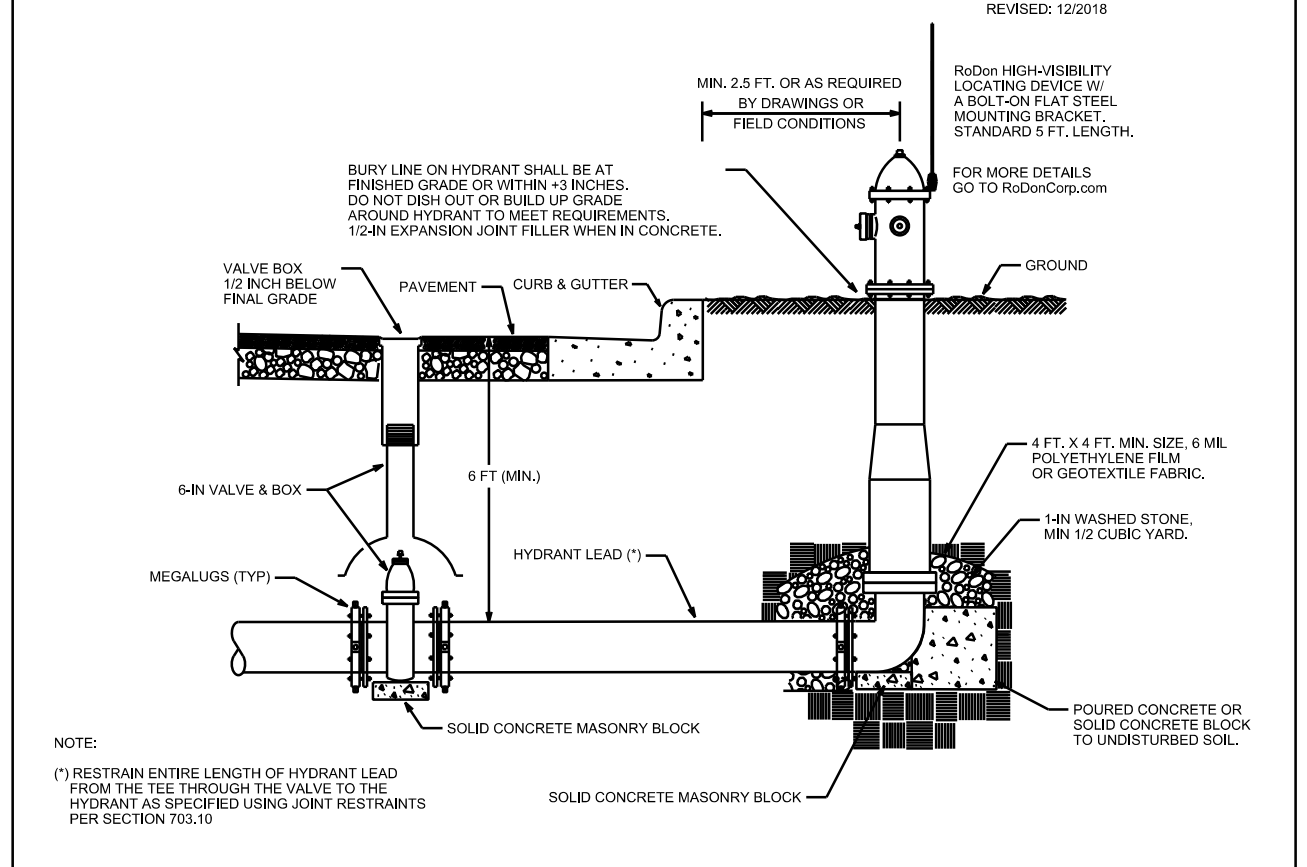
*\* ESTIMATE OF MATERIALS IS FOR INFORMATION ONLY. ENGINEER DOES NOT GUARANTEE ACCURACY OF MATERIAL TAKE-OFF.*

NONE

PART VII - WATER MAINS AND SERVICE LATERALS

DETAIL DRAWING NO. 7.04

REVISED: 12/2018



NOTE:  
(\*) RESTRAIN ENTIRE LENGTH OF HYDRANT LEAD FROM THE TEE THROUGH THE VALVE TO THE HYDRANT AS SPECIFIED USING JOINT RESTRAINTS PER SECTION 703.10

CITY OF MADISON WATER UTILITY	NOT TO SCALE	TYPICAL HYDRANT INSTALLATION
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City of Madison Standard Specifications for Public Works Construction

PLOT SCALE: \_\_\_\_\_

PLOT NAME: \_\_\_\_\_

REV. DATE: \_\_\_\_\_

ORIGINATOR: CITY OF MADISON, STREETS DIVISION



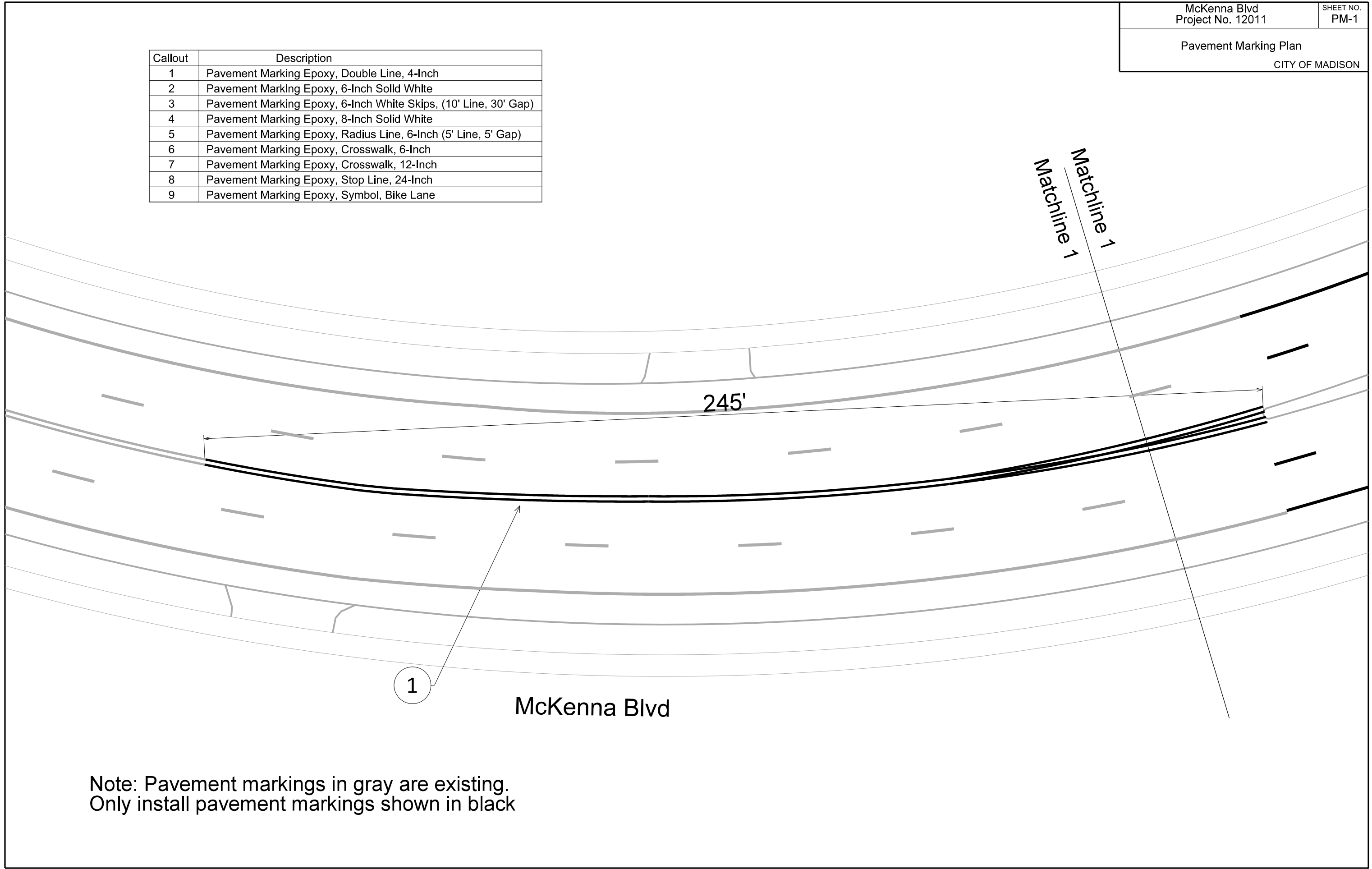
Callout	Description
1	Pavement Marking Epoxy, Double Line, 4-Inch
2	Pavement Marking Epoxy, 6-Inch Solid White
3	Pavement Marking Epoxy, 6-Inch White Skips, (10' Line, 30' Gap)
4	Pavement Marking Epoxy, 8-Inch Solid White
5	Pavement Marking Epoxy, Radius Line, 6-Inch (5' Line, 5' Gap)
6	Pavement Marking Epoxy, Crosswalk, 6-Inch
7	Pavement Marking Epoxy, Crosswalk, 12-Inch
8	Pavement Marking Epoxy, Stop Line, 24-Inch
9	Pavement Marking Epoxy, Symbol, Bike Lane

PLOT SCALE:

PLOT NAME:

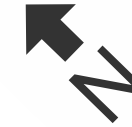
REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



Note: Pavement markings in gray are existing.  
Only install pavement markings shown in black

Callout	Description
1	Pavement Marking Epoxy, Double Line, 4-Inch
2	Pavement Marking Epoxy, 6-Inch Solid White
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5	Pavement Marking Epoxy, Radius Line, 6-Inch (5' Line, 5' Gap)
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7	Pavement Marking Epoxy, Crosswalk, 12-Inch
8	Pavement Marking Epoxy, Stop Line, 24-Inch
9	Pavement Marking Epoxy, Symbol, Bike Lane

