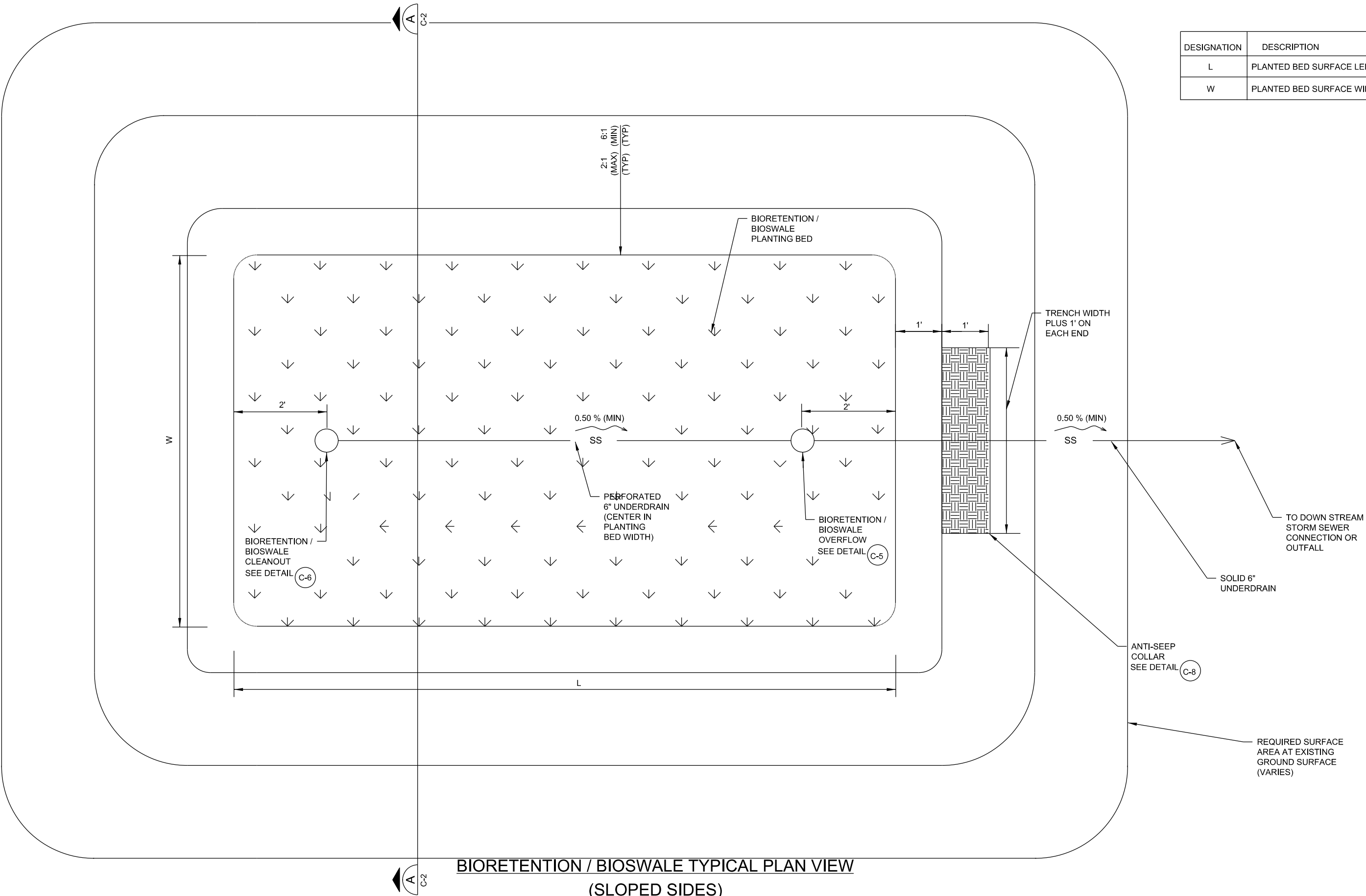



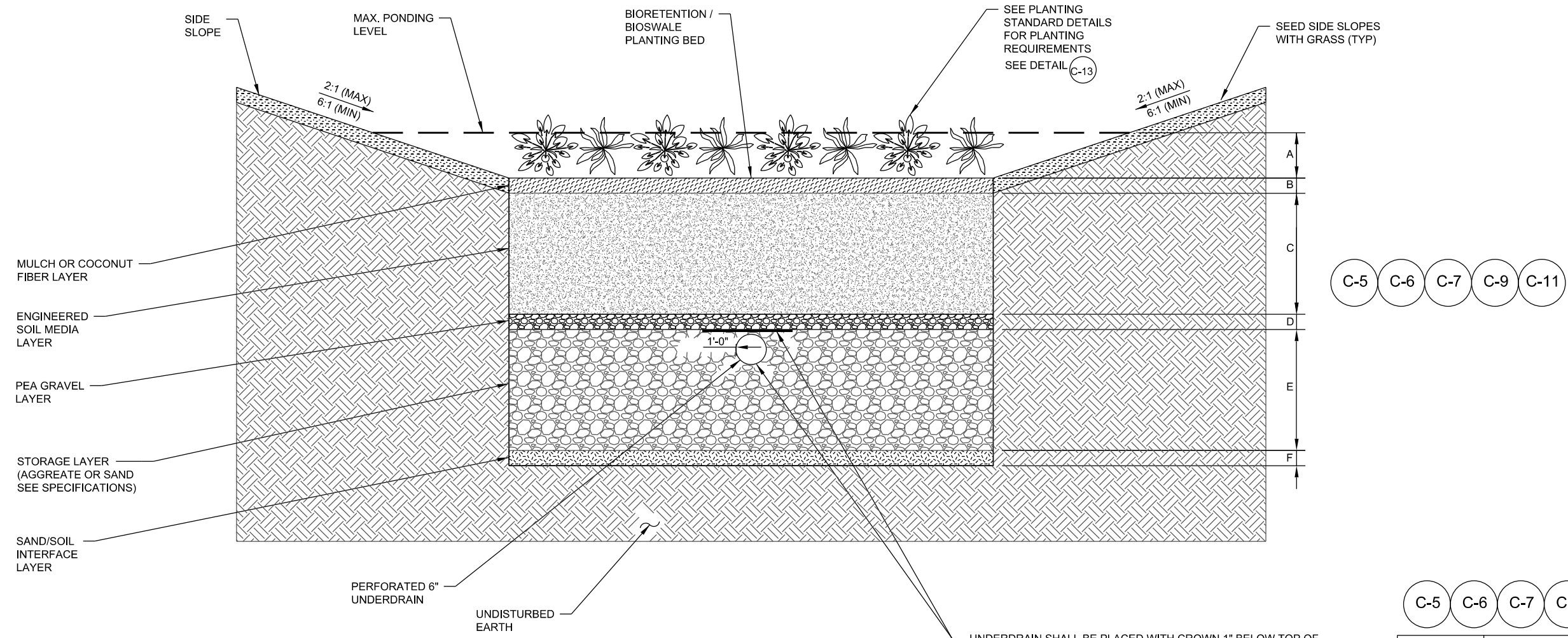
DESIGNATION	DESCRIPTION	DISTANCE
L	PLANTED BED SURFACE LENGTH	X
W	PLANTED BED SURFACE WIDTH	X



