Dennis Avenue LID Design Summary Sheet

SWM #	Drainage Area (ac)	Impervious Area (ac)	Treatment Required by ESD WQv (CF)	PE (in)*	ESDV (CF)*	Type of SWM	Proposed ** ESDV (CF)	PE (in)	Note
1	0.55	0.290	1047	1.8	1885	Filterra 12'x6'	1047	1.0	
2A	0.45	0.11	441	1.2	529	Filterra 12'x6'	441	1.0	
2	0.94	0.089	682	1.0	481	Filterra 12'x6'	682	1.4	
3A	0.10	0.090	312	1.8	562	Filterra 6'x4'	312	1.0	
3	0.35	0.098	383	1.2	460	SWALE	524	1.4	3.25' media&stone
4	0.63	0.183	712	1.2	855	HYBRID	869	1.2	1.5~1.8' media&stone
5	2.54	0.570	2323	1.2	2788	HYBRID	1774	0.8	2.5~3.25' media&stone
6	0.93	0.206	842	1.2	1010	HYBRID	435	0.5	3.25' media&stone
7	0.24	0.124	449	1.8	808	SWALE	885	2.0	2.0' media&stone
8	0.10	0.09	312	1.8	562	Filterra 6'x4'	312	1.0	
9A	0.10	0.07	182	1.8	327	Filterra 6'x4'	182	1.0	
9	1.18	0.415	1570	1.6	2512	Bioretention	2653	1.7	3.25' media&stone
10	0.83	0.235	918	1.2	1102	Bioretention	1362	1.5	3.25' MEDIA&STONE
11	19.66	5.22	20622	1.2	24746	Bioretention	1835	0.1	3.25' media&stone
12	4.80	1.05	4302	1.2	5102	Bioretention	2114	0.5	3.25' media&stone
15	0.17	0.11	390	1.8	702	Filterra 6'x4'	390	1.0	
16	0.31	0.13	481	1.8	866	Hybrid	1003	2.1	2.1' media&stone
17	2.69	0.72	2840	1.2	3409	SPSC	1393	0.5	TREATED IN SPSC
19	0.09	0.06	212	1.8	382	Filterra 6'x4'	212	1.0	
20	0.08	0.06	211	1.8	379	Filterra 6'x4'	211	1.0	
27	1.84	1.05	3764	1.8	6776	Hybrid	5526	1.5	27A+27B, 2.0' MEDIA
28	0.86	0.49	1757	1.8	3162	Hybrid	4244	2.4	1.8' media & stone
31	0.34	0.19	682	1.8	1226	Filterra 10'X6'	682	1.0	
33	0.20	0.069	262	1.6	419	Filterra 8'X4'	262	1.0	
TOTAL	39.98	11.72	45696		61052		29350		

SPSC: Regenerative Step Pool Storm Conveyance Hybrid: Combination of curb extension and swale plan

* Requirement for Environmental Site Design (ESD) to get water quality, channel protection and recharge volume

** The volume = ponding volume + storage within planting media & stone assuming 40% void .

TEMPORARY TRAFFIC CONTROL, OBJECT MARKER & DELINEATOR TABLE

SWM #	STANDARD TCP #	TYPE 3 OBJECT MARKER (OM-3R)	GRAY W/ WHITE RETROREFLECTIVE DELINEATORS
1	102.01	-	-
2	102.01	-	-
2A	105.07	-	-
3	105.03	-	-
3A	105.06	-	-
4	105.04	1	3
5	105.07	1	3
6	105.07	1	3
7	105.03	-	-
8	105.05	-	-
9	105.07	-	-
9A	105.06	-	-
10	105.07	-	-
11	105.07	-	-
12	105.07	-	-
15	105.02	-	-
16	105.02	1	3
17	105.02	-	-
19	105.02	-	-
20	105.02	-	-
27A	102.02	1	3
27B	102.02	1	3
28	102.02	1	3
31	102.02	-	-
33	105.01	-	-

CONSTRUCTION NOTES.

1. THE UNDERGROUND UTILITY INFORMATION WAS OBTAINED FROM A/I DATA. THE TEST PITS LOCATIONS WERE BASED ON INITIAL DESIGN LAYOUT WHICH MIGHT NOT MATCH WHERE THE UTILITY CROSSINGS ARE AT THE FINAL DESIGN. SOME ASSUMPTIONS WERE MADE AT THE DESIGN. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY AND FIELD LOCATE EXACT LOCATION AND ELEVATION OF ALL EXISTING UTILITIES AT UTILITY CROSSINGS. THE CONTRACTOR SHALL HAND DIG AROUND UTILITIES LOCATED IN THE VICINITY OF THE PROPOSED EXCAVATION.

2. CONTRACTOR SHALL PROVIDE ONE FOOT MIN. VERTICAL CLEARANCE BETWEEN THE TOP OF UTILITY AND BOTTOM OF SWM FACILITY. SEE MSHA–UD3 FOR TYPICAL UTILITY CROSSING DETAIL.

3. UNLESS SPECIFIED ON THE PLAN WITH SWALE INVERT AND BOTTOM ELEVATION, THE LONGITUDINAL SLOPE OF SWALE SHOULD MATCH ROAD SLOPE.

4. CONTRACTOR SHALL PROVIDE MINIMUM COVER FOR EXISTING UTILITIES.

5. CONTRACTOR TO PROVIDE 12" MIN. VERTICAL CLEARANCE BETWEEN STORM DRAIN AND UTILITIES. SPECIAL CROSSING TREATMENT METHODS LIKE ENCASEMENT AND/OR SPECIAL BEDDING SHALL BE FOLLOWED.

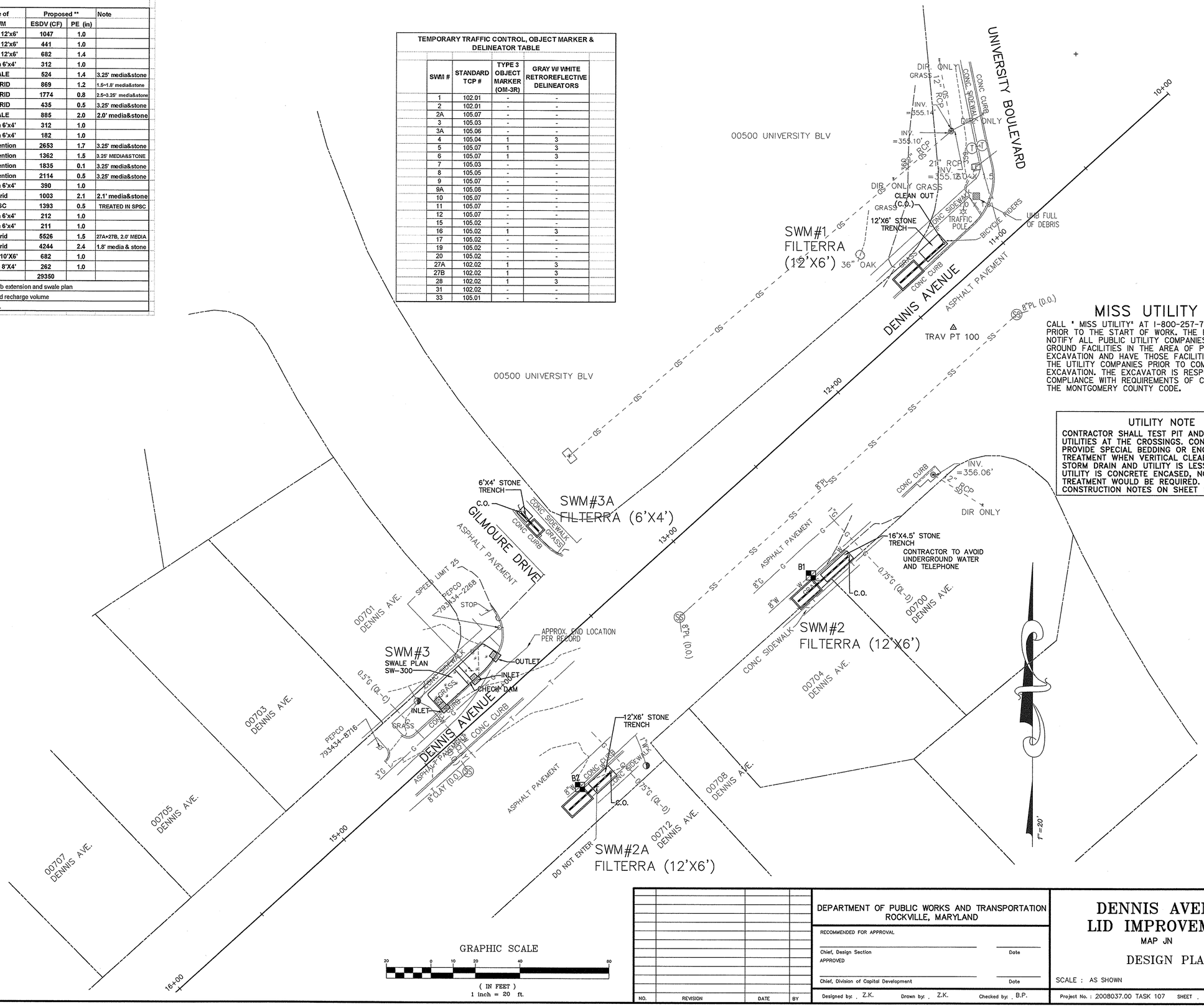
6. SPOT SHOWN AT INLET AND OUTLET MEAN INVERTS OF INLET OR OUTLET. SPOTS SHOWN IN EACH FACILITY CELL ARE SWALE INVERTS (FACILITY TOPS).