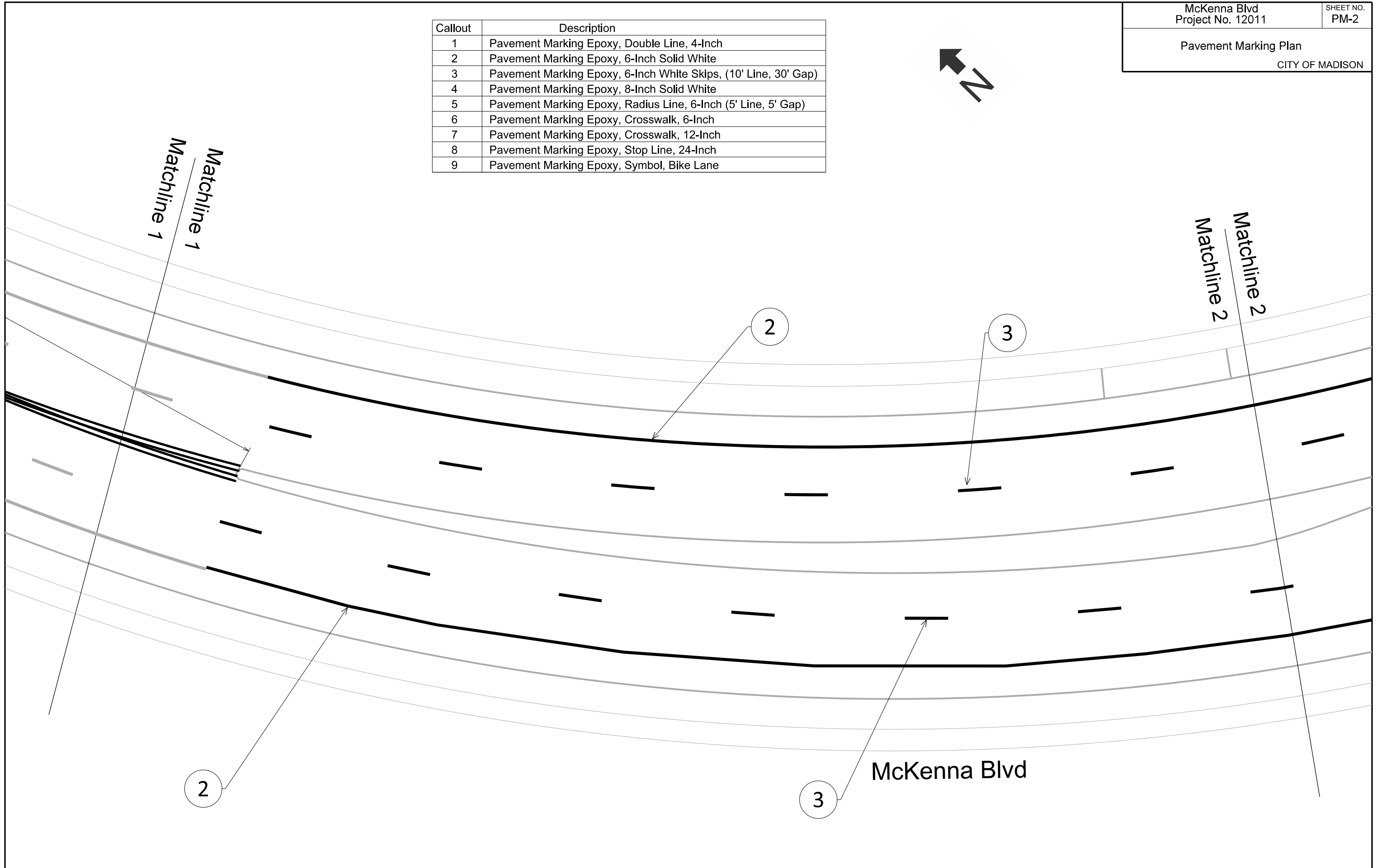


PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



Callout	Description
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8	Pavement Marking Epoxy, Stop Line, 24-Inch
9	Pavement Marking Epoxy, Symbol, Bike Lane

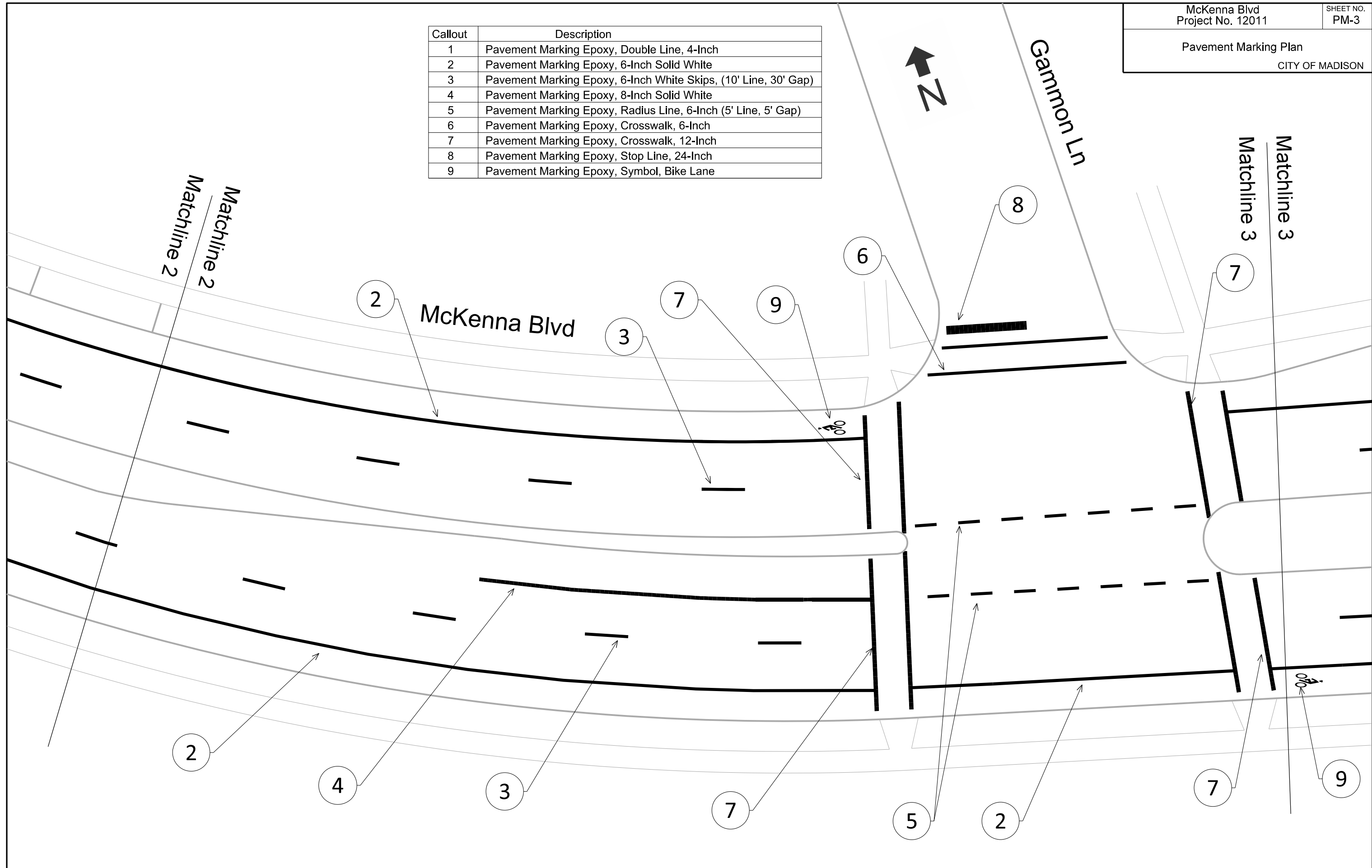


Gammon Ln

Matchline 3  
Matchline 3

McKenna Blvd

Matchline 2  
Matchline 2



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

Callout	Description
1	Pavement Marking Epoxy, Double Line, 4-Inch
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8	Pavement Marking Epoxy, Stop Line, 24-Inch
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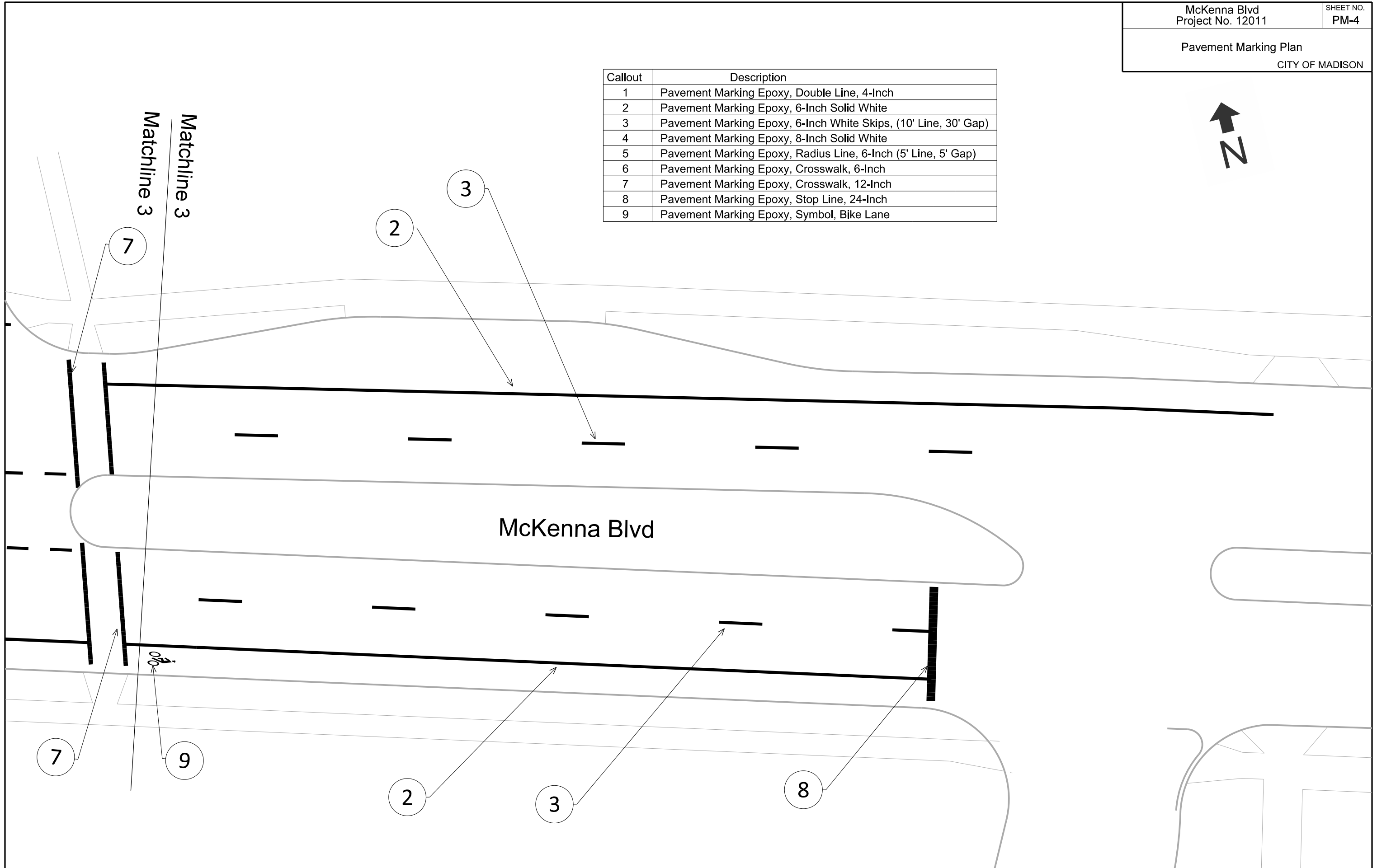


PLOT SCALE:

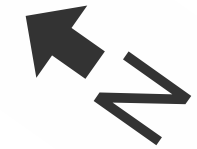
PLOT NAME:

REV. DATE:

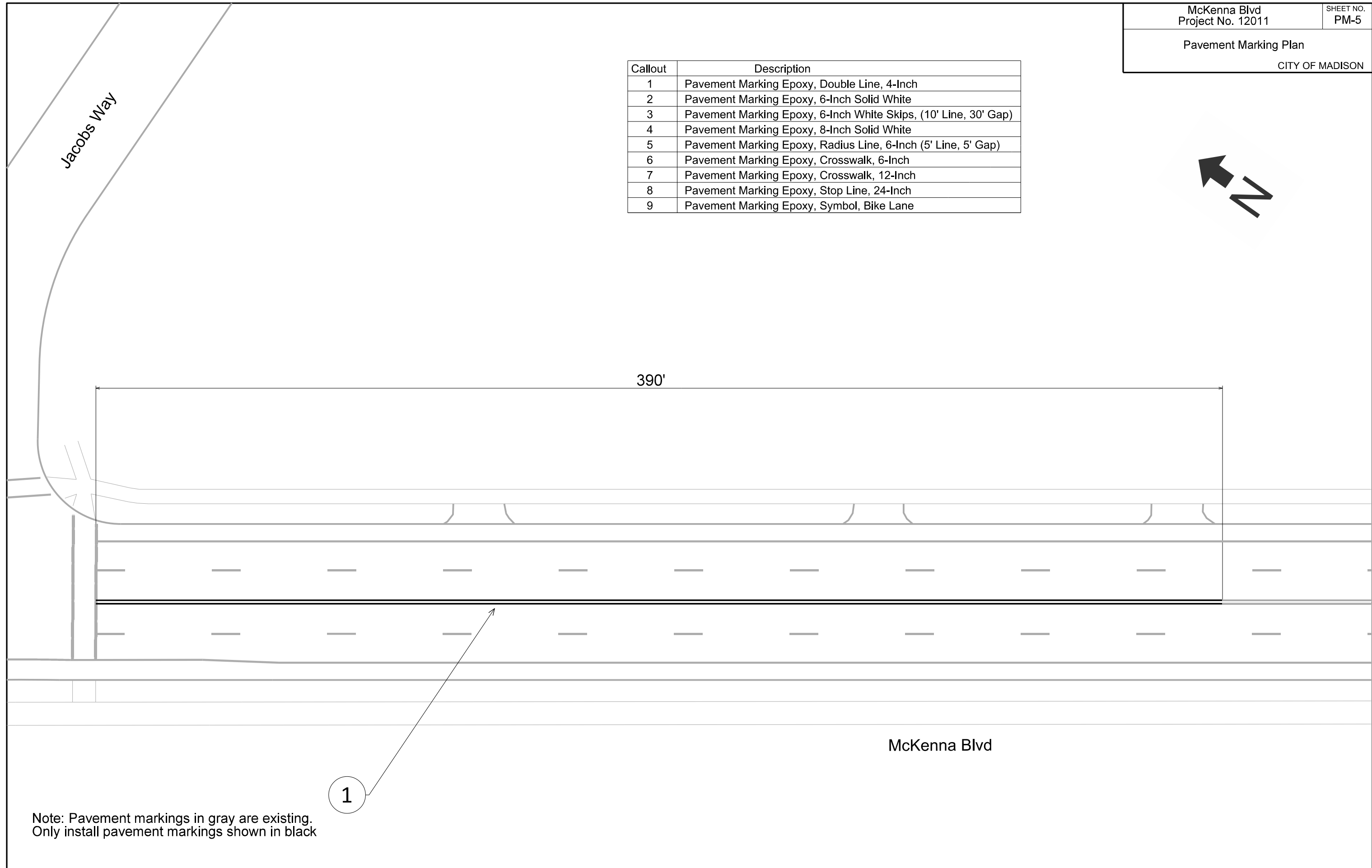
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



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PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



Note: Pavement markings in gray are existing.  
Only install pavement markings shown in black

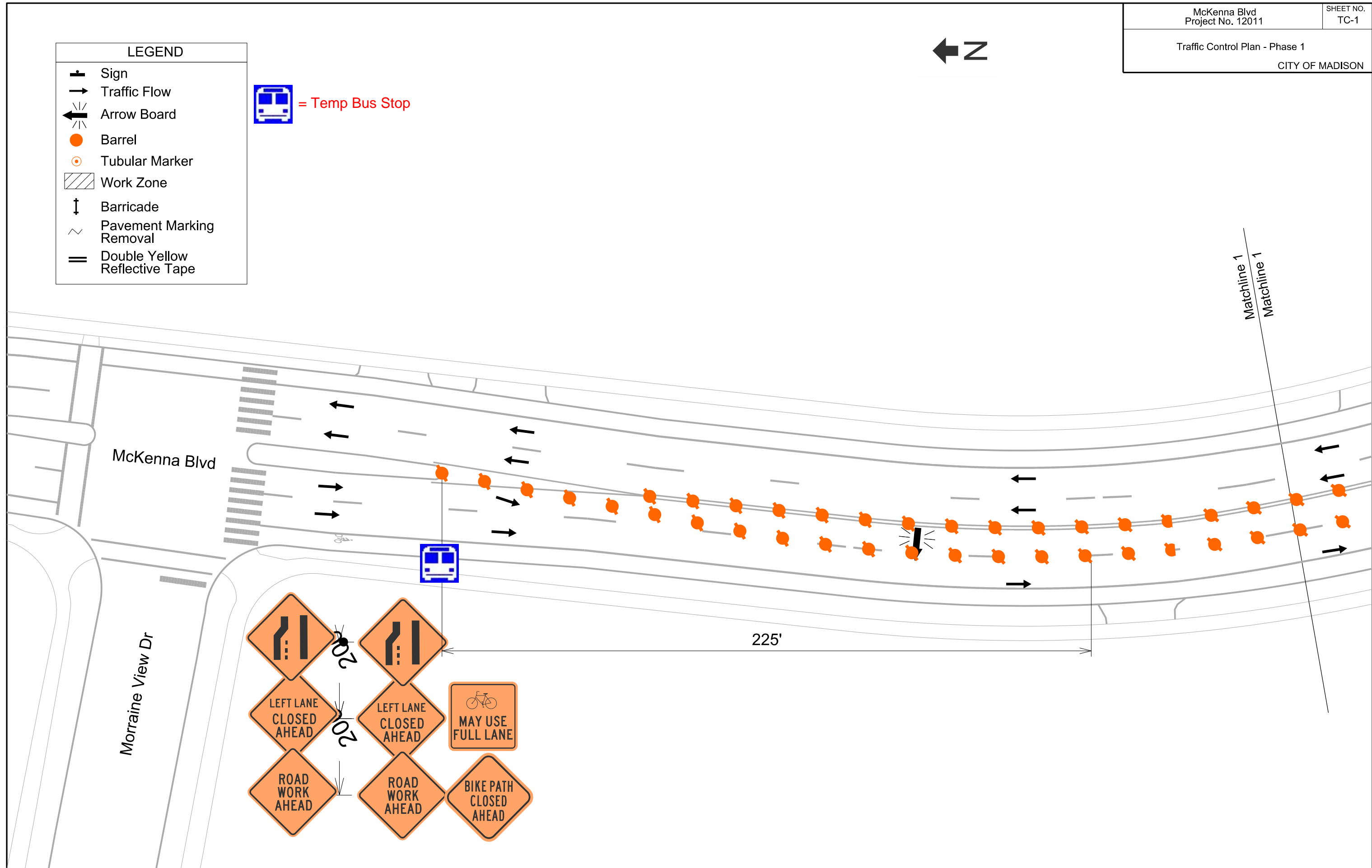
1



LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop

PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



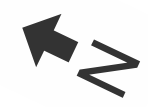
202'

202'

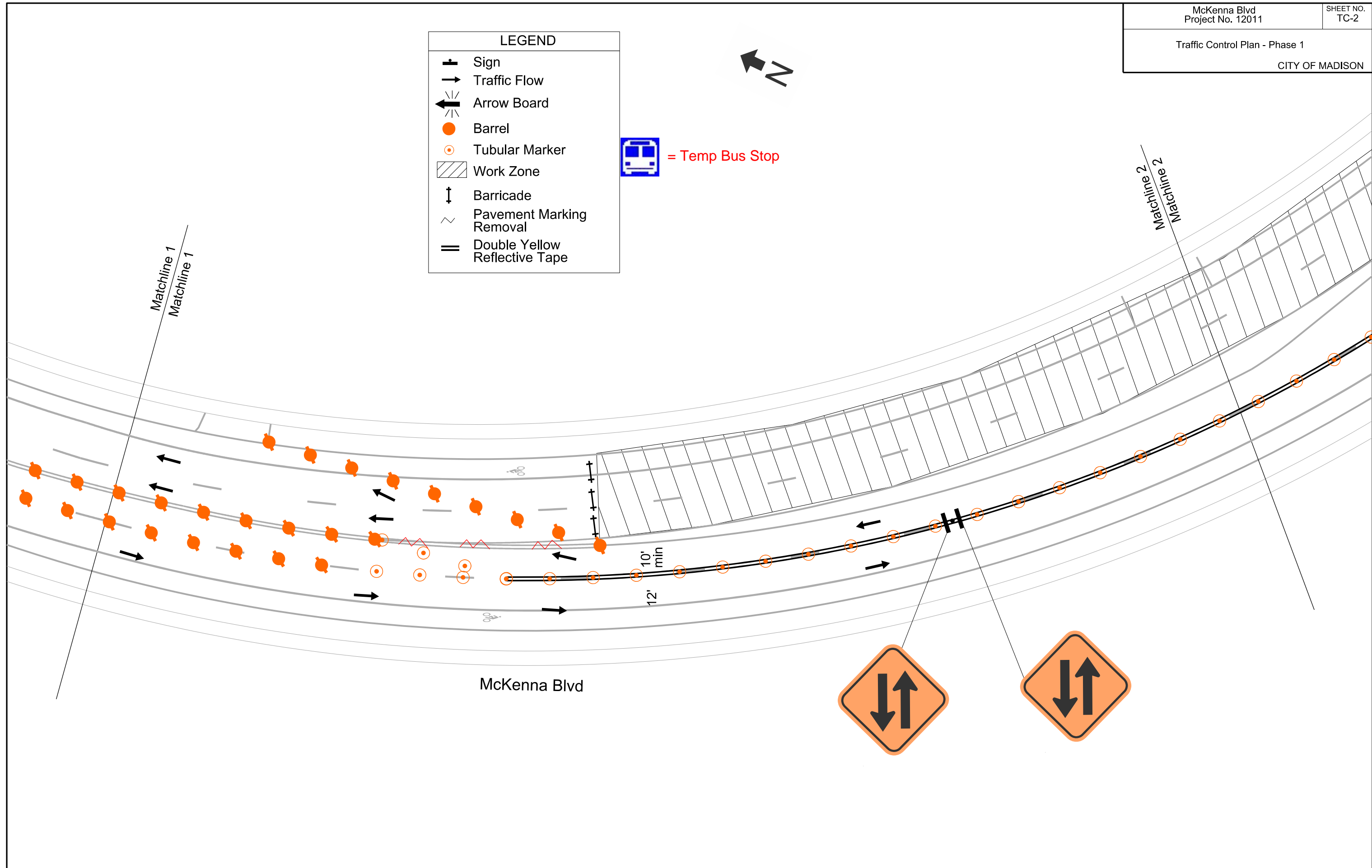
225'

LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.