BIORETENTION / BIOSWALE TYPICAL PLAN VIEW
(SLOPED SIDES)
NTS

FINAL

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		DR PA ROEPER									DRAWING NO.: C-1					
		CHK CJR									SHEET: 3					
		APVD JTL									DATE: JULY, 2016					
		CONTRACT: MO3064P21														
WATERCOURSE GREEN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES												MMSD FILE:				
CIVIL BIORETENTION / BIOSWALE TYPICAL PLAN VIEW (SLOPED SIDES)																
REV. NO.					DATE		REVISION DESCRIPTION				BY	APVD				



C-5 C-6 C-7 C-9 C-11

C-5 C-6 C-7 C-9 C-11

UNDERDRAIN SHALL BE PLACED WITH CROWN 1" BELOW TOP OF STORAGE LAYER. UNDERDRAIN SHALL BE PROTECTED FROM CLOGGING BY 4" LAYER OF PEA GRAVEL ABOVE THE UNDERDRAIN WHEN GRAVEL STORAGE IS USED. IF SAND STORAGE LAYER IS USED, A FILTER SOCK MAY BE USED TO PROTECT UNDERDRAIN FROM CLOGGING. IN GRAVEL STORAGE LAYER NO FILTER SOCK IS ALLOWED. PROVIDE SINGLE LAYER OF FILTER FABRIC ABOVE UNDERDRAIN. FABRIC SHALL EXTEND 1'-0" ON BOTH SIDES OF UNDERDRAIN.

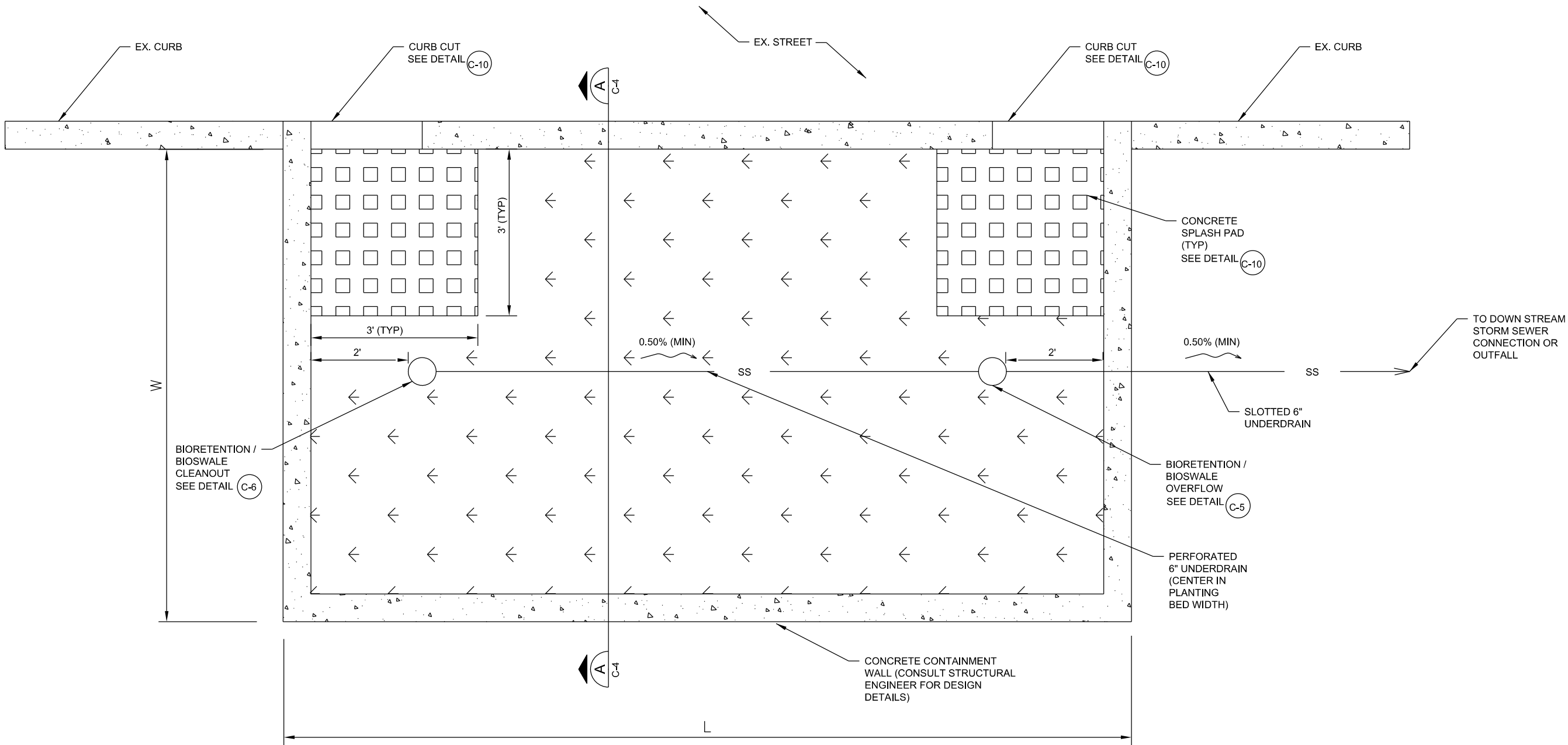
DIMENSION	LAYER NAME	DEPTH
A	SURFACE PONDING	X
B	MULCH OR COCONUT FIBER	X
C	ENGINEERED SOIL MEDIA	X
D	PEA GRAVEL	X
E	STORAGE	X
F	SAND/SOIL INTERFACE	X

BIORETENTION / BIOSWALE TYPICAL CROSS-SECTION
(SLOPED SIDES)