7. PRECAST SINGLE WR INLET SHALL BE MODIFIED WITH AN 18" MIN. DIAMETER HOLE IN THE BOTTOM OF THE INLET TO SERVE AS DRAIN TO SURFACE OUTLET. THE CONTRACTOR SHALL BACKFILL THE INSIDE WITH NO.2 AGGREGATE AND PROVIDE GALVANIZED HARDWARE CLOTH COVERING PIPE END (SEE DETAIL NOTES MSHA–UD1)

8. SWM 4&5 WAS DESIGNED BASED ON ASSUMPTION OF 3" GAS BEING ABANDONED. CONTRACTOR SHALL VERIFY THE ASSUMPTION BEFORE PROCEEDING WITH CONSTRUCTION OF SWM 4 & 5. IF THE 3" GAS IS STILL ACTIVE, CONTRACTOR SHALL PERFORM SHALLOW EXCAVATION.

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- 45.2 PROPOSED SPOT ELEVATION
- EX. SEWER
- EX. WATER
- EX. WATER STRUCTURE
- EX. TELEPHONE
- EX. GAS LINE
- PROPERTY /RW LINE
- PROPOSED STORM DRAIN
- SHALLOW EXCAVATION TO AVOID CONFLICT WITH UTILITY
- SODDED SWALE
- STORMWATER FACILITY
- REPLACE PEDESTRIAN RAMP /SIDEWALK /SIDEWALK
- PROPOSED STORM DRAIN STRUCTURE
- L.P. H.P. LOW POINT, HIGH POINT
- PROPOSED CURB
- EX. TREE TO REMAIN
- TREE REMOVAL



MISS UTILITY

CALL " MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDER GROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF CHAPTER 36A OF THE MONTGOMERY COUNTY CODE.

UTILITY NOTE

CONTRACTOR SHALL TEST PIT AND VERIFY ALL UTILITIES AT THE CROSSINGS. CONTRACTOR SHALL PROVIDE SPECIAL BEDDING OR ENCASEMENT TREATMENT WHEN VERITICAL CLEARANCE BETWEEN STORM DRAIN AND UTILITY IS LESS THAN 12". IF UTILITY IS CONCRETE ENCASED, NO SPECIAL TREATMENT WOULD BE REQUIRED. SEE CONSTRUCTION NOTES ON SHEET 1

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

NO.	REVISION	DATE	BY

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
ROCKVILLE, MARYLAND

RECOMMENDED FOR APPROVAL

Chief, Design Section Date

APPROVED

Chief, Division of Capital Development Date

Designed by: Z.K. Drawn by: Z.K. Checked by: B.P.

DENNIS AVENUE LID IMPROVEMENT

MAP JN

DESIGN PLAN

SCALE : AS SHOWN

Project No. : 2008037.00 TASK 107 SHEET 1 of 10

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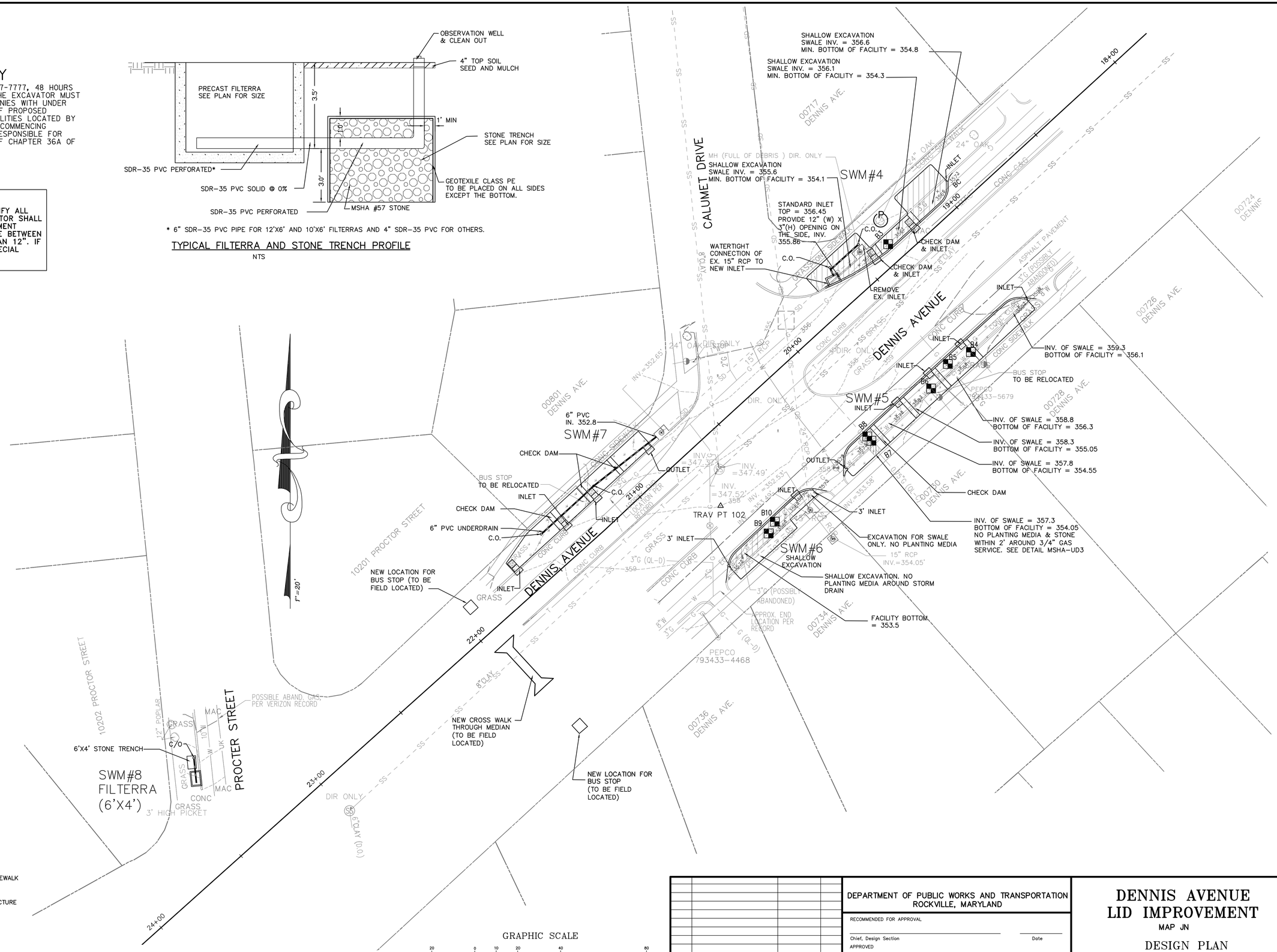
* 6" SDR-35 PVC PIPE FOR 12'X6' AND 10'X6' FILTERRAS AND 4" SDR-35 PVC FOR OTHERS.