Gannon Ln

McKenna Blvd

Matchline 2  
Matchline 2

Matchline 3  
Matchline 3

LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



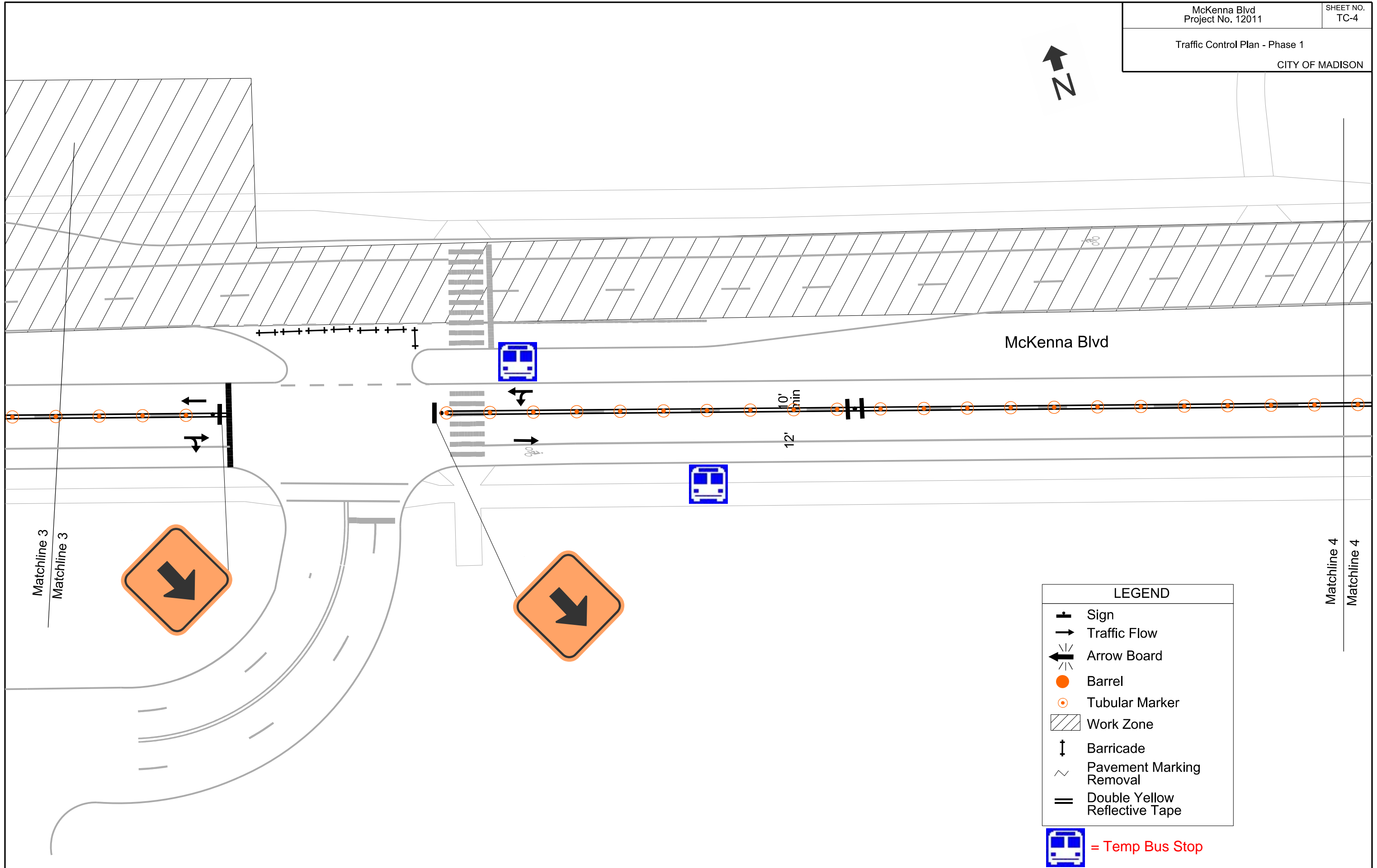


PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

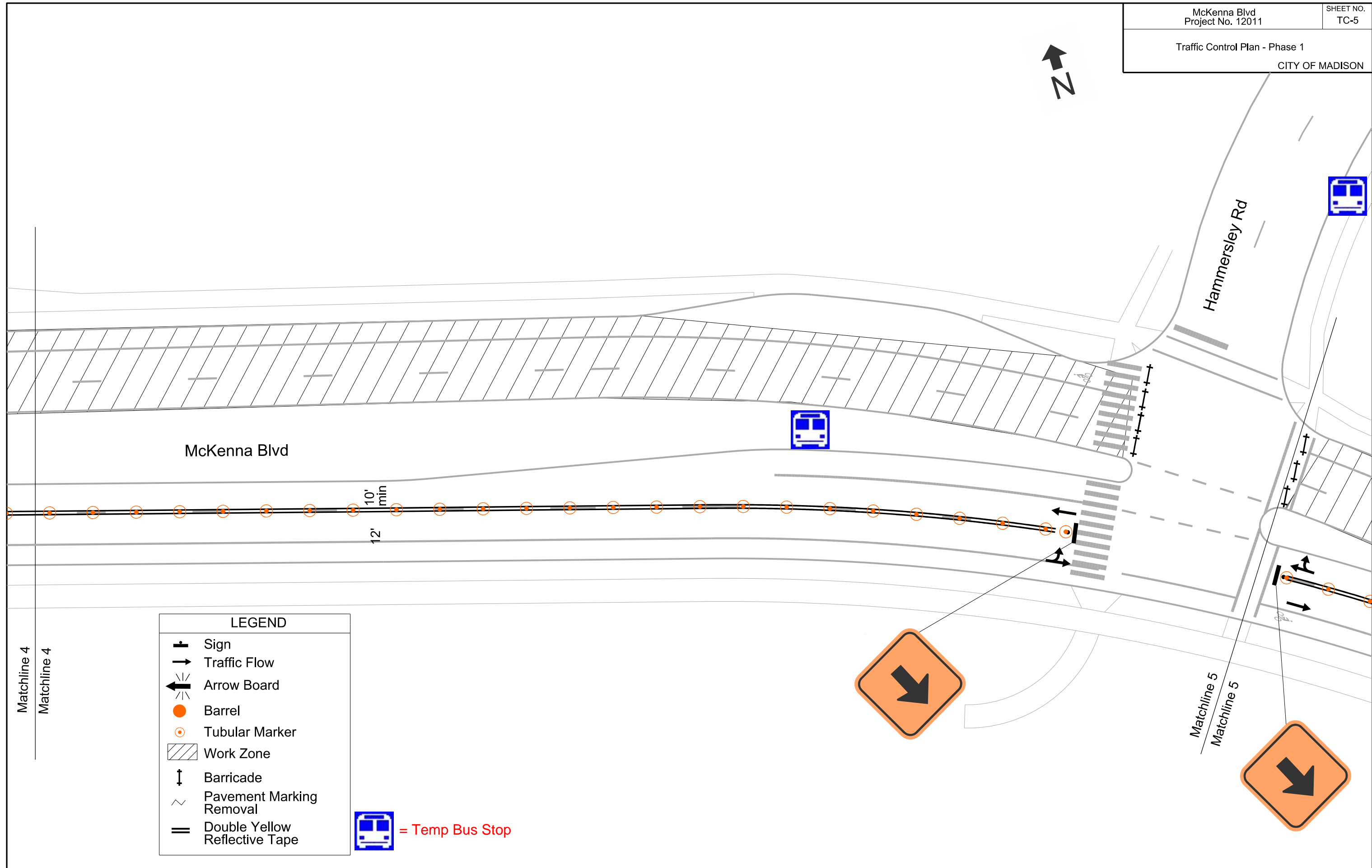


LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

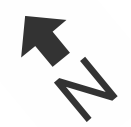


LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