SECTION A
NTS C-1



FINAL

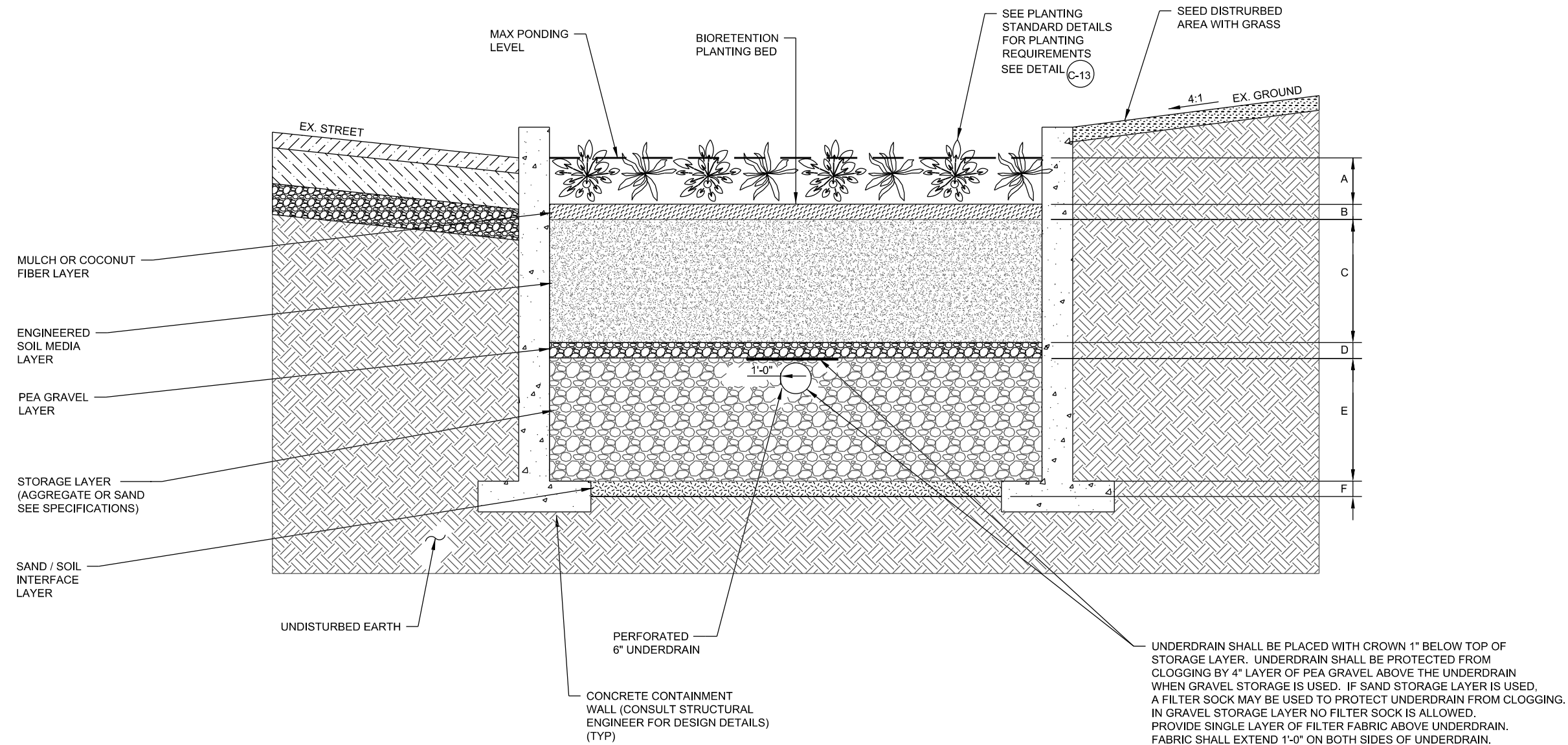
DESIGNATION	DESCRIPTION	DISTANCE
L	PLANTED BED SURFACE LENGTH	X
W	PLANTED BED SURFACE WIDTH	X



BIORETENTION TYPICAL PLAN VIEW
(CONCRETE PERIMETER CURB)
NTS

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		DR PA ROEPER	 STRAND ASSOCIATES®						WATERCOURSE GREEN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES		SHEET:	5
		CHK CJR							DATE:		JULY, 2016	
		APVD JTL							CONTRACT:		M03064P21	
									MMSD FILE:			
			REV. NO.	DATE	REVISION DESCRIPTION			BY	APVD	CIVIL BIORETENTION TYPICAL PLAN VIEW (CONCRETE PERIMETER CURB)		





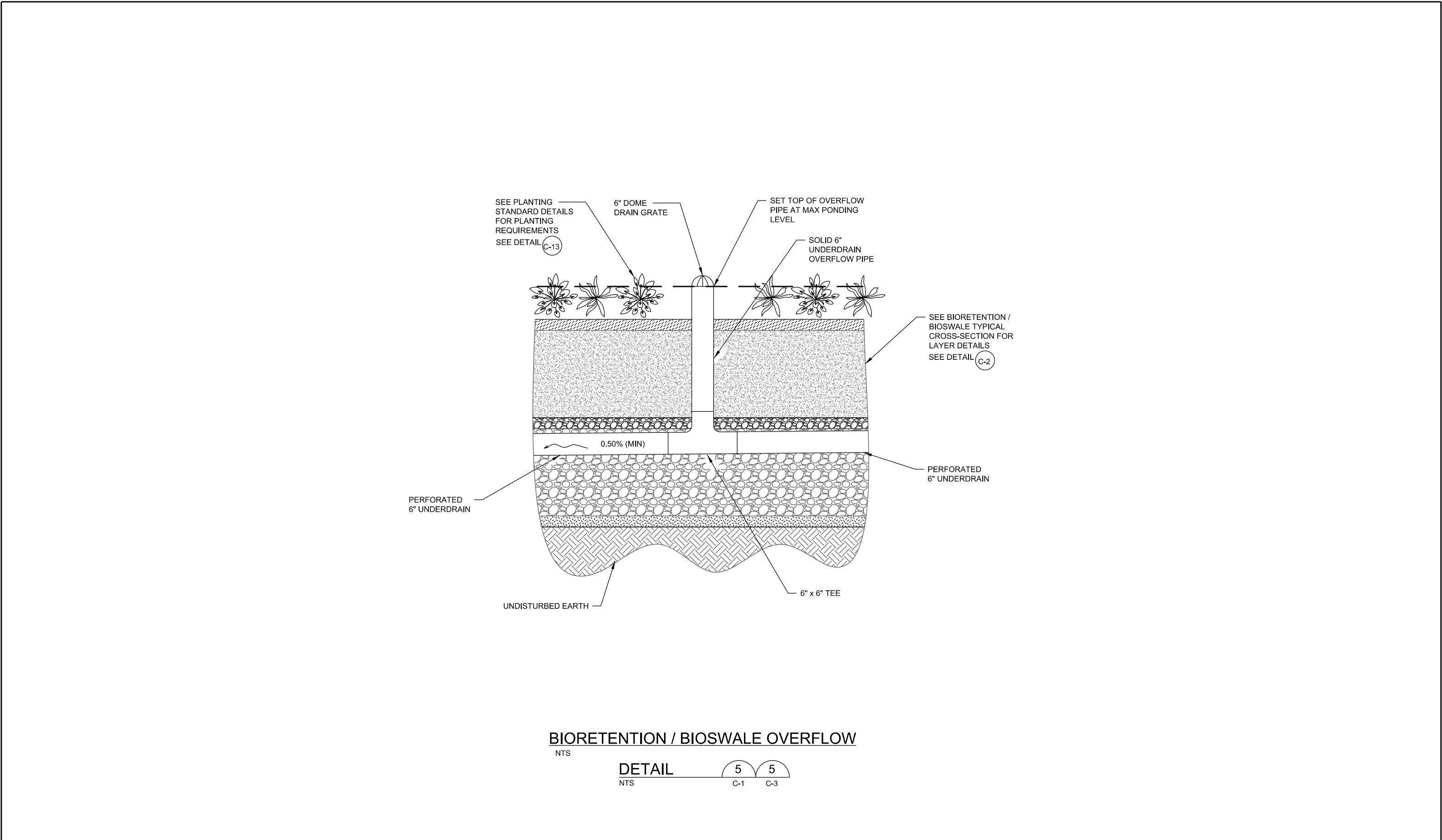
BIORETENTION TYPICAL CROSS-SECTION
(CONCRETE PERIMETER CURB)

SECTION A
NTS C-3

DIMENSION	LAYER NAME	DEPTH
A	SURFACE PONDING	X
B	MULCH OR COCONUT FIBER	X
C	ENGINEERED SOIL MEDIA	X
D	PEA GRAVEL	X
E	STORAGE	X
F	SAND/SOIL INTERFACE	X