TYPICAL FILTERRA AND STONE TRENCH PROFILE

NTS



LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- EX. SEWER
- EX. WATER
- EX. WATER STRUCTURE
- EX. TELEPHONE
- EX. GAS LINE
- PROPERTY /RW LINE
- PROPOSED STORM DRAIN
- SHALLOW EXCAVATION TO AVOID CONFLICT WITH UTILITY
- SODDED SWALE
- STORMWATER FACILITY
- REPLACE PEDESTRIAN RAMP /SIDEWALK
- PROPOSED STORM DRAIN STRUCTURE
- LOW POINT, HIGH POINT
- PROPOSED CURB
- EX. TREE TO REMAIN
- TREE REMOVAL

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

NO.	REVISION	DATE	BY

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
ROCKVILLE, MARYLAND

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DENNIS AVENUE LID IMPROVEMENT

MAP JN

DESIGN PLAN

SCALE : AS SHOWN

Project No. : 2008037.00 TASK 107 SHEET 2 of 10

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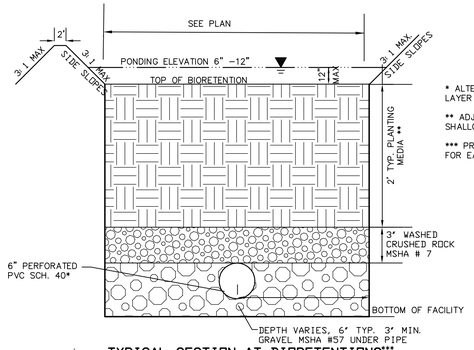


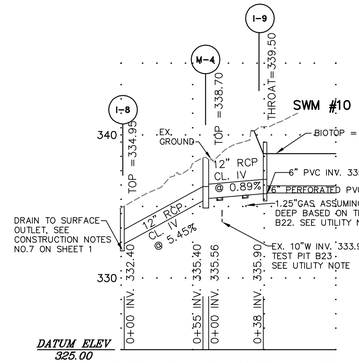
TYPICAL SECTION AT BIORETENTIONS***

NOT TO SCALE

* ALTERNATE 6" MSHA #57 GRAVEL DRAIN LAYER WHERE NO UNDERDRAIN IS SHOWN.

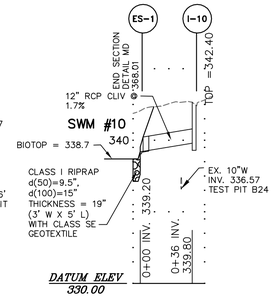
** ADJUST MEDIA DEPTH AT AREA MARKED AS SHALLOW EXCAVATION. SEE DETAIL MSHA-UD3.

*** PROVIDE AT LEAST ONE OBSERVATION WELL FOR EACH BIORETENTION FACILITY



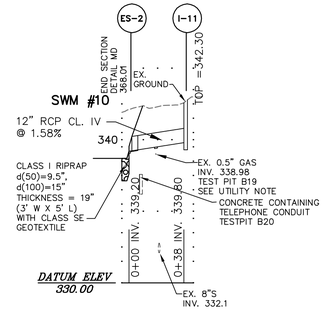
PROFILE I-8 TO SWM #10

1" = 50' HORIZONTAL; 1" = 5' VERTICAL



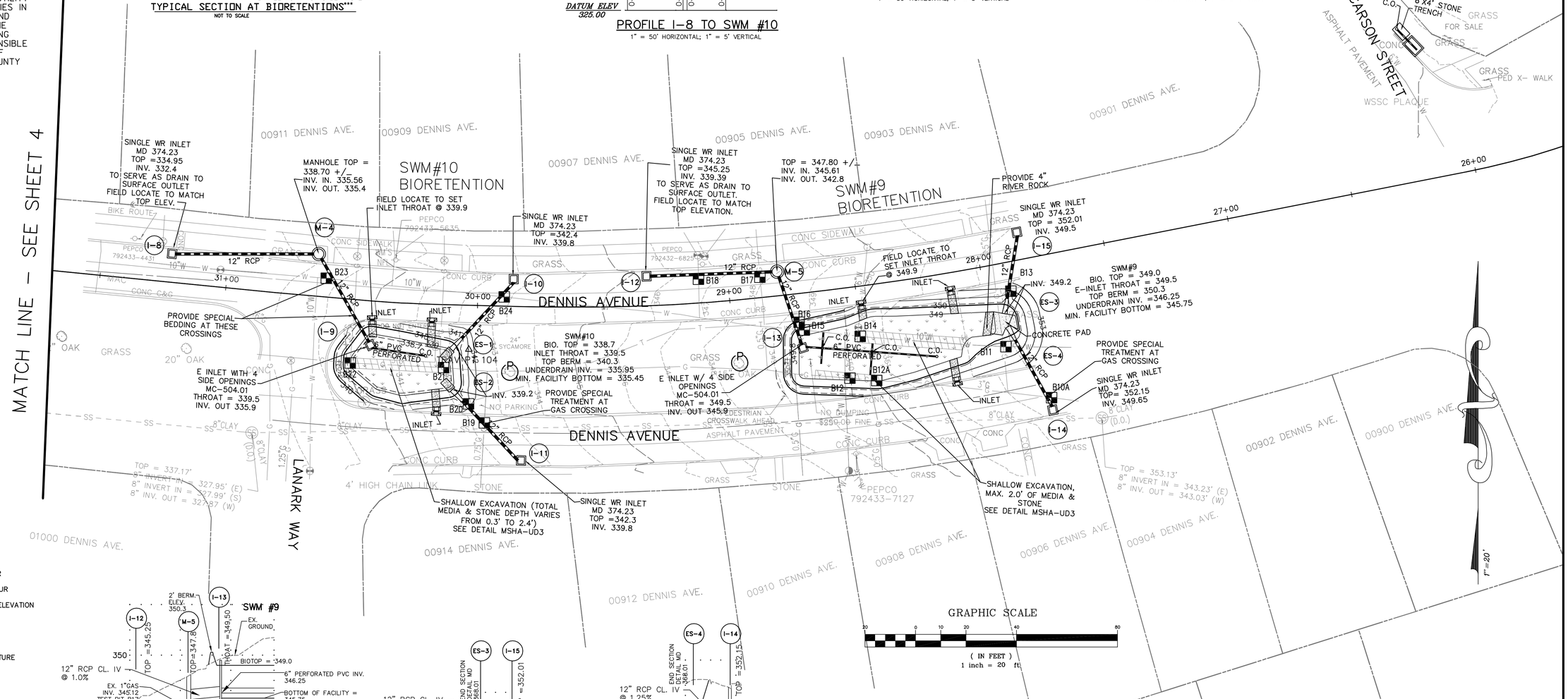
PROFILE I-10 TO SWM #10

1" = 50' HORIZONTAL; 1" = 5' VERTICAL



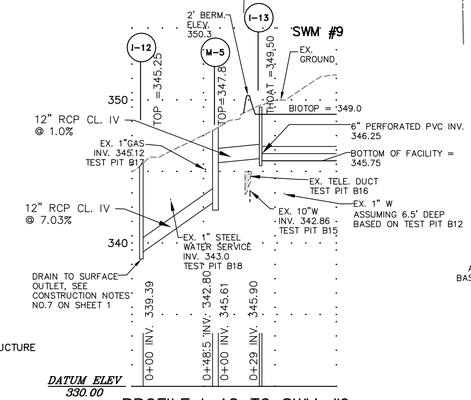
PROFILE I-11 TO SWM #10

1" = 50' HORIZONTAL; 1" = 5' VERTICAL



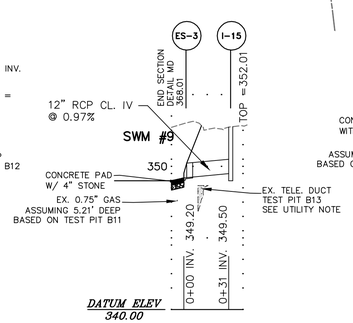
LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- EX. SEWER
- EX. WATER
- EX. WATER STRUCTURE
- EX. TELEPHONE
- EX. GAS LINE
- PROPERTY /RW LINE
- PROPOSED STORM DRAIN
- SHALLOW EXCAVATION TO AVOID CONFLICT WITH UTILITY
- SODDED SWALE
- STORMWATER FACILITY
- PROPOSED STORM DRAIN STRUCTURE
- LOW POINT, HIGH POINT
- PROPOSED CURB
- EX. TREE TO REMAIN
- TREE REMOVAL



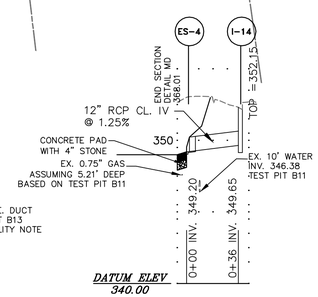
PROFILE I-12 TO SWM #9

1" = 50' HORIZONTAL; 1" = 5' VERTICAL



PROFILE I-15 TO SWM #9

1" = 50' HORIZONTAL; 1" = 5' VERTICAL



PROFILE I-14 TO SWM #9

1" = 50' HORIZONTAL; 1" = 5' VERTICAL

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

NO.	REVISION	DATE	BY

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
ROCKVILLE, MARYLAND

RECOMMENDED FOR APPROVAL

Chief, Design Section — Date

APPROVED

Chief, Division of Capital Development — Date

Designed by: Z.K. Drawn by: Z.K. Checked by: B.P.