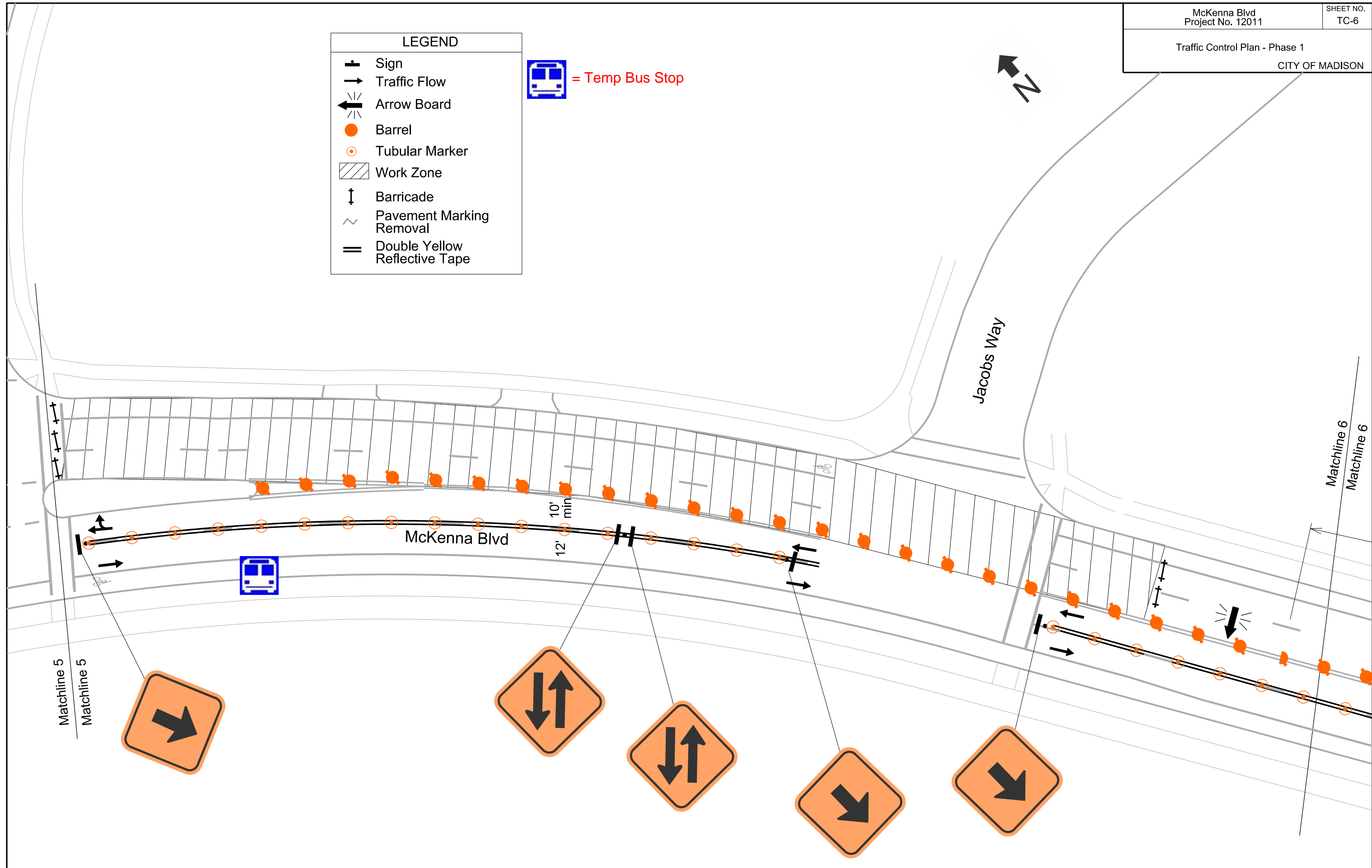
= Temp Bus Stop

LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

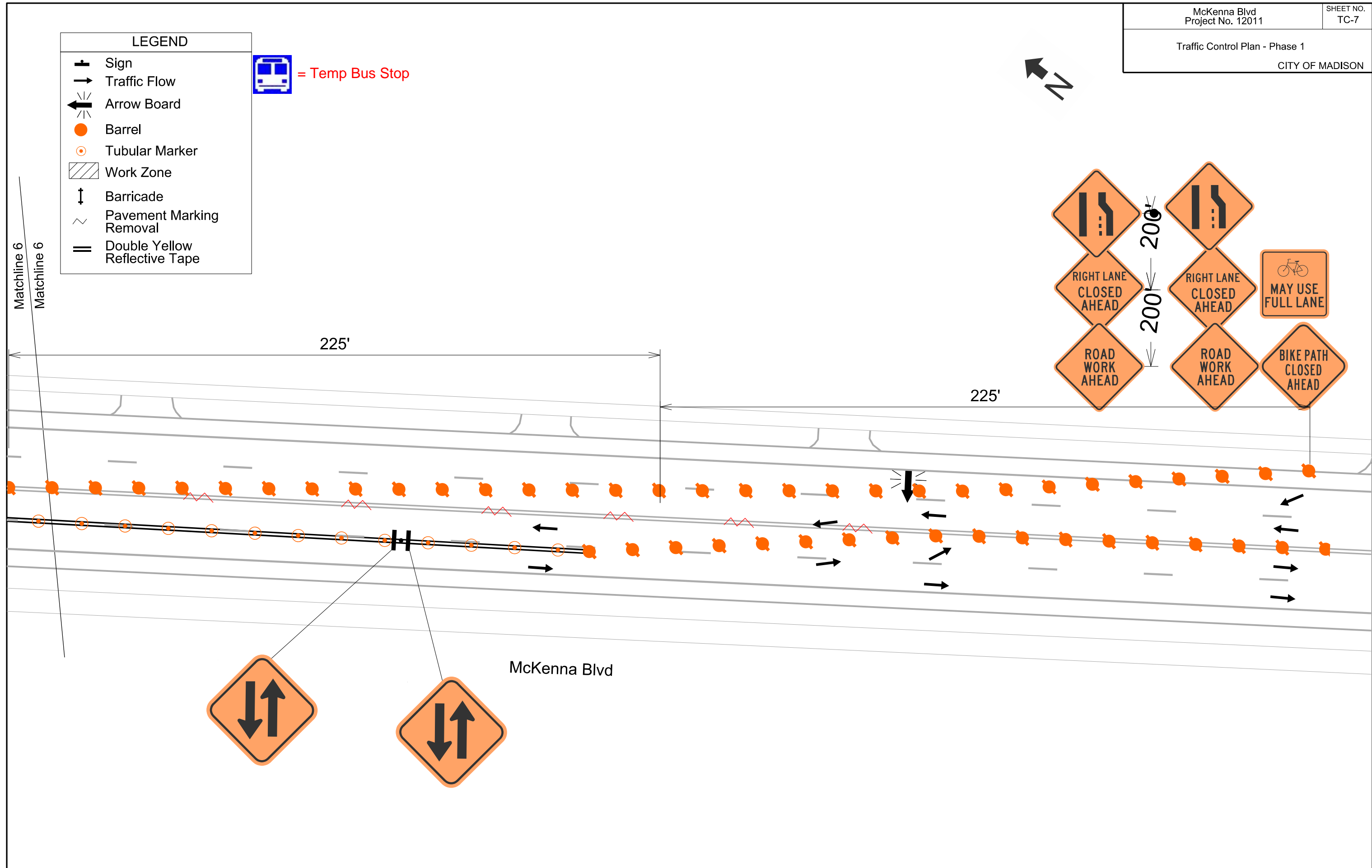


LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.





LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

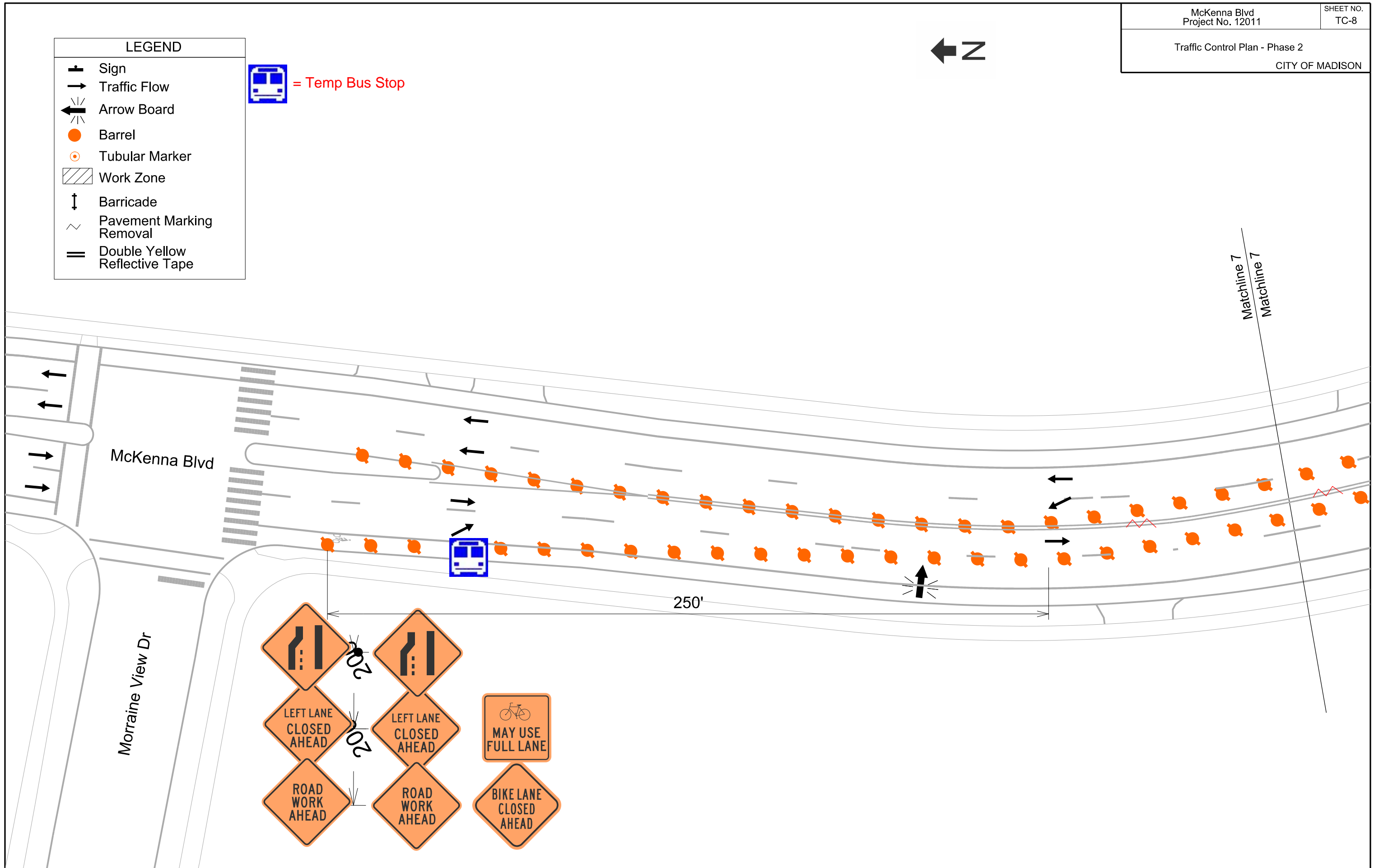
= Temp Bus Stop

PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



202

202

202

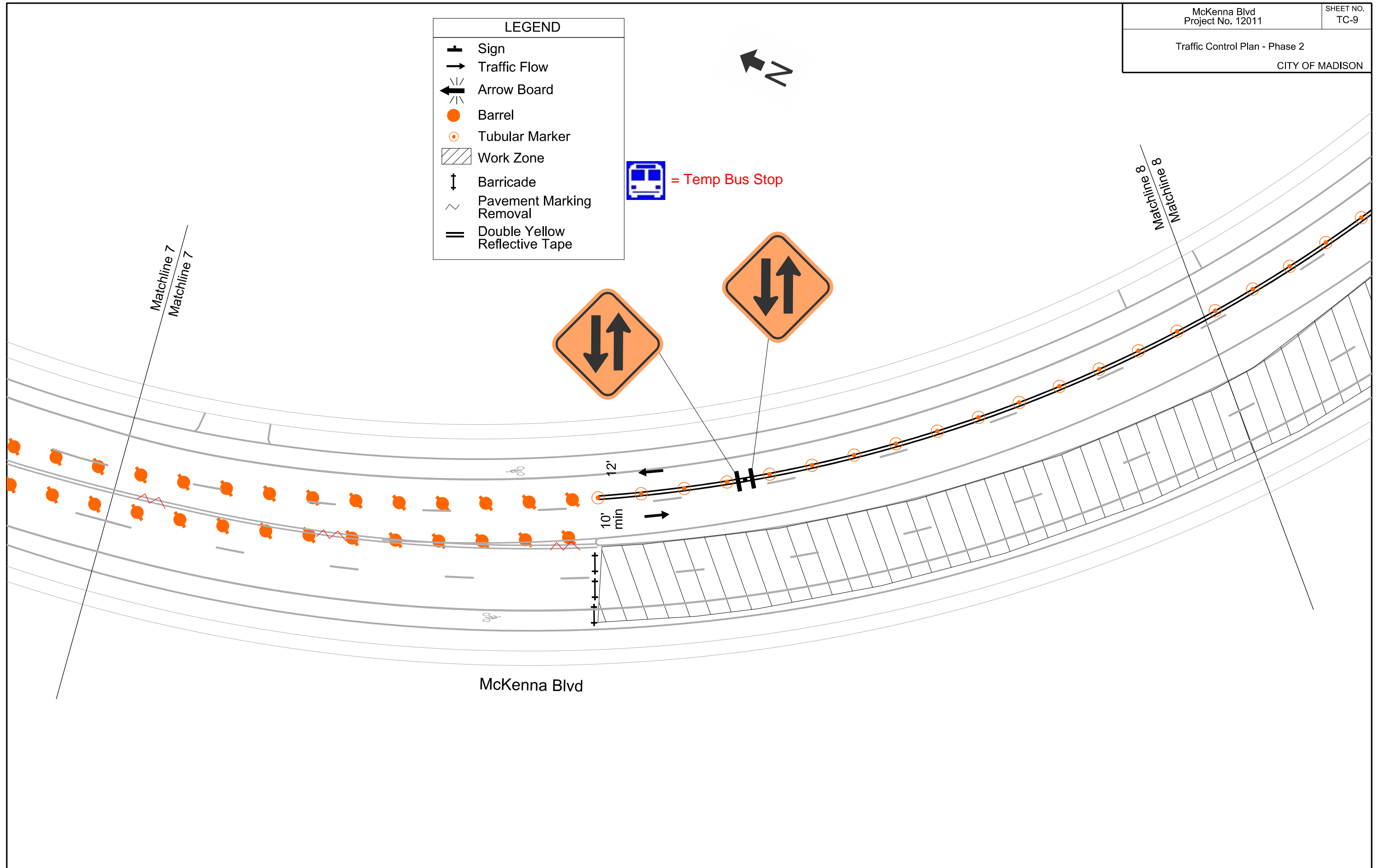
250'

LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape



= Temp Bus Stop

PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



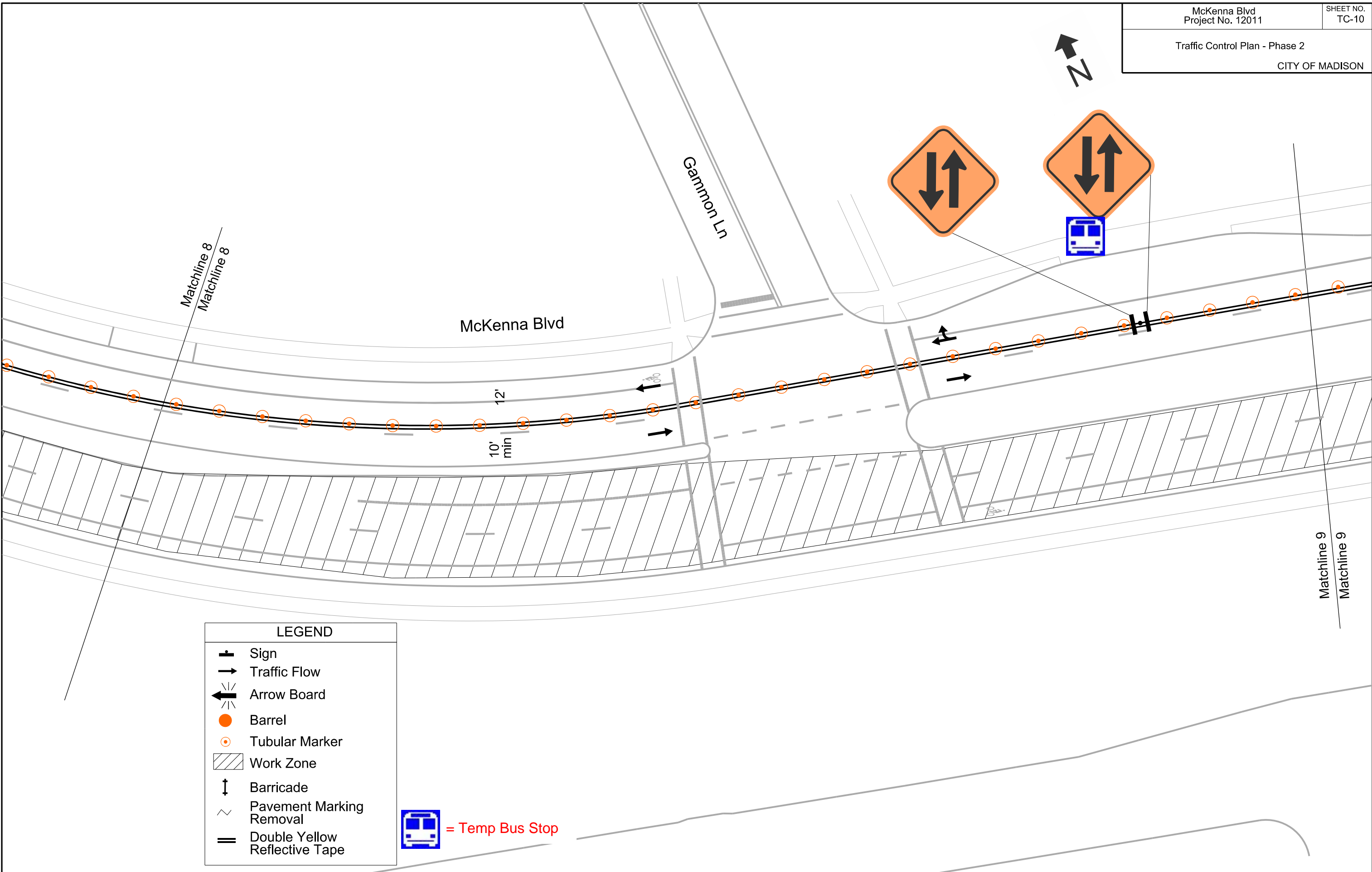


PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



LEGEND

-  Sign
-  Traffic Flow
-  Arrow Board
-  Barrel
-  Tubular Marker
-  Work Zone
-  Barricade
-  Pavement Marking Removal
-  Double Yellow Reflective Tape

 = Temp Bus Stop

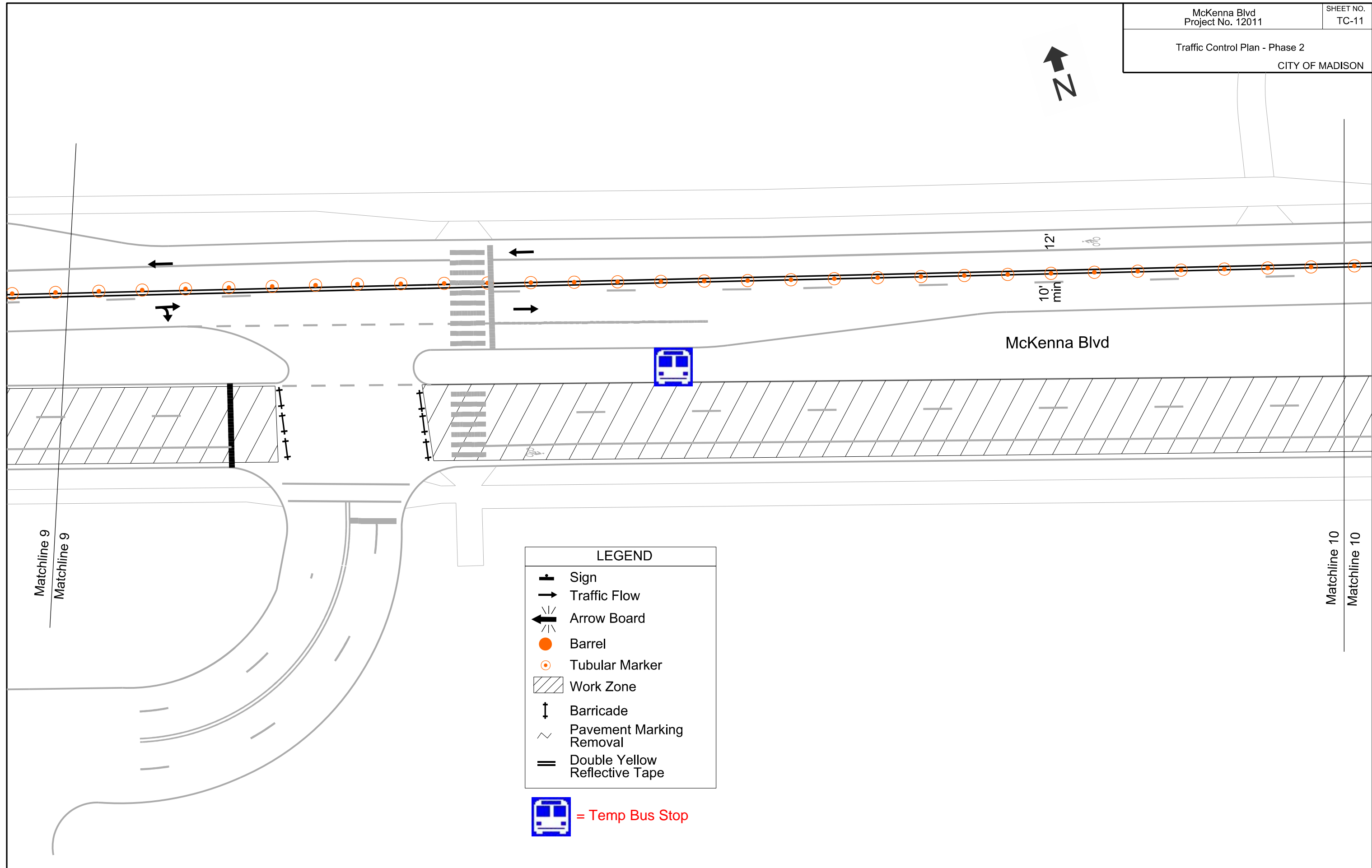


PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop



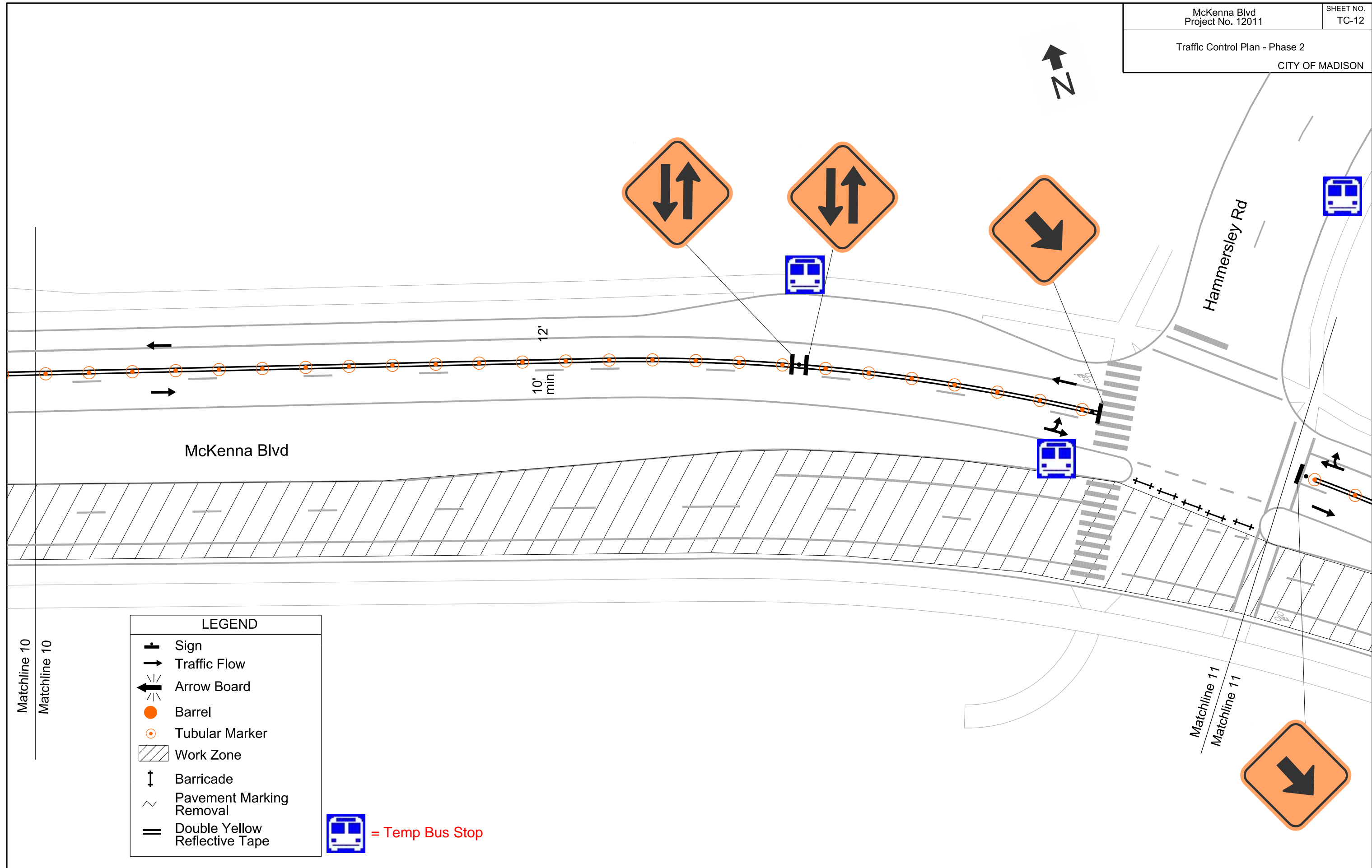


PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



**LEGEND**

- Sign
- Traffic Flow
- Arrow Board
- Barrel
- Tubular Marker
- Work Zone
- Barricade
- Pavement Marking Removal
- Double Yellow Reflective Tape