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		HPK	 STRAND ASSOCIATES®	REV. NO.	DATE	REVISION DESCRIPTION	BY		APVD	WATERCOURSE GREEN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES	SHEET:	6
		DR									DATE:	JULY, 2016
		PA ROEPER									CONTRACT:	M03064P21
		CHK									MMSD FILE:	
CJR							CIVIL BIORETENTION TYPICAL CROSS-SECTION (CONCRETE PERIMETER CURB)					
APVD												
JTL												





BIORETENTION / BIOSWALE OVERFLOW
NTS

DETAIL 5 5
NTS C-1 C-3

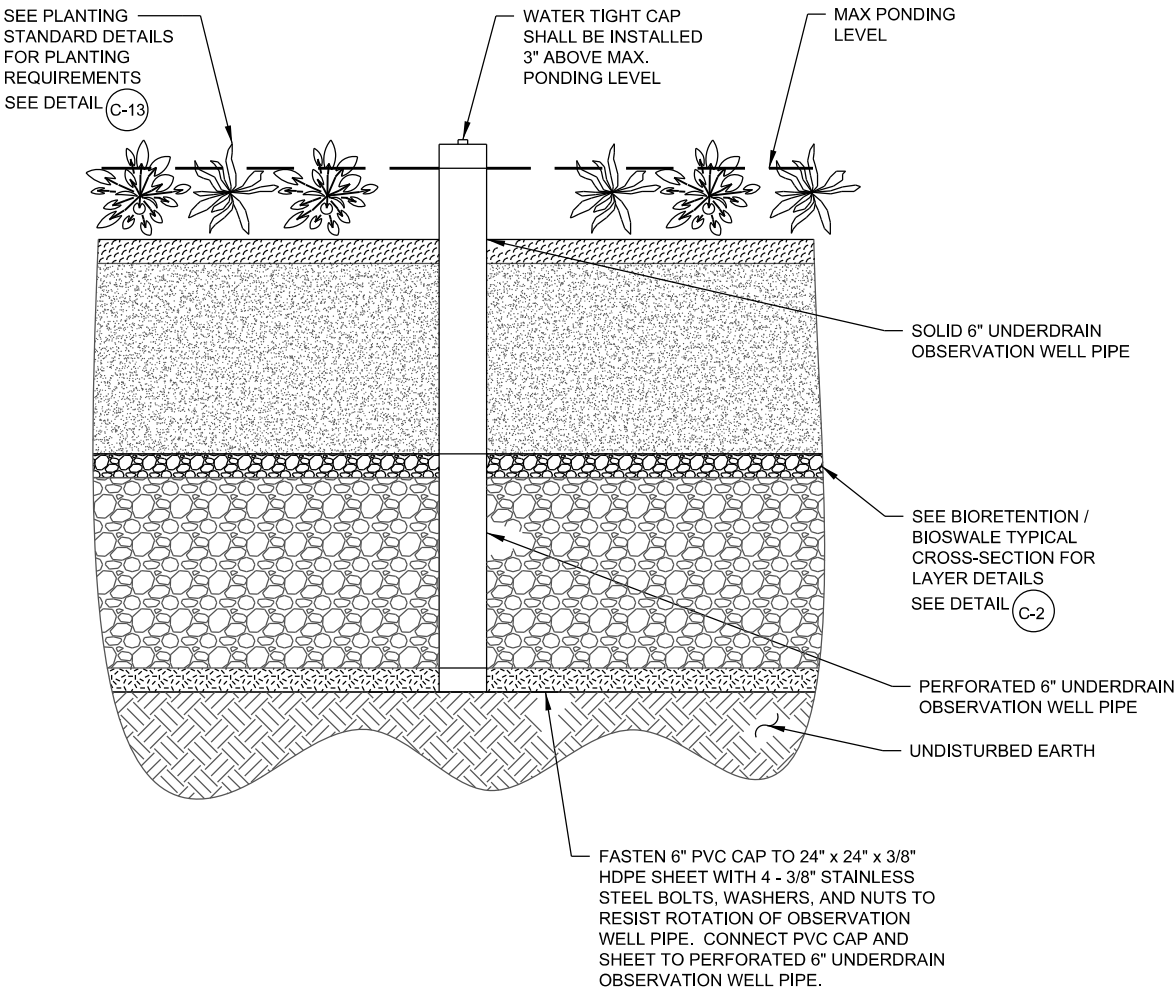
<div>REUSE OF DOCUMENTS</div> <div>THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN IS AN INSTRUMENT OF PROFESSIONAL SERVICE AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF THE MILWAUKEE METROPOLITAN SEWERAGE DISTRICT.</div>	<div>VERIFY SCALES</div> <div>BAR IS ONE-HALF INCH ON ORIGINAL DRAWING</div> <div>0' ————— 0.5'</div> <div>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</div>	DSGN	<div>This Design Prepared For MMSD By:</div> <div><div>SA</div><div>STRAND ASSOCIATES®</div></div>					<div><div>MMSD</div><div>PARTNERS FOR A CLEANER ENVIRONMENT</div></div>	MILWAUKEE METROPOLITAN SEWERAGE DISTRICT		DRAWING NO.:	C-5
		DR							WATERCOURSE		SHEET:	7
		PA ROEPER							GREEN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES		DATE:	JULY, 2016
		CHK							CIVIL		CONTRACT:	M03064P21
		CJR							BIORETENTION / BIOSWALE OVERFLOW		MMSD FILE:	
APVD		REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD						
JTL												

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											WATERCOURSE GREEN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES	SHEET: 8 DATE: JULY, 2016 CONTRACT: M03064P21 MMSD FILE:

NOTE


1. ONE OBSERVATION WELL
REQUIRED PER 1,000
SQUARE FEET OF SURFACE
AREA LOCATED IN CENTER



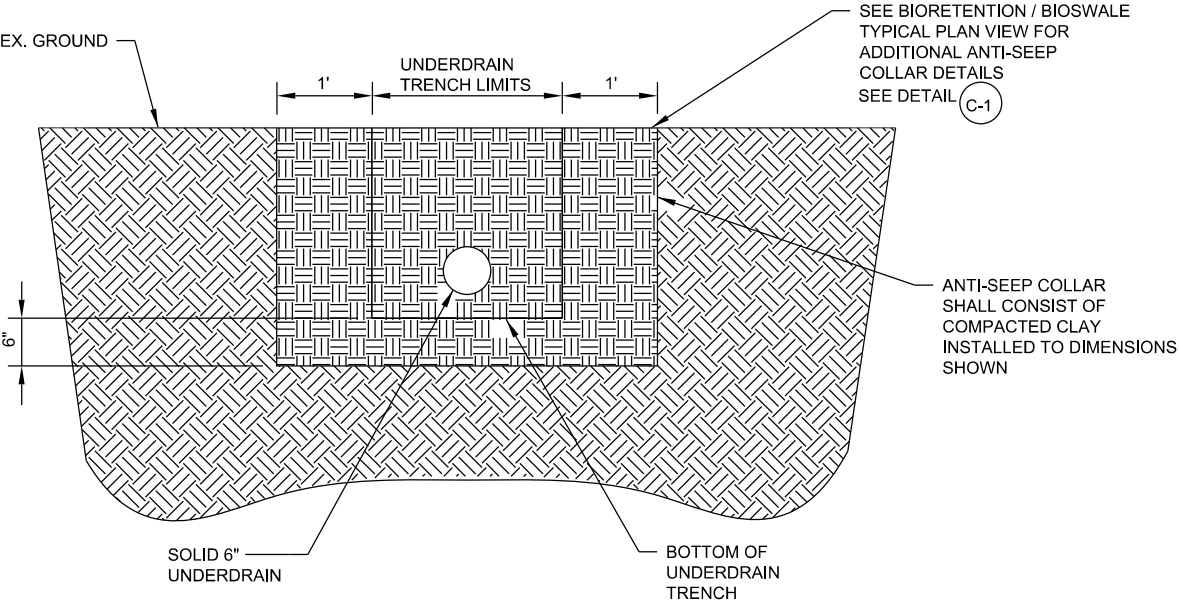
BIORETENTION / BIOSWALE OBSERVATION WELL