DENNIS AVENUE LID IMPROVEMENT

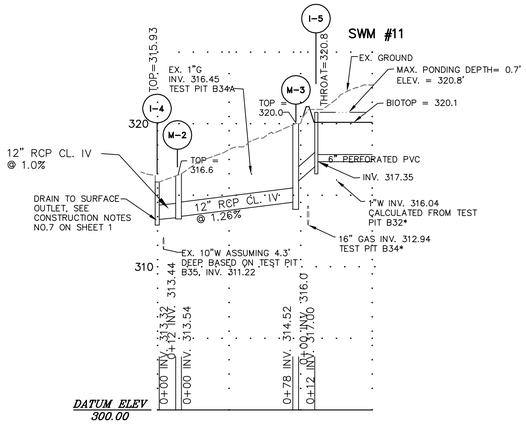
MAP JN

DESIGN PLAN

SCALE : AS SHOWN

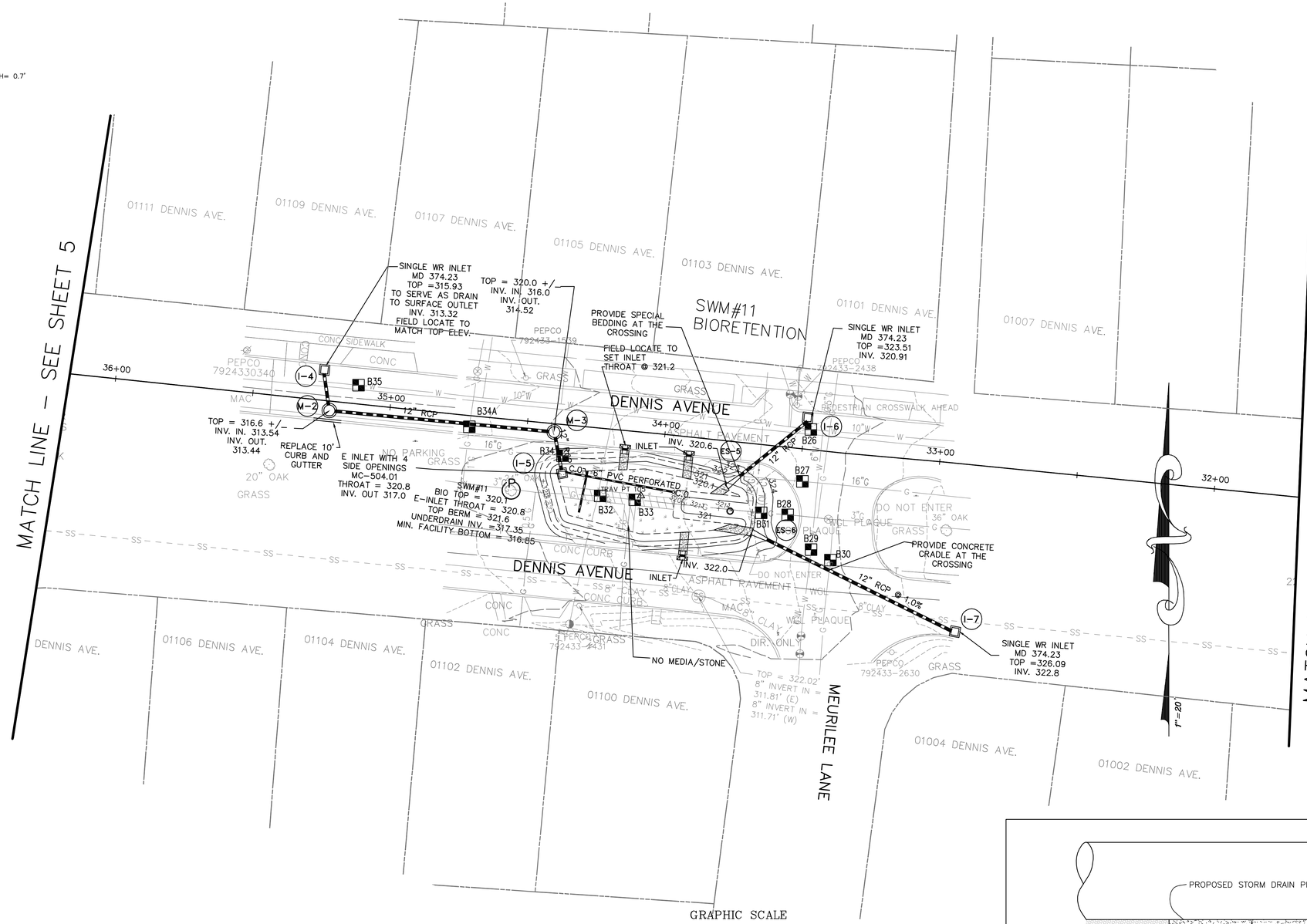
Project No. : 2008037.00 TASK 107 SHEET 3 of 10

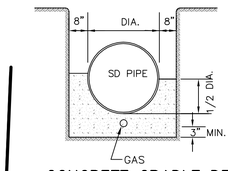
N:\2008\2008037\2008037.00\2008037.00 Tsk 107 Dennis Avenue LID Retrofits\dwg\SWM-FINAL.dwg, 1/17/2012 2:20:35 PM, deskPDF



PROFILE FROM I-4 TO I-5

1" = 50' HORIZONTAL; 1" = 5' VERTICAL





CONCRETE CRADLE DETAIL

NOT TO SCALE

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

UTILITY NOTE

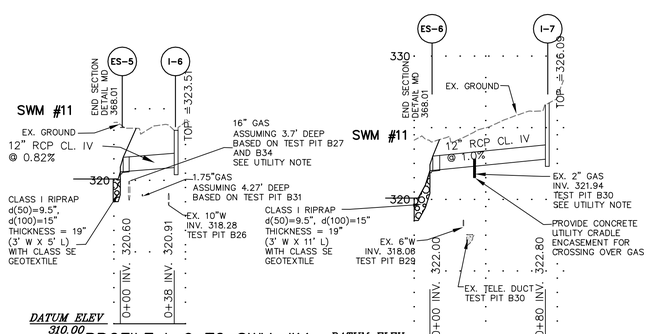
CONTRACTOR SHALL TEST PIT AND VERIFY ALL UTILITIES AT THE CROSSINGS. CONTRACTOR SHALL PROVIDE SPECIAL BEDDING OR ENCASEMENT TREATMENT WHEN VERITICAL CLEARANCE BETWEEN STORM DRAIN AND UTILITY IS LESS THAN 12". IF UTILITY IS CONCRETE ENCASED, NO SPECIAL TREATMENT WOULD BE REQUIRED. SEE CONSTRUCTION NOTES ON SHEET 1

MISS UTILITY

CALL " MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDER GROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF CHAPTER 36A OF THE MONTGOMERY COUNTY CODE.

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- 45.5 PROPOSED SPOT ELEVATION
- EX. SEWER
- EX. WATER
- EX. WATER STRUCTURE
- EX. TELEPHONE
- EX. GAS LINE
- PROPERTY /RW LINE
- PROPOSED STORM DRAIN
- SHALLOW EXCAVATION TO AVOID CONFLICT WITH UTILITY
- SODDED SWALE
- STORMWATER FACILITY
- REPLACE PEDESTRIAN RAMP /SIDEWALK
- PROPOSED STORM DRAIN STRUCTURE
- L.P. H.P. LOW POINT, HIGH POINT
- PROPOSED CURB
- EX. TREE TO REMAIN
- TREE REMOVAL

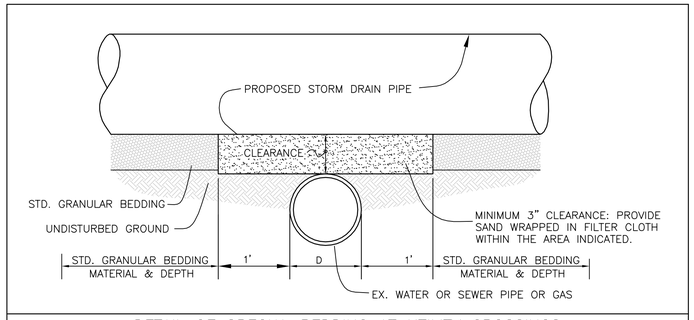


PROFILE I-6 TO SWM #11

1" = 50' HORIZONTAL; 1" = 5' VERTICAL

PROFILE I-7 TO SWM #11

1" = 50' HORIZONTAL; 1" = 5' VERTICAL



DETAIL OF SPECIAL BEDDING AT UTILITY CROSSINGS WHEN CLEARANCE IS LESS THAN 12"

NOT TO SCALE

NO.	REVISION	DATE	BY

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
ROCKVILLE, MARYLAND

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Chief, Design Section — Date

APPROVED

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Designed by: Z.K. Drawn by: Z.K. Checked by: B.P.