= Temp Bus Stop

Matchline 10  
Matchline 10

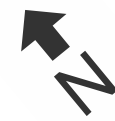
Matchline 11  
Matchline 11

McKenna Blvd

Hammersley Rd

LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop

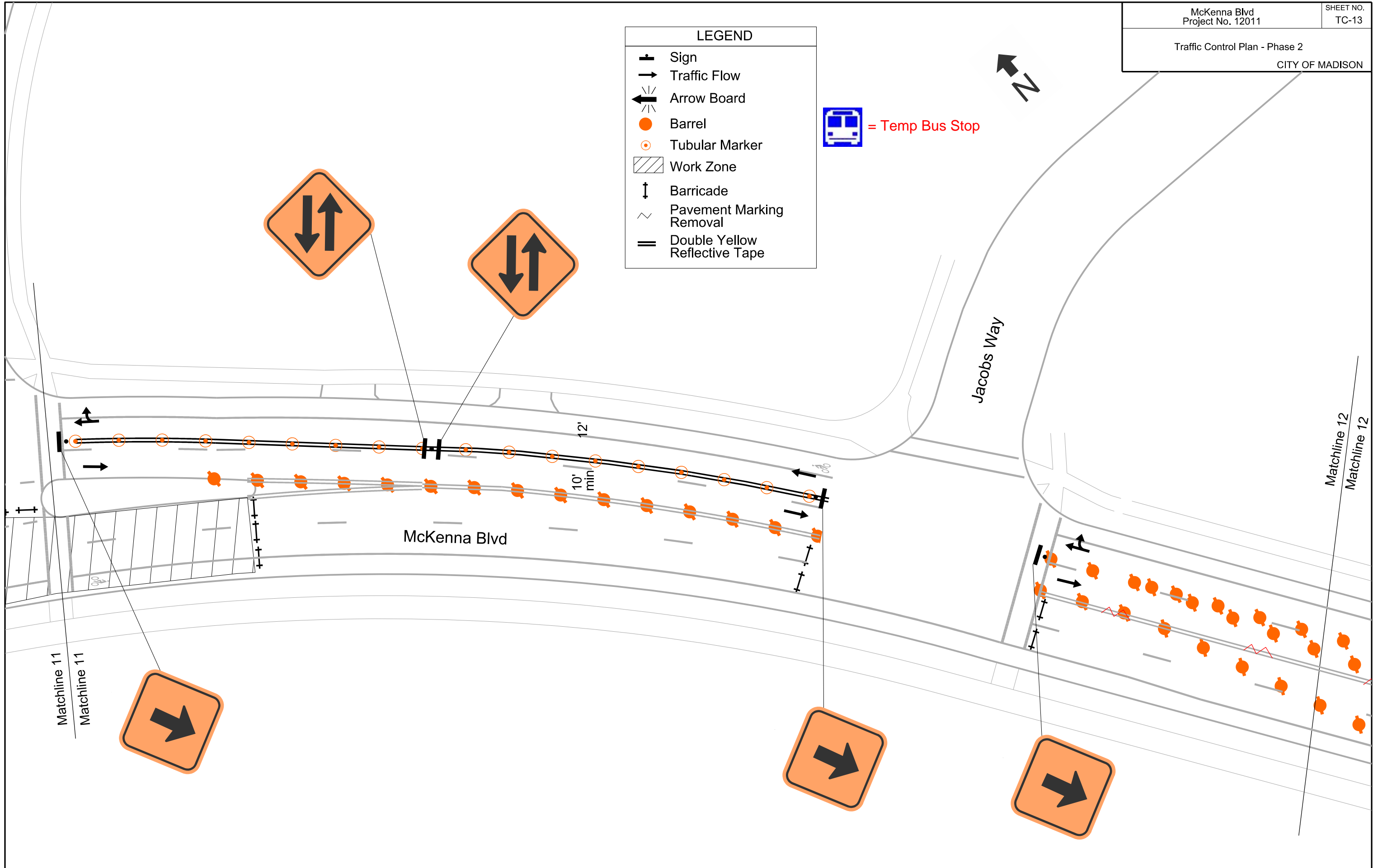


PLOT SCALE:

PLOT NAME:

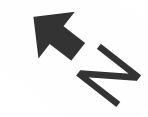
REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop



PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.





LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape



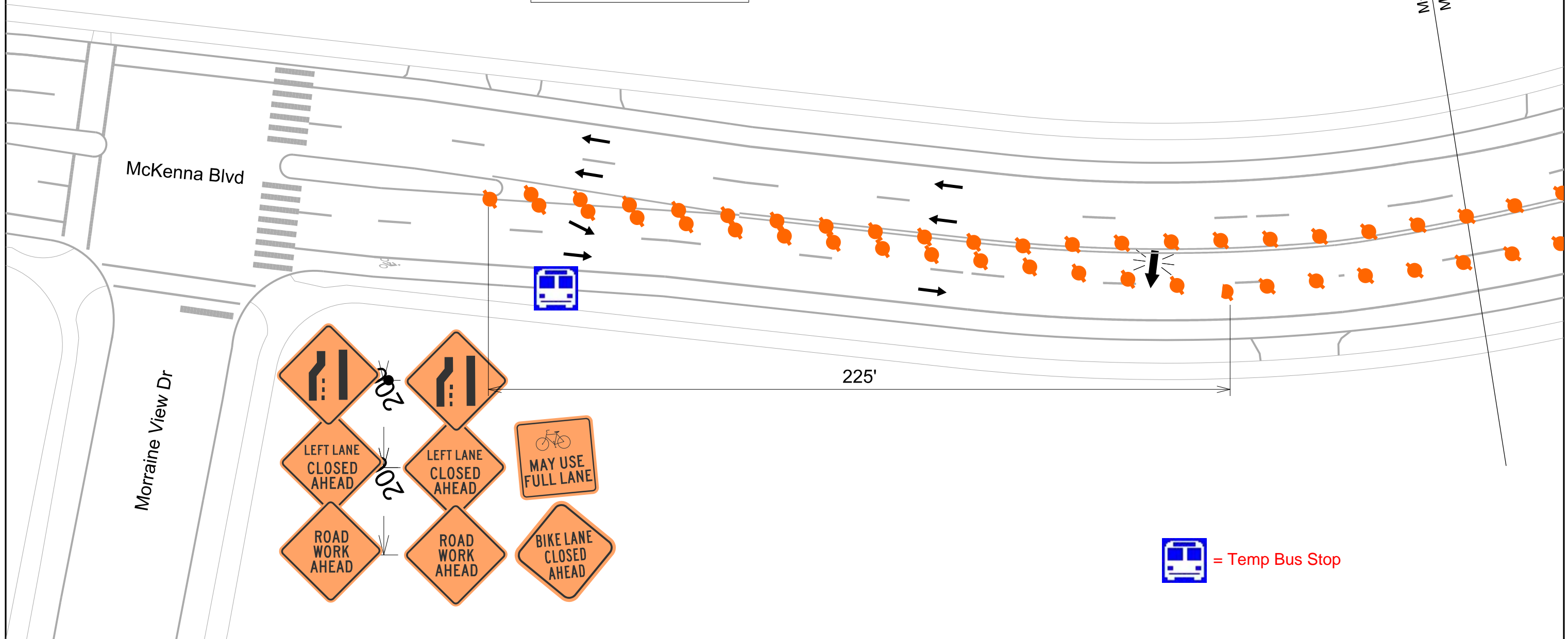
= Temp Bus Stop

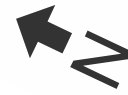
PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