DETAIL 7

NTS

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		DR								WATERCOURSE	SHEET:	9
		PA ROEPER								GREEN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES	DATE:	JULY, 2016
		CHK								CIVIL	CONTRACT:	M03064P21
		CJR								BIORETENTION / BIOSWALE OBSERVATION WELL	MMSD FILE:	
APVD		REV. NO.	DATE	REVISION DESCRIPTION	BY	APVD						
JTL												

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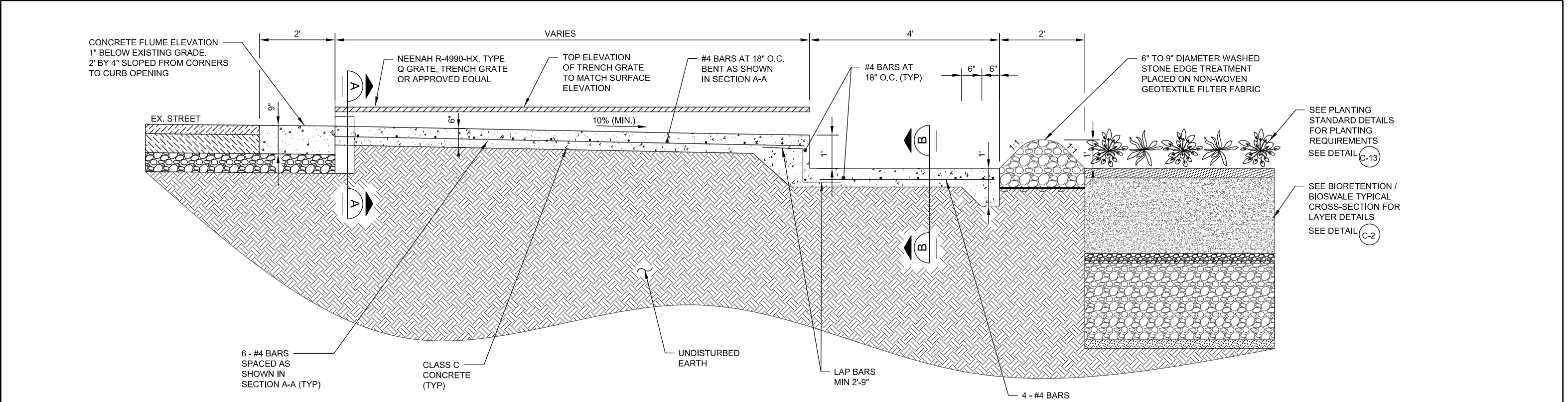


ANTI - SEEP COLLAR

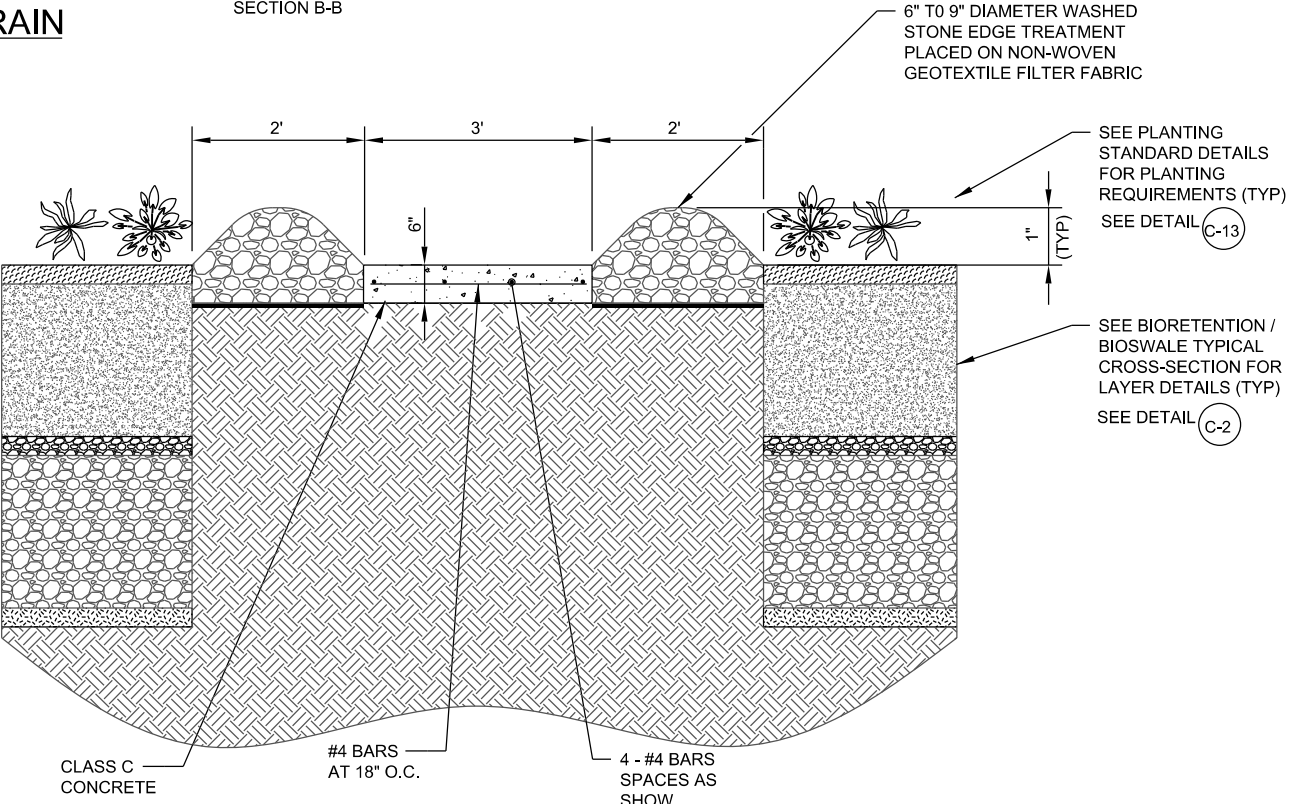
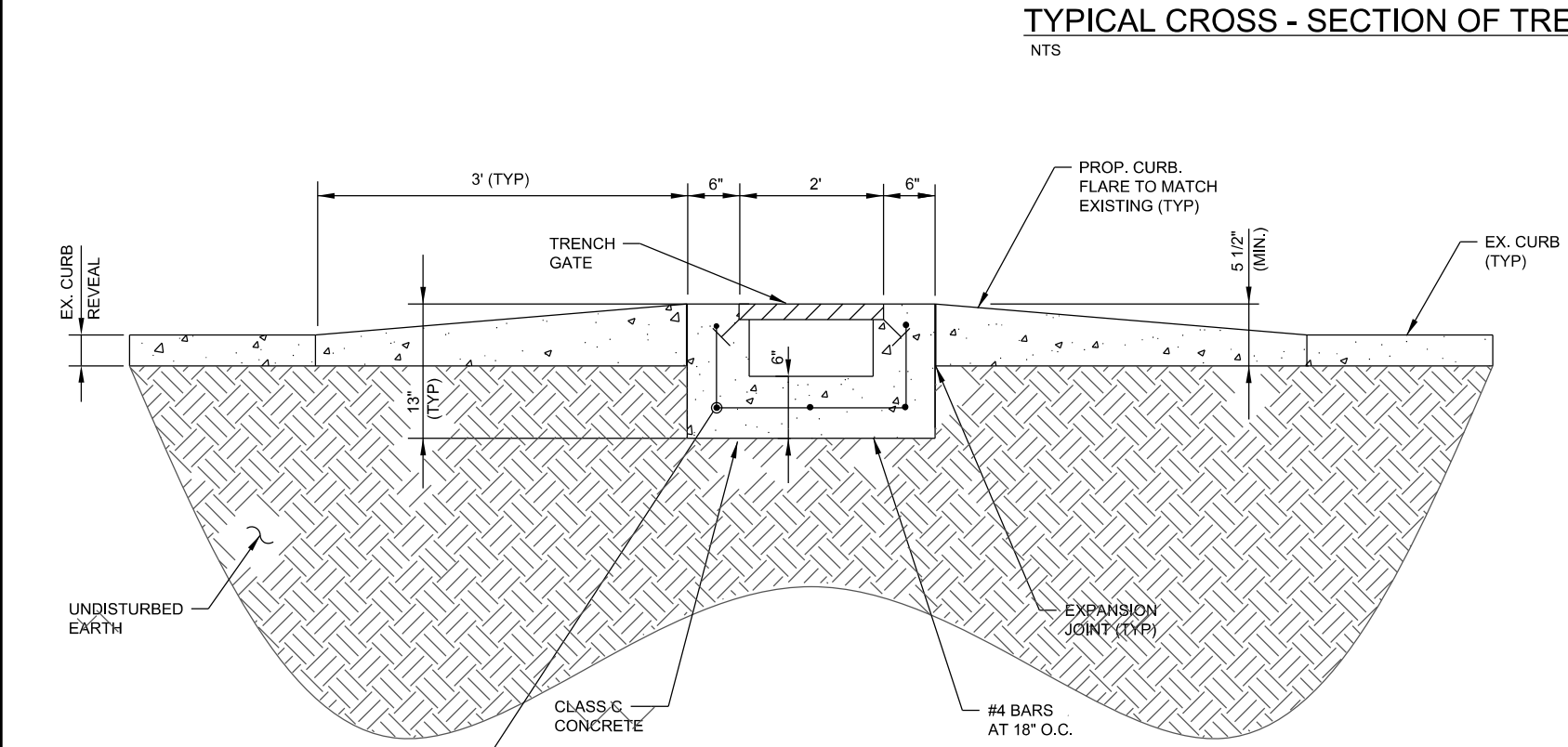
DETAIL 1
NTS C-8