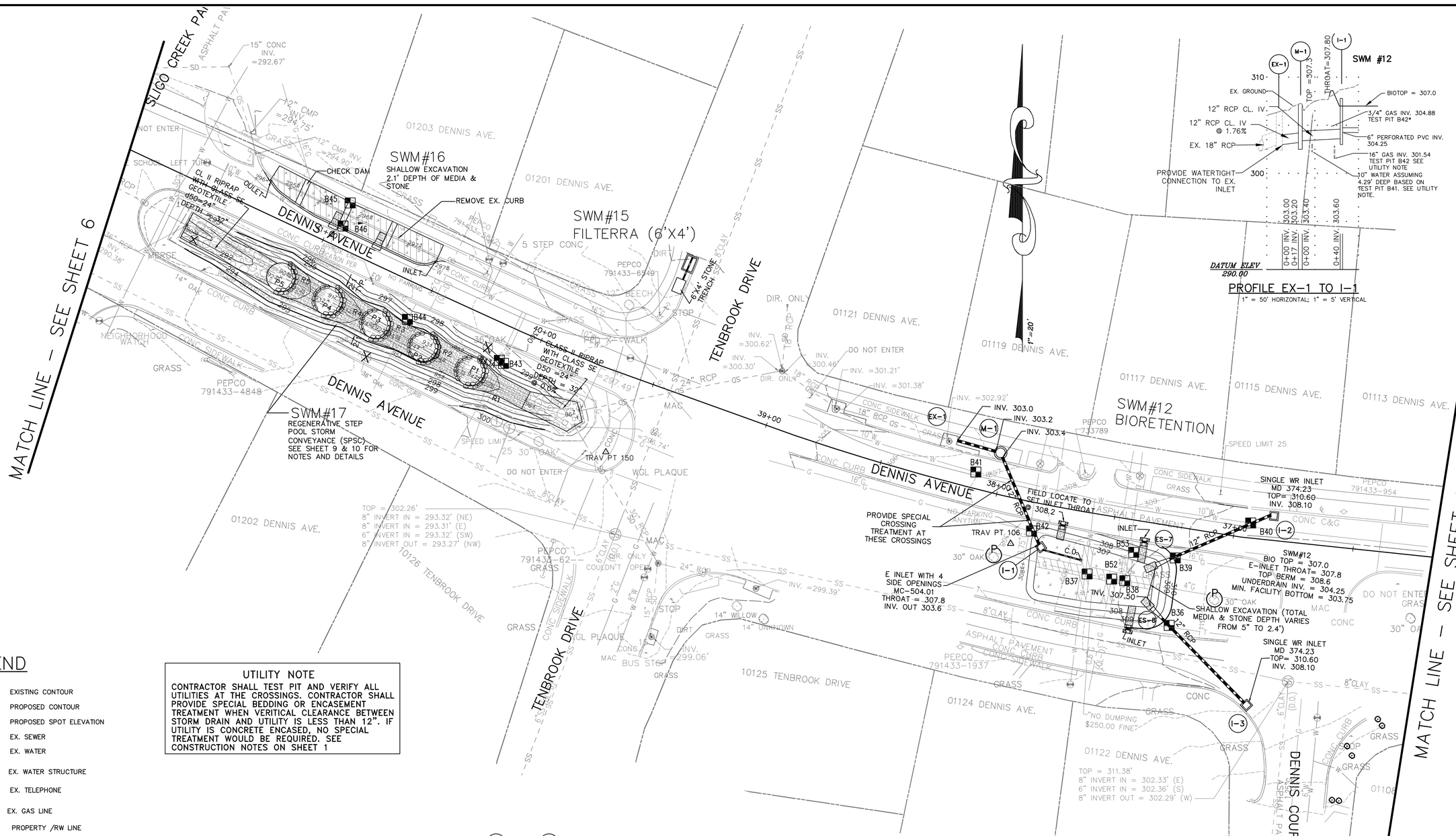
DENNIS AVENUE LID IMPROVEMENT

MAP JN

DESIGN PLAN

SCALE : AS SHOWN

Project No. : 2008037.00 TASK 107 SHEET 4 of 10



LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- EX. SEWER
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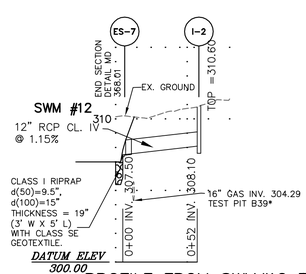
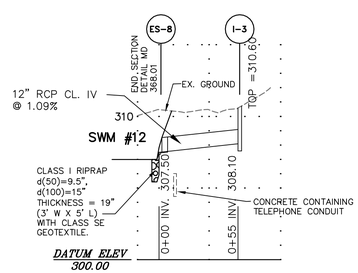


PROFILE FROM SWM#12 TO I-2

1" = 50' HORIZONTAL; 1" = 5' VERTICAL



PROFILE FROM SWM#12 TO I-3

1" = 50' HORIZONTAL; 1" = 5' VERTICAL

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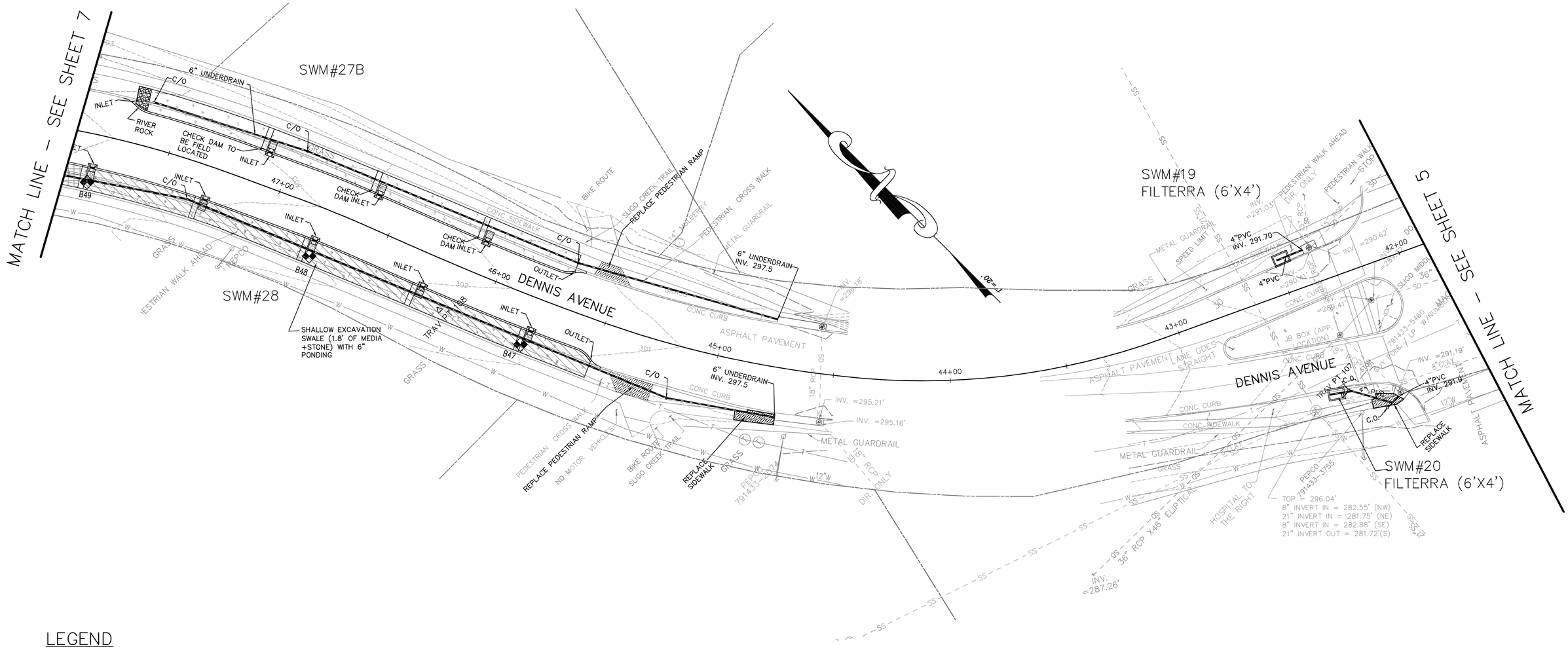
DENNIS AVENUE LID IMPROVEMENT