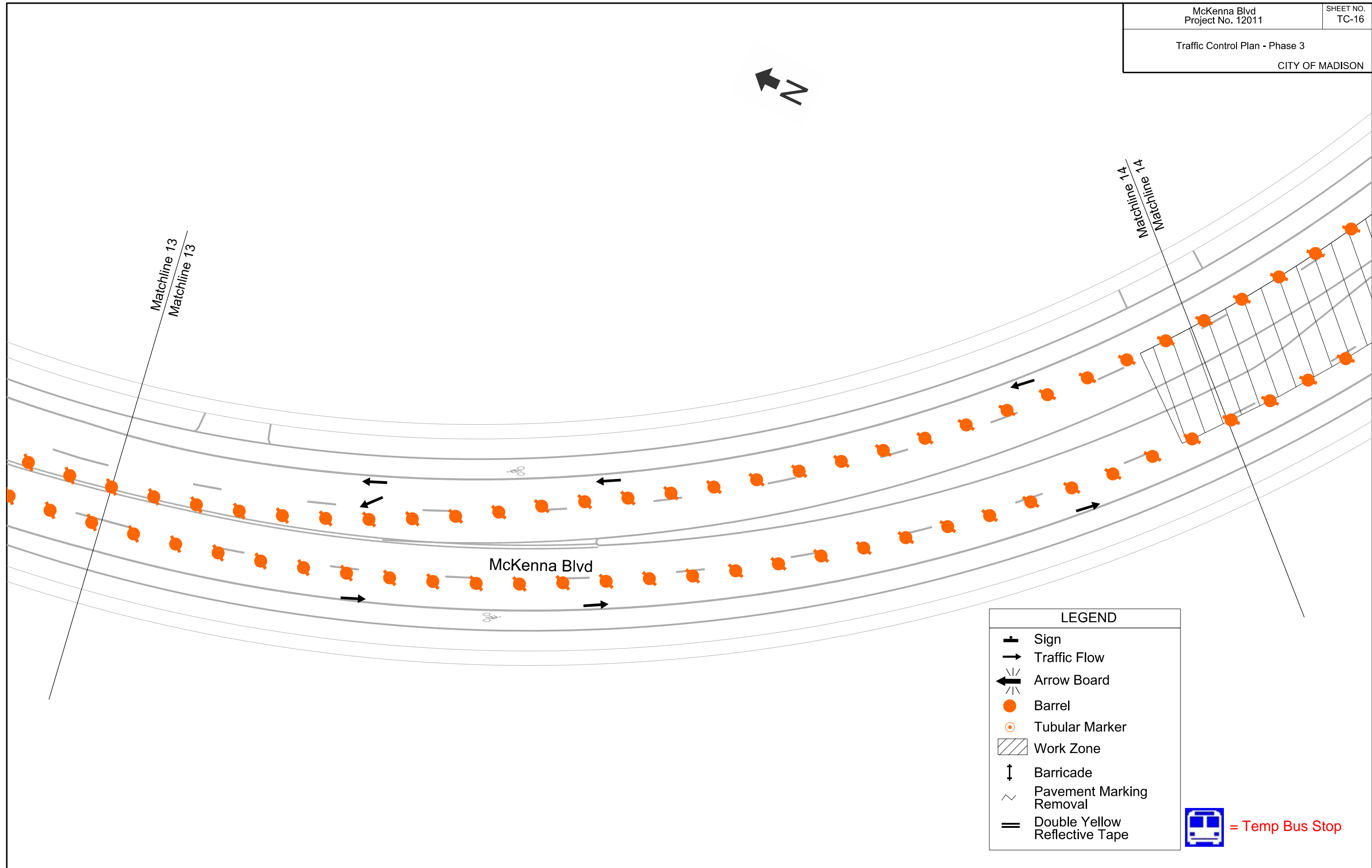


PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



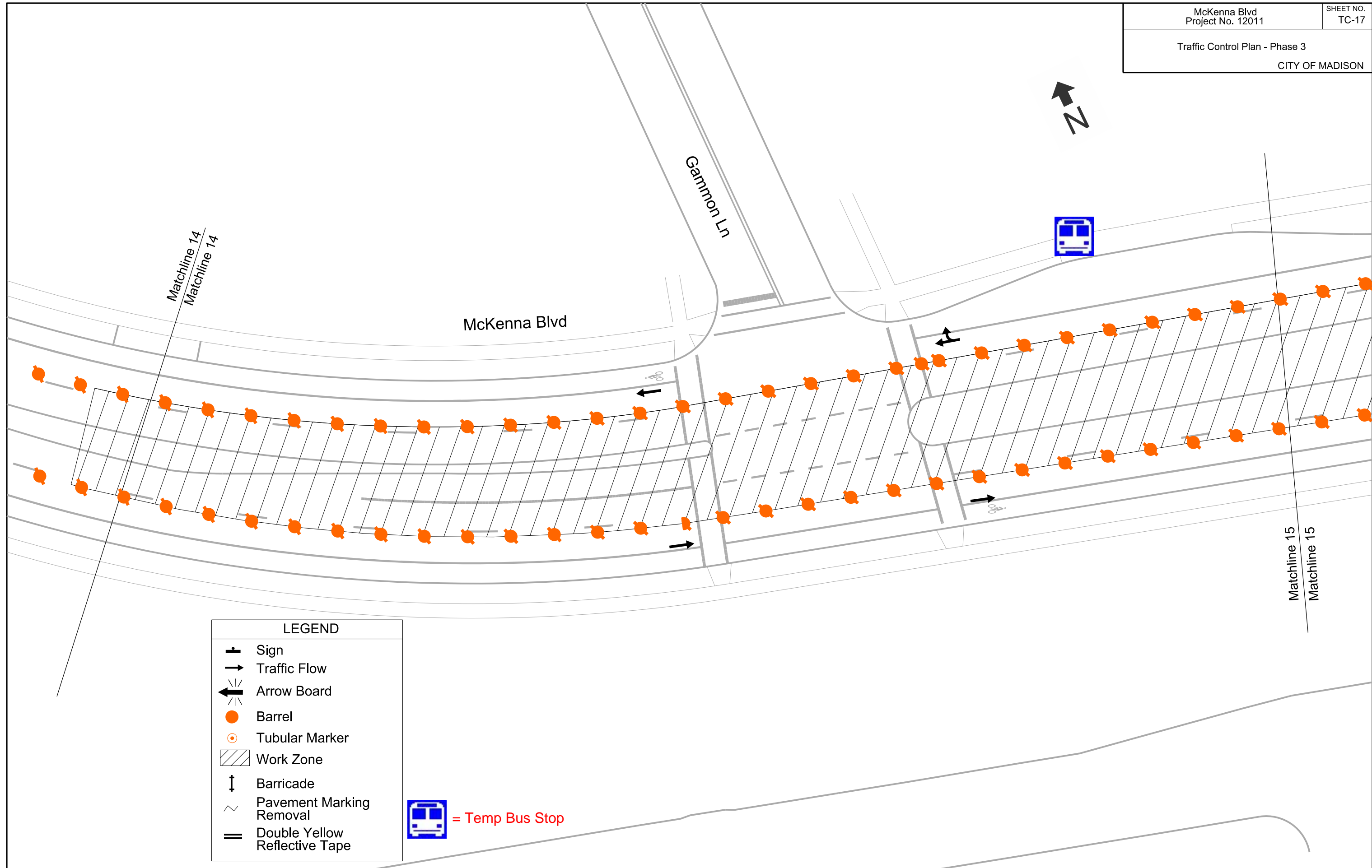
**LEGEND**

- Sign
- Traffic Flow
- Arrow Board
- Barrel
- Tubular Marker
- Work Zone
- Barricade
- Pavement Marking Removal
- Double Yellow Reflective Tape

 = Temp Bus Stop



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



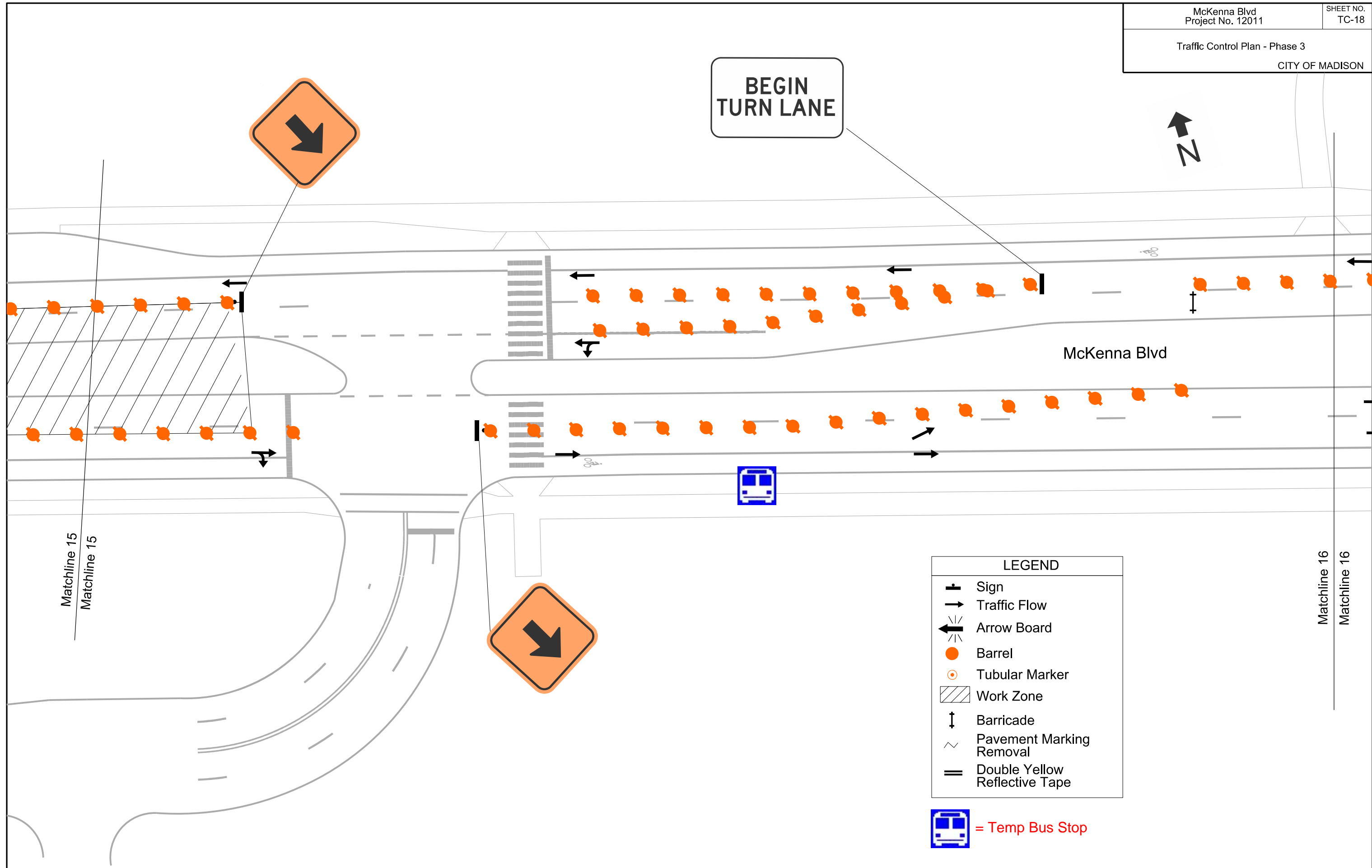
LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop

BEGIN  
TURN LANE



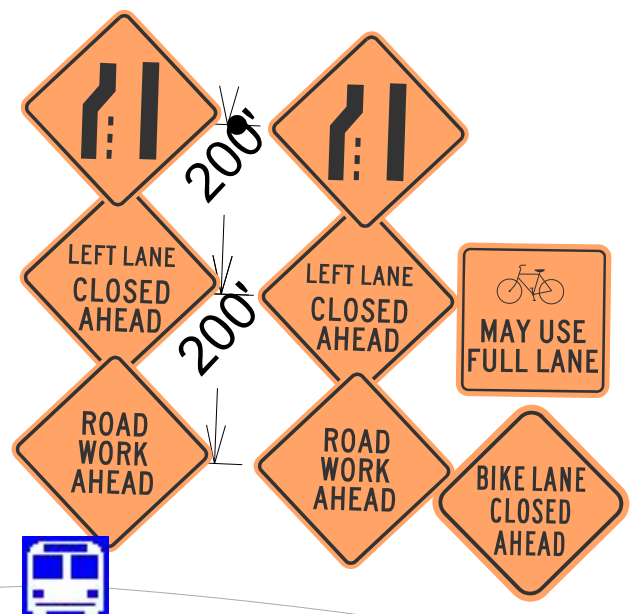
PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.



LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape

= Temp Bus Stop

225'



Hammersley Rd

McKenna Blvd

LEGEND	
	Sign
	Traffic Flow
	Arrow Board
	Barrel
	Tubular Marker
	Work Zone
	Barricade
	Pavement Marking Removal
	Double Yellow Reflective Tape



= Temp Bus Stop

PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

Matchline 16  
Matchline 16



PLOT SCALE:  
PLOT NAME:  
REV. DATE:  
ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