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												SHEET: 10	
												DATE: JULY, 2016	
												CONTRACT: M03064P21	
												MMSD FILE:	

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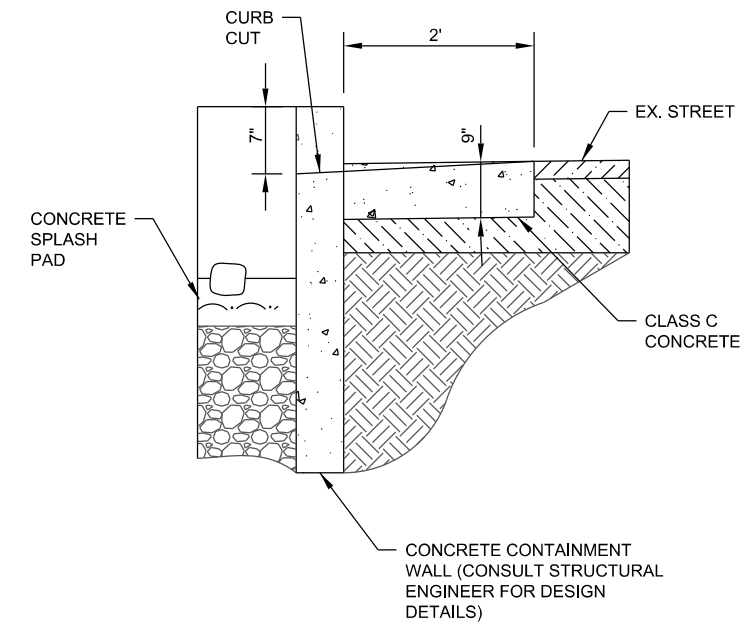
TYPICAL CROSS - SECTION OF TRENCH DRAIN
NTS