MAP JN

DESIGN PLAN

SCALE : AS SHOWN

Project No. : 2008037.00 TASK 107 SHEET 5 of 10



LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- 45.5 PROPOSED SPOT ELEVATION
- SS EX. SEWER
- W EX. WATER
- W EX. WATER STRUCTURE
- T EX. TELEPHONE
- G EX. GAS LINE
- PROPERTY /RW LINE
- PROPOSED STORM DRAIN
- SHALLOW EXCAVATION TO AVOID CONFLICT WITH UTILITY
- SODDED SWALE
- STORMWATER FACILITY
- REPLACE PEDESTRIAN RAMP /SIDEWALK
- L.P. H.P. LOW POINT, HIGH POINT
- PROPOSED CURB
- EX. TREE TO REMAIN
- TREE REMOVAL
  PROPOSED STORM DRAIN STRUCTURE

UTILITY NOTE

CONTRACTOR SHALL TEST PIT AND VERIFY ALL UTILITIES AT THE CROSSINGS. CONTRACTOR SHALL PROVIDE SPECIAL BEDDING OR ENCASEMENT TREATMENT WHEN VERITICAL CLEARANCE BETWEEN STORM DRAIN AND UTILITY IS LESS THAN 12". IF UTILITY IS CONCRETE ENCASED, NO SPECIAL TREATMENT WOULD BE REQUIRED. SEE CONSTRUCTION NOTES ON SHEET 1

MISS UTILITY

CALL " MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDER GROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF CHAPTER 36A OF THE MONTGOMERY COUNTY CODE.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

NO.	REVISION	DATE	BY

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
ROCKVILLE, MARYLAND

RECOMMENDED FOR APPROVAL

Chief, Design Section — Date

APPROVED

Chief, Division of Capital Development — Date

Designed by: Z.K. Drawn by: Z.K. Checked by: B.P.

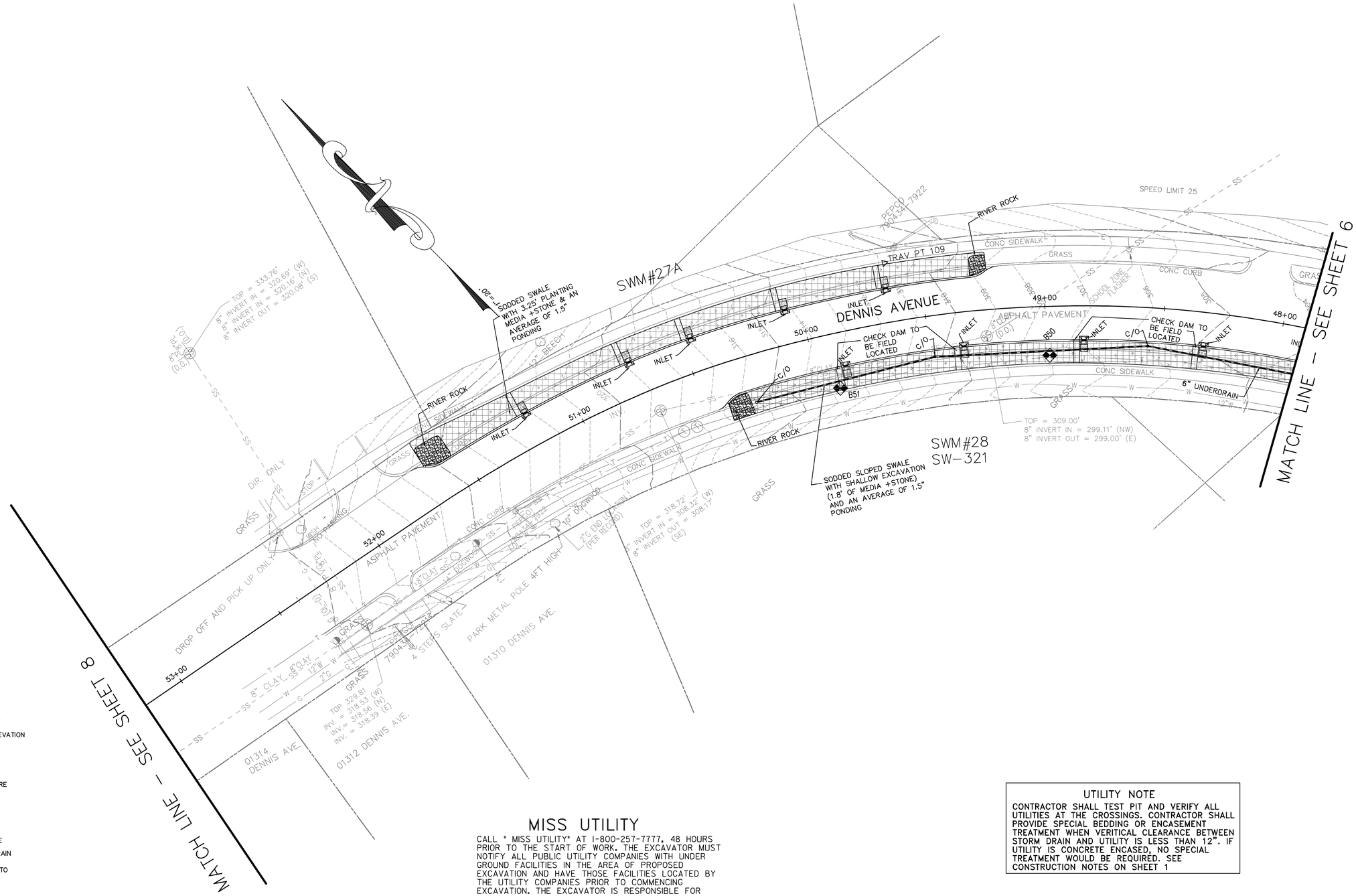
DENNIS AVENUE LID IMPROVEMENT

MAP JN

DESIGN PLAN

SCALE : AS SHOWN

Project No. : 2008037.00 TASK 107 SHEET 6 of 10



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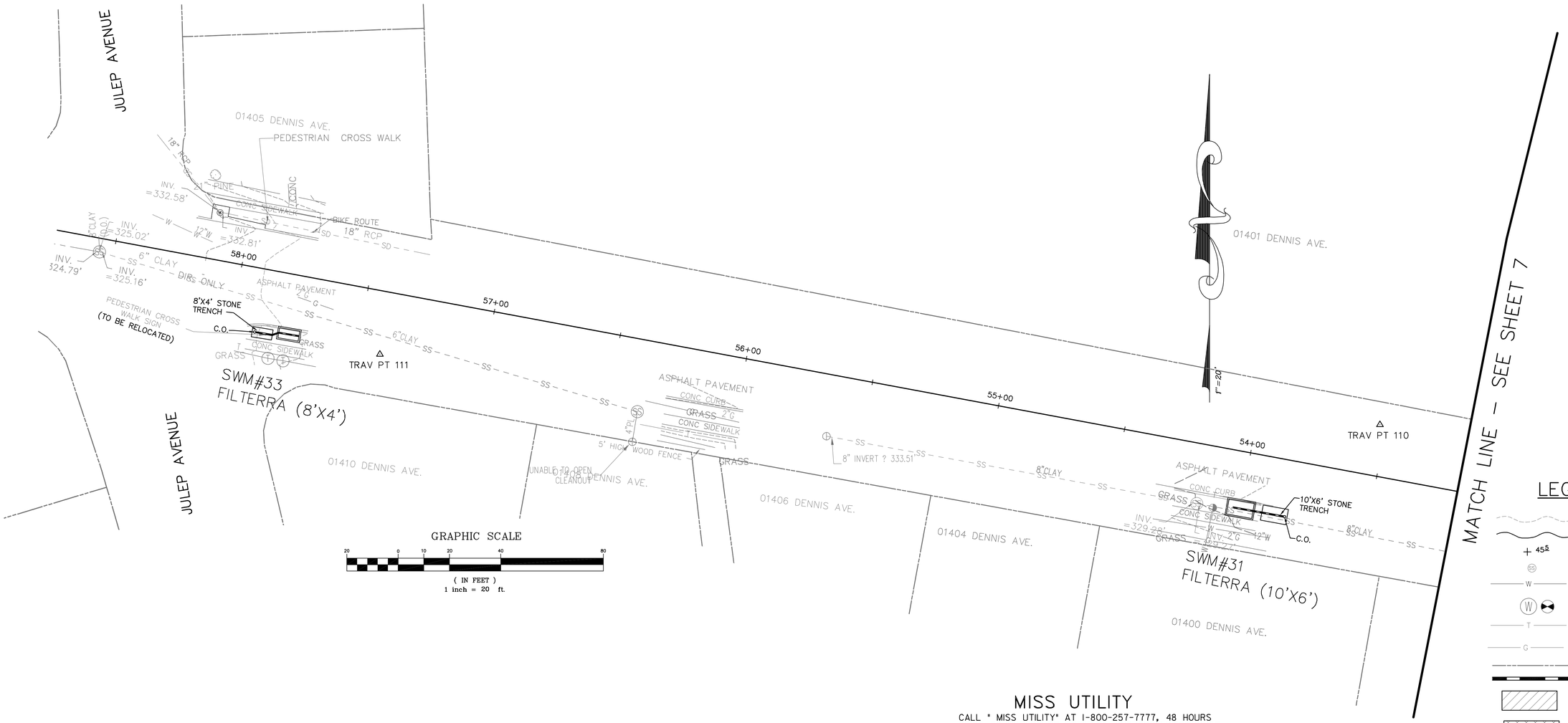

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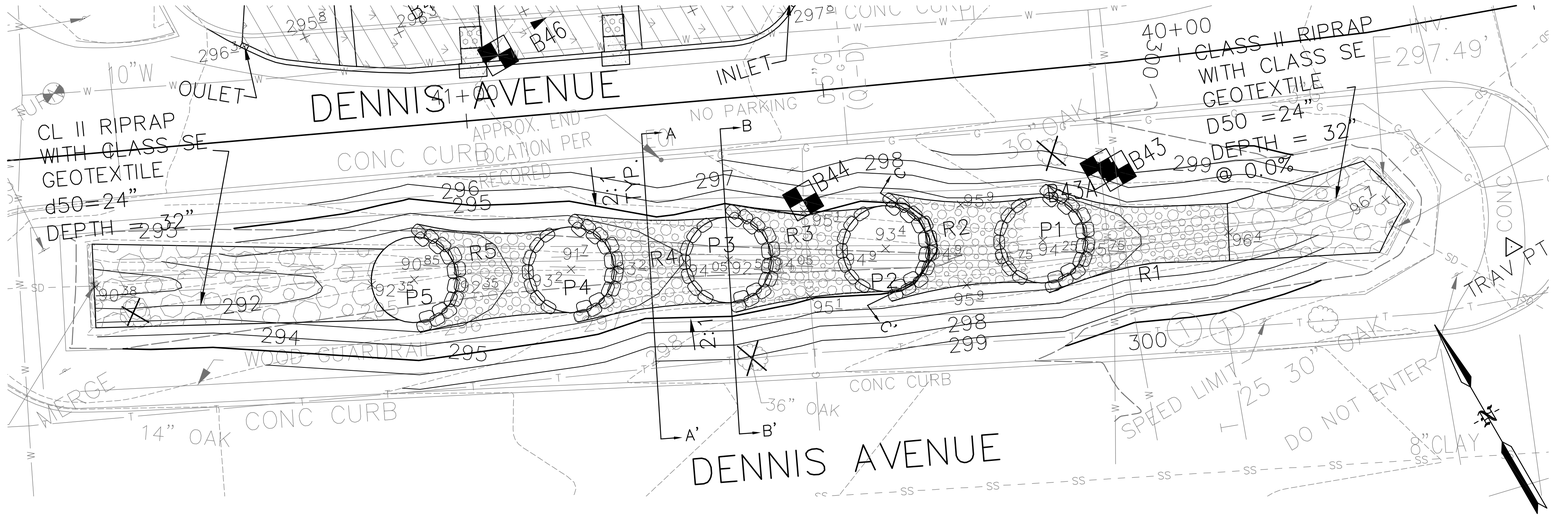
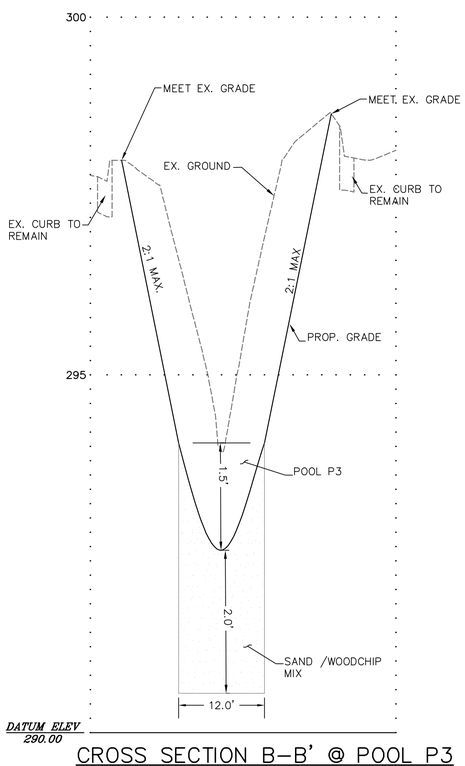


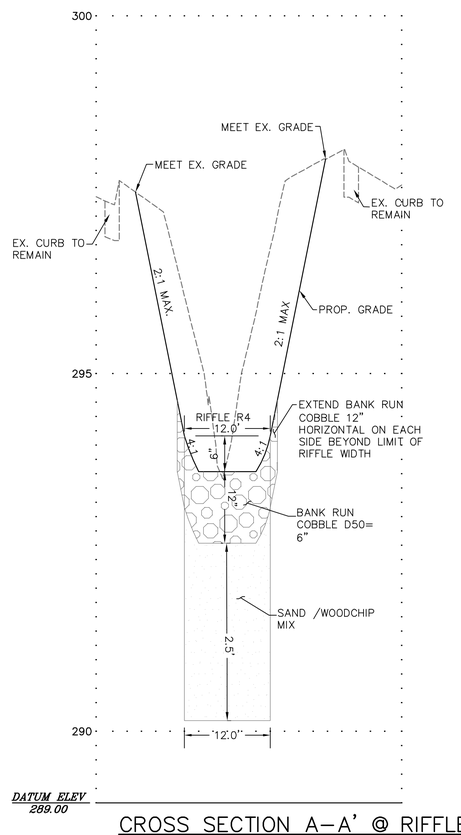
REGENERATIVE STEP POOL STORM CONVEYANCE (SPSC) PLAN VIEW

1" =10'