TRENCH DRAIN TYPICAL CROSS - SECTION
SECTION B
NTS

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FINAL



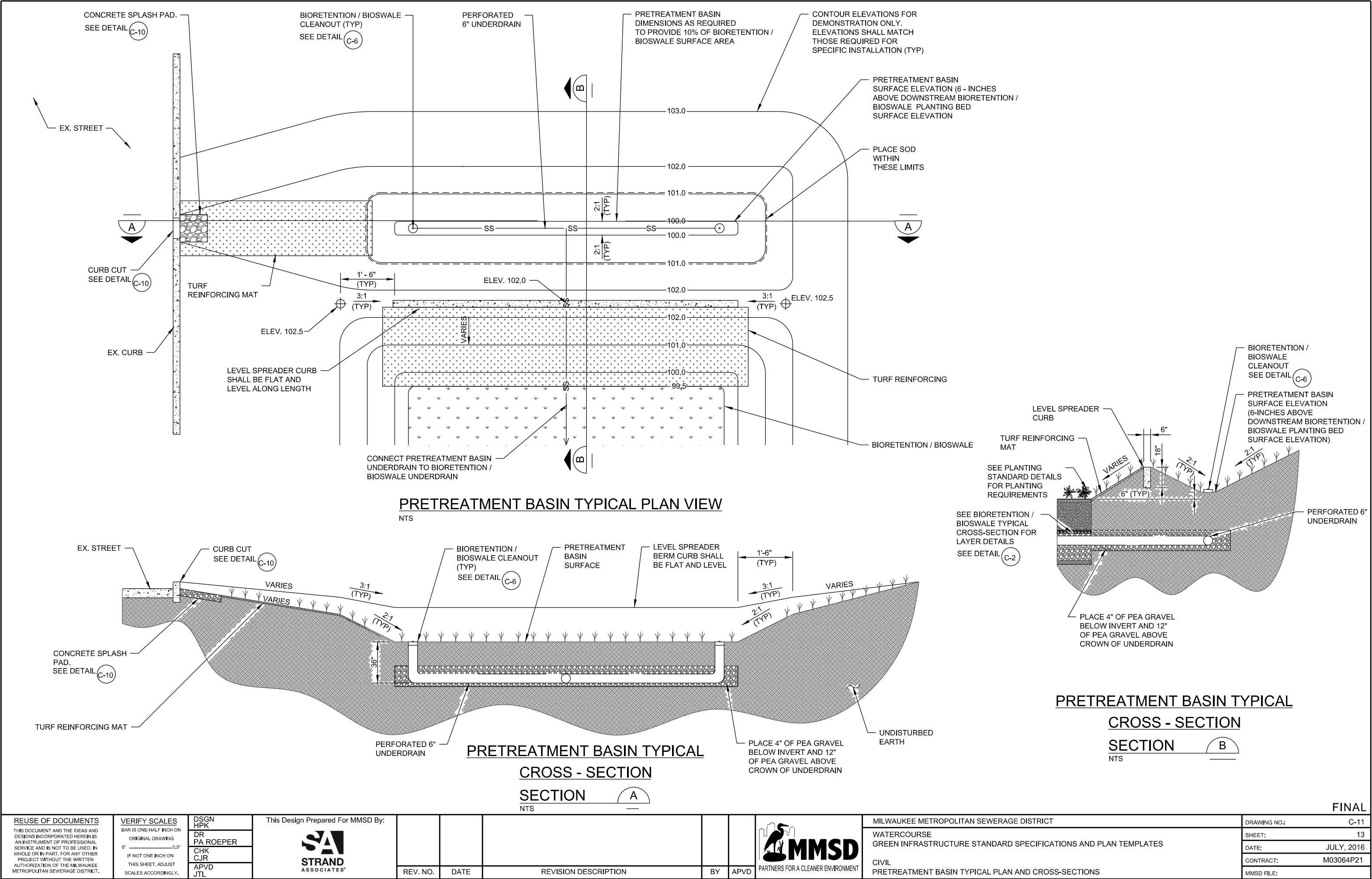
SECTION A
NTS C-11

DETAIL

NTS

10 10

C-3 C-11



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VERIFY SCALES

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0" 0.5"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DSGN
HPK
DR
PA ROEPER
CHK
CJR
APVD
JTL

This Design Prepared For MMSD By:



REV. NO.

DATE

REVISION DESCRIPTION

BY

APVD



MILWAUKEE METROPOLITAN SEWERAGE DISTRICT

WATERCOURSE
GREEN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES

CIVIL
PRETREATMENT BASIN TYPICAL PLAN AND CROSS-SECTIONS

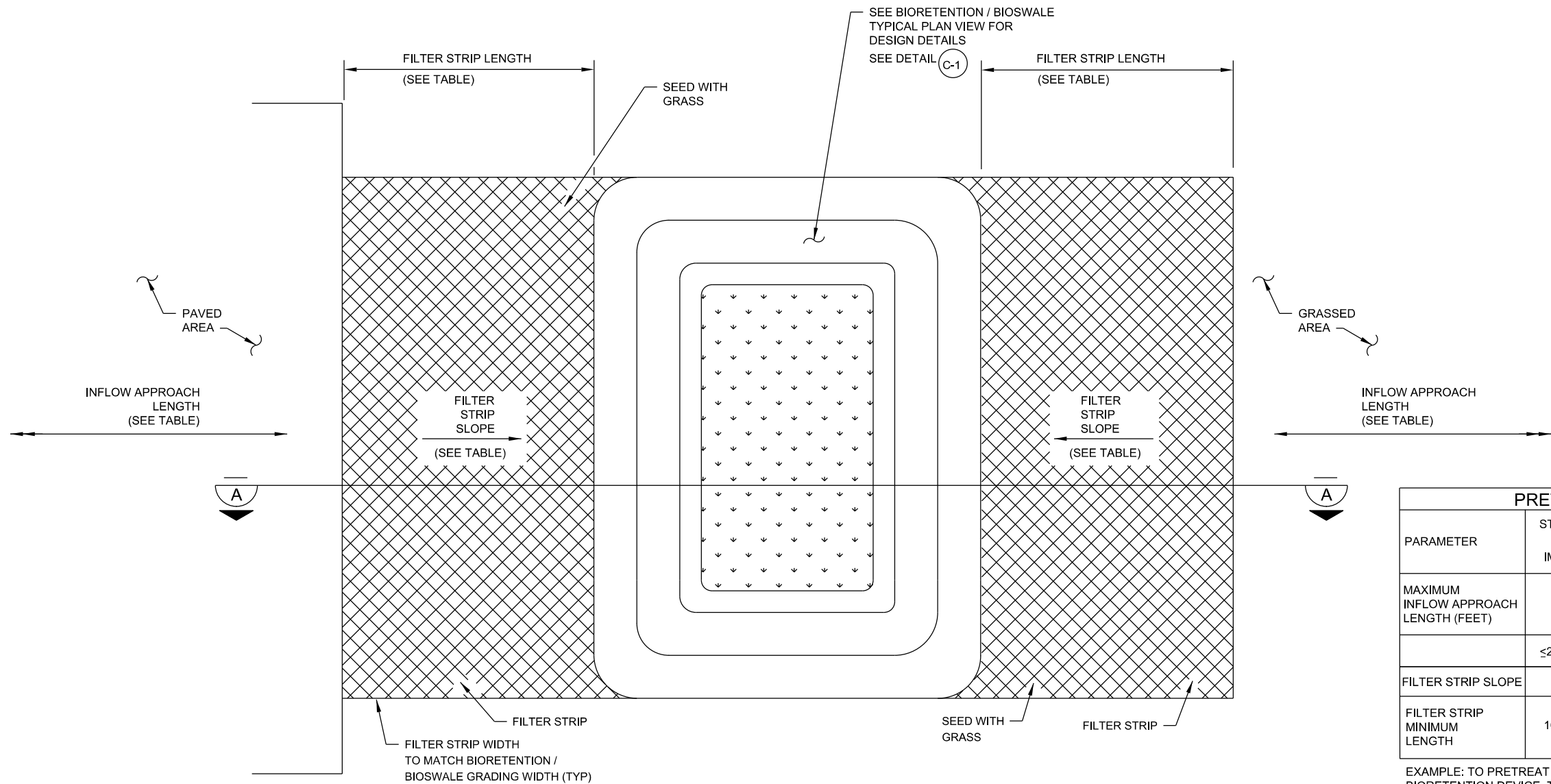
DRAWING NO.: C-11

SHEET: 13

DATE: JULY, 2016

CONTRACT: M03064P21

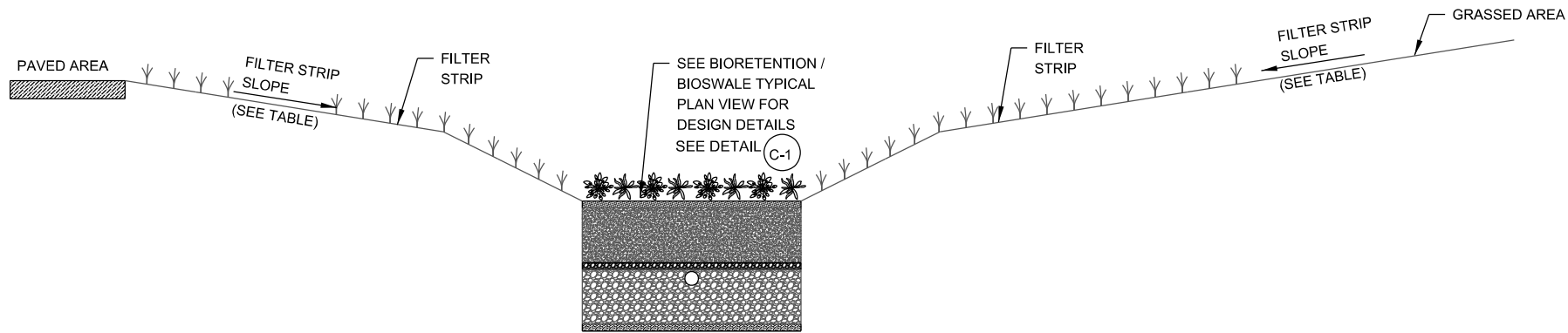
MMSD FILE:



FILTER STRIP TYPICAL PLAN VIEW
NTS

PRETREATMENT FILTER STRIP SIZING GUIDANCE									
PARAMETER	STORMWATER RUNOFF INFLOW APPROACH FROM IMPERVIOUS PARKING LOTS				STORMWATER RUNOFF INFLOW APPROACH FROM LAWNS / LANDSCAPED AREAS				NOTES
MAXIMUM INFLOW APPROACH LENGTH (FEET)	35		75		75		150		
	≤2%	>2%	≤2%	>2%	≤2%	>2%	≤2%	>2%	MAXIMUM
FILTER STRIP SLOPE									SLOPE = 6%
FILTER STRIP MINIMUM LENGTH	10'	15'	20'	25'	10'	12'	15'	18'	

EXAMPLE: TO PRETREAT RUNOFF THAT FLOWS 75 FEET ACROSS A PARKING LOT BEFORE REACHING THE BIORETENTION DEVICE, THE FILTER STRIP SHOULD BE 20 FEET LONG IF THE FILTER STRIP SLOPE IS LESS THAN OR EQUAL TO 2% AND 25 FEET LONG IF THE FILTER STRIP SLOPE IS OVER 2%.



FILTER STRIP TYPICAL CROSS SECTION

SECTION
NTS

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DR
PA ROEPER
CHK
CJR
APVD
JTL

This Design Prepared For MMSD By:



REV. NO.

DATE

REVISION DESCRIPTION

BY

APVD



MILWAUKEE METROPOLITAN SEWERAGE DISTRICT

WATERCOURSE
GREN INFRASTRUCTURE STANDARD SPECIFICATIONS AND PLAN TEMPLATES

CIVIL
FILTER STRIP TYPICAL PLAN VIEW

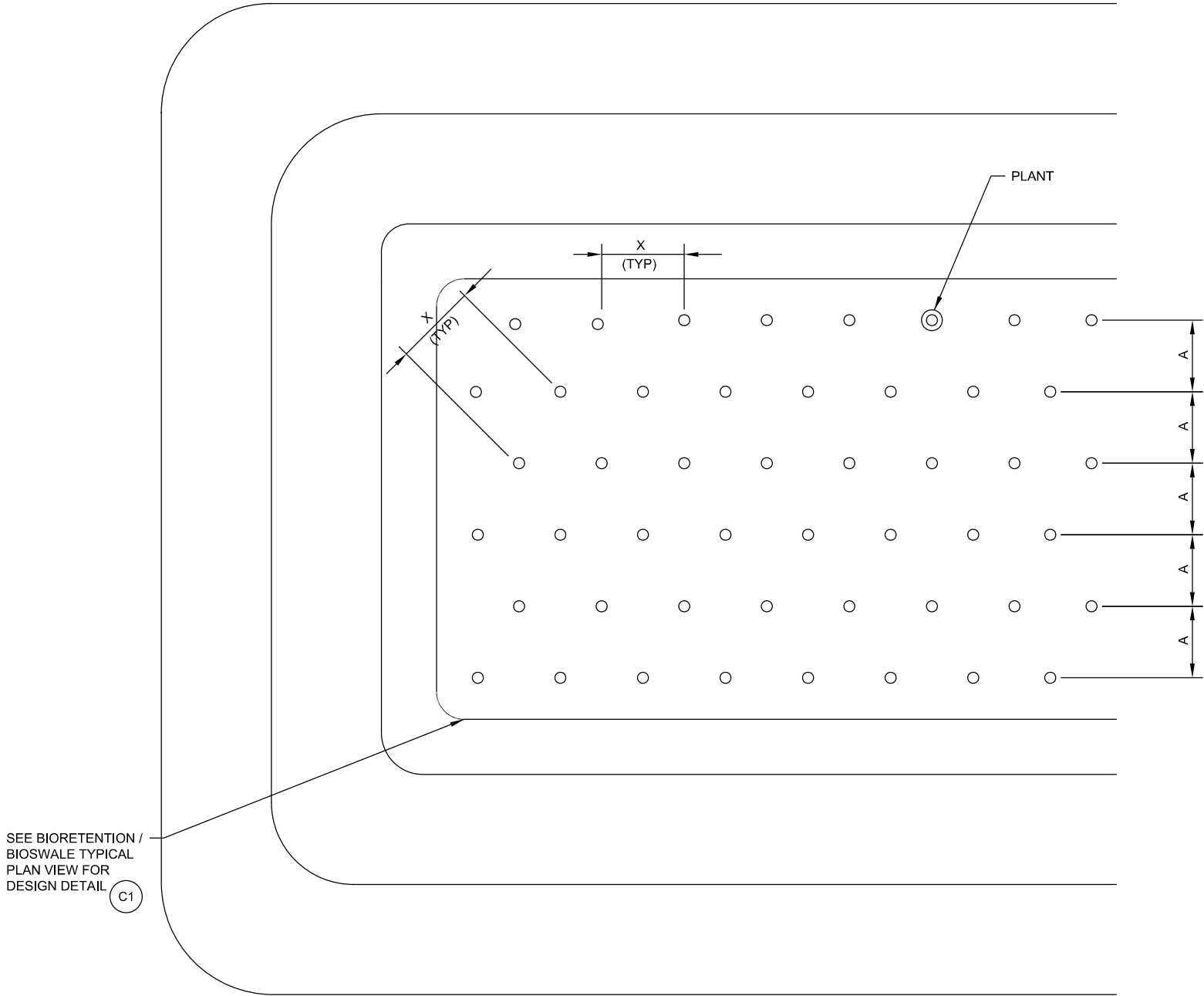
DRAWING NO.: C-12

SHEET: 14

DATE: JULY, 2016

CONTRACT: M03064P21

MMSD FILE:



SPACING SCHEDULE	
SPACING "X" (SUGGESTED PLANT SPACING)	SPACING "A"
8" O.C.	7"
12" O.C.	10 1/2"
18" O.C.	15 1/2"
24" O.C.	20 3/4"
30" O.C.	26"
36" O.C.	31"
42" O.C.	36"
60" O.C.	52"

BIORETENTION / BIOSWALE
PLANT SPACING

DETAIL
NTS

13

13

13

13

13

13

C-2C-4C-5C-6C-9C-10