CROSS SECTION B–B' @ POOL P3

1" = 10' HORIZONTAL; 1" =1' VERTICAL



CROSS SECTION A–A' @ RIFFLE R4

1" = 10' HORIZONTAL; 1" =1' VERTICAL

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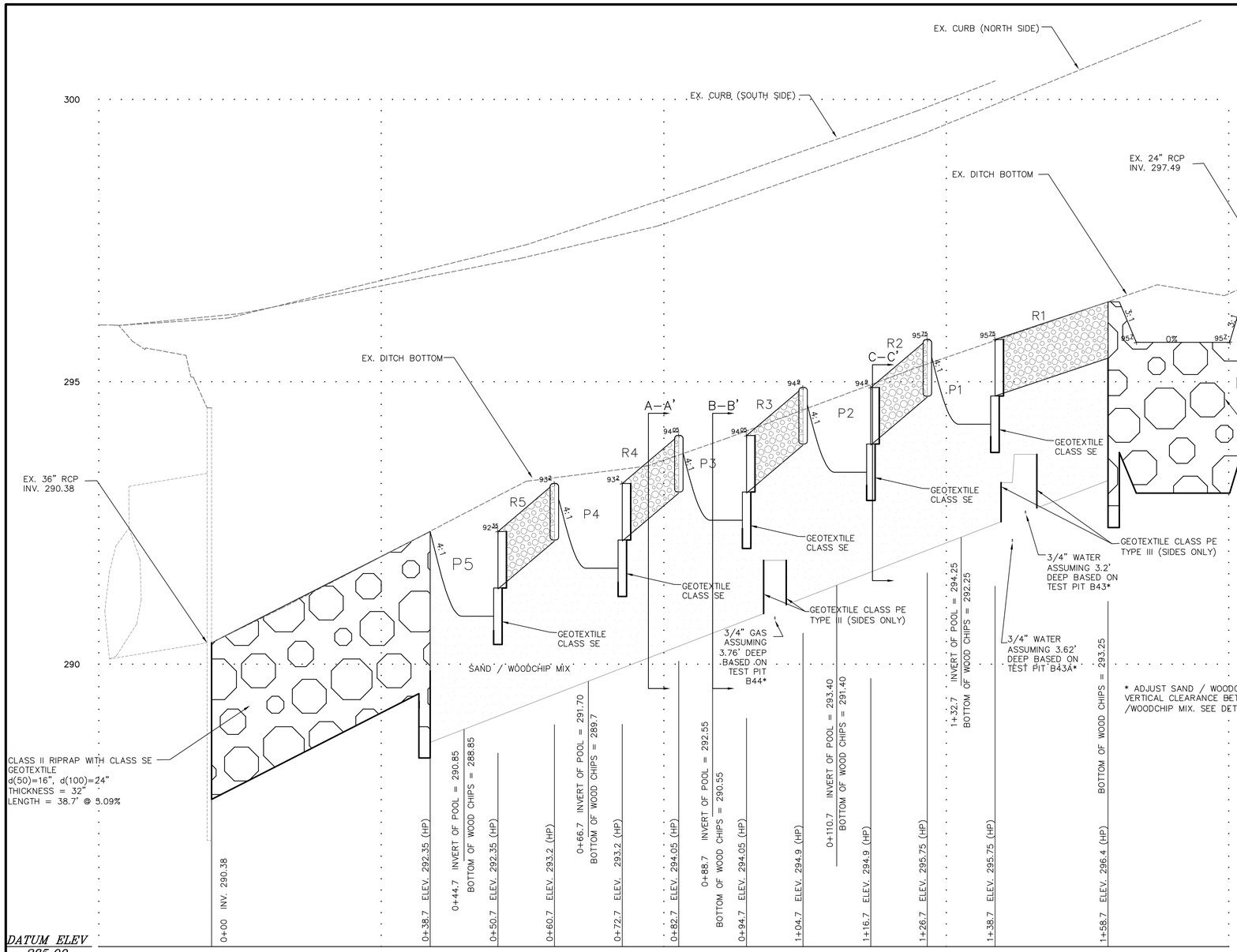
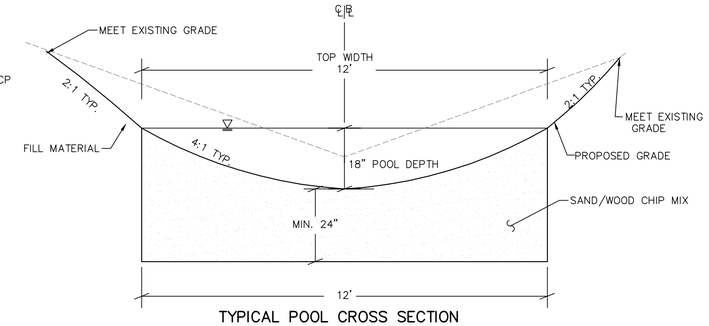


SPSC PROFILE ALONG CENTER LINE

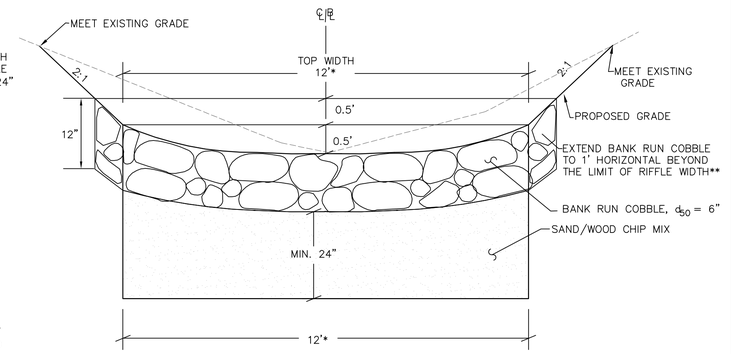
1" = 10' HORIZONTAL; 1" =1' VERTICAL

* ADJUST SAND / WOODCHIP MIX DEPTH TO ACHIEVE MIN. 12" VERTICAL CLEARANCE BETWEEN UTILITY AND BOTTOM OF SAND /WOODCHIP MIX. SEE DETAIL MSHA–UD3



TYPICAL POOL CROSS SECTION

NOT TO SCALE

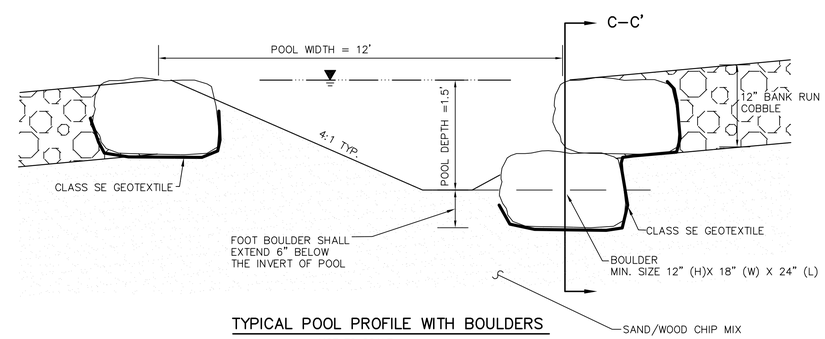


TYPICAL RIFFLE CROSS SECTION

NOT TO SCALE

* 8' FOR RIFFLE R1. SEE PLAN

** FOR RIFFLE R1, EXTEND BANK RUN COBBLE ON 2:1 SIDE SLOPE 3' HORIZONTAL BEYOND THE RIFFLE WIDTH. TOTAL CROSS WIDTH OF BANK RUN COBBLE = 14'



TYPICAL POOL PROFILE WITH BOULDERS

NOT TO SCALE

SPSC NOTES

1. THE SAND/WOOD CHIP FILTER MEDIA SHALL MEET THE MDE ESD SPECIFICATIONS FOR SAND. SAND SHALL CONFORM TO AASHTO–M–6 OR ASTM–C–33, 0.02 INCHES TO 0.04 INCHES IN SIZE. SAND SUBSTITUTIONS SUCH AS DIABASE AND GRAYSTONE (AASHTO) #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATED OR DOLOMITIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND. THE WOODCHIPS ARE ADDED TO THE SAND MIX, APPROXIMATELY 20% BY VOLUME, TO INCREASE THE ORGANIC CONTENT AND PROMOTE PLANT GROWTH AND SUSTAINABILITY.

2. SAND/WOOD CHIP FILTER MEDIA AREA IS TO BE EXCAVATED NEAR VERTICAL AND BACKFILLED IN THE SAME DAY.

3. THE TYPICAL BOULDER SIZE SHALL NOT BE LESS THAN 2 FT IN LENGTH. BOULDERS ARE TO BE SANDSTONE OR COUNTY APPROVED ALTERNATIVE. SANDSTONE BOULDERS SHALL BE TABULAR IN SHAPE TO ALLOW FOR MAXIMUM INTERLOCKING.

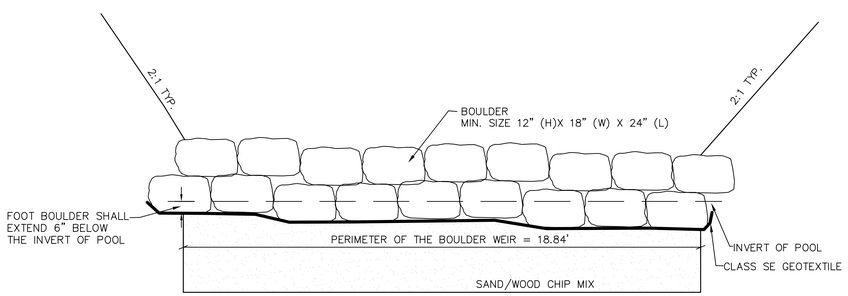
4. BOULDERS SHALL WEIGH BETWEEN 500 LBS AND 800 LBS. CLASS SE GEOTEXTILE SHALL BE PLACED UNDER ALL BOULDERS.

5. THE RIFFLE/WEIR AND POOL CHANNELS SHALL BE PARABOLIC IN SHAPE. SEE THIS SHEET AND SHEET 9 FOR TYPICAL PROFILE AND DETAILS.

6. SET A REBAR AND CAP IN A VISIBLE LOCATION AT 6 INCHES ABOVE THE LOWEST BOTTOM ELEVATION OF EACH POOL FOR DETERMINING WHEN SEDIMENT NEEDS TO BE REMOVED FROM THE POOLS.

7. STABILIZE EXPOSED TOPSOIL AND SAND/WOOD CHIP AREA WITH SEED AND MULCH.

8. PLACE ALL EXCESS MATERIALS, BOULDERS, AT THE EDGE OF THE CROSS SECTION FOR USE DURING THE MAINTENANCE PHASE TO CORRECT ANY PHYSICAL INSTABILITY.



TYPICAL BOULDER PERIMETER CROSS SECTION C–C'

NOT TO SCALE

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