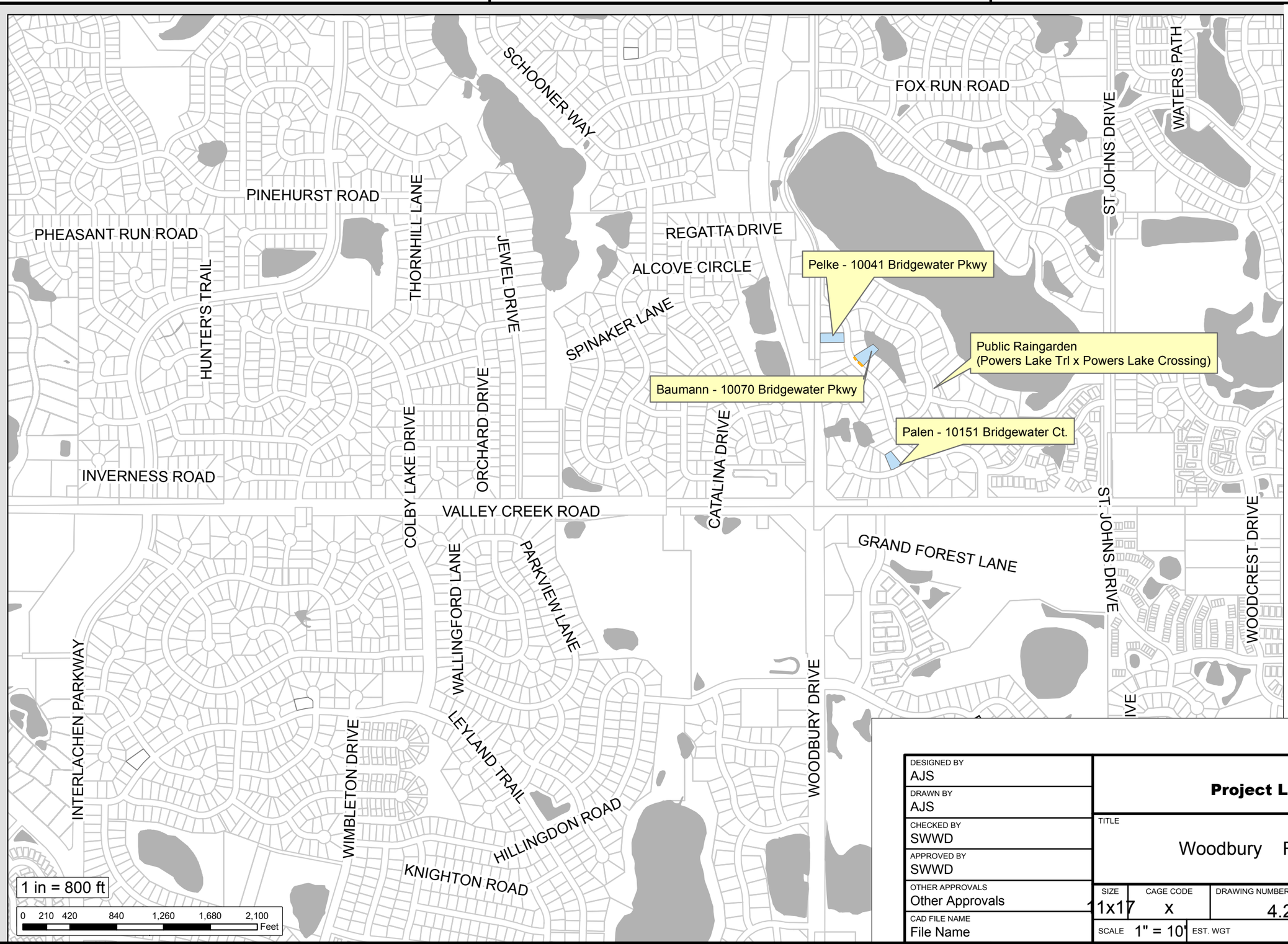


DESIGNED BY	AJS
DRAWN BY	AJS
CHECKED BY	SWWD
APPROVED BY	SWWD
OTHER APPROVALS	Other Approvals
CAD FILE NAME	File Name

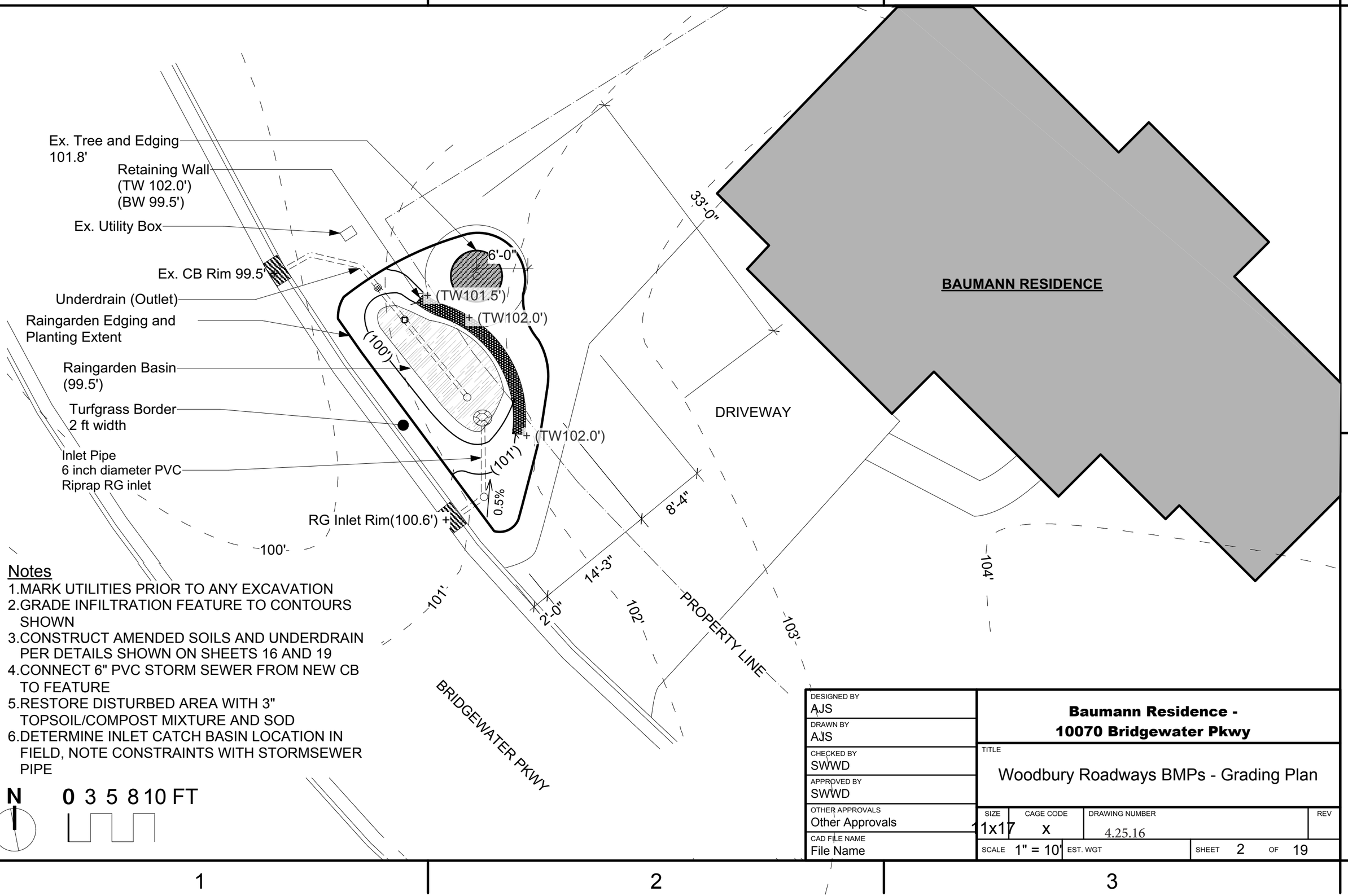
Project Locations

TITLE

Woodbury Roadways BMPs

SIZE	CAGE CODE	DRAWING NUMBER	REV
11x17	x	4.25.16	

SCALE 1" = 10' | EST. WGT | SHEET 1 OF 19



Notes

1. MARK UTILITIES PRIOR TO ANY EXCAVATION
2. GRADE INFILTRATION FEATURE TO CONTOURS SHOWN
3. CONSTRUCT AMENDED SOILS AND UNDERDRAIN PER DETAILS SHOWN ON SHEETS 16 AND 19
4. CONNECT 6" PVC STORM SEWER FROM NEW CB TO FEATURE
5. RESTORE DISTURBED AREA WITH 3" TOPSOIL/COMPOST MIXTURE AND SOD
6. DETERMINE INLET CATCH BASIN LOCATION IN FIELD, NOTE CONSTRAINTS WITH STORMSEWER PIPE

DESIGNED BY	AJS
DRAWN BY	AJS
CHECKED BY	SWWD
APPROVED BY	SWWD
OTHER APPROVALS	Other Approvals
CAD FILE NAME	File Name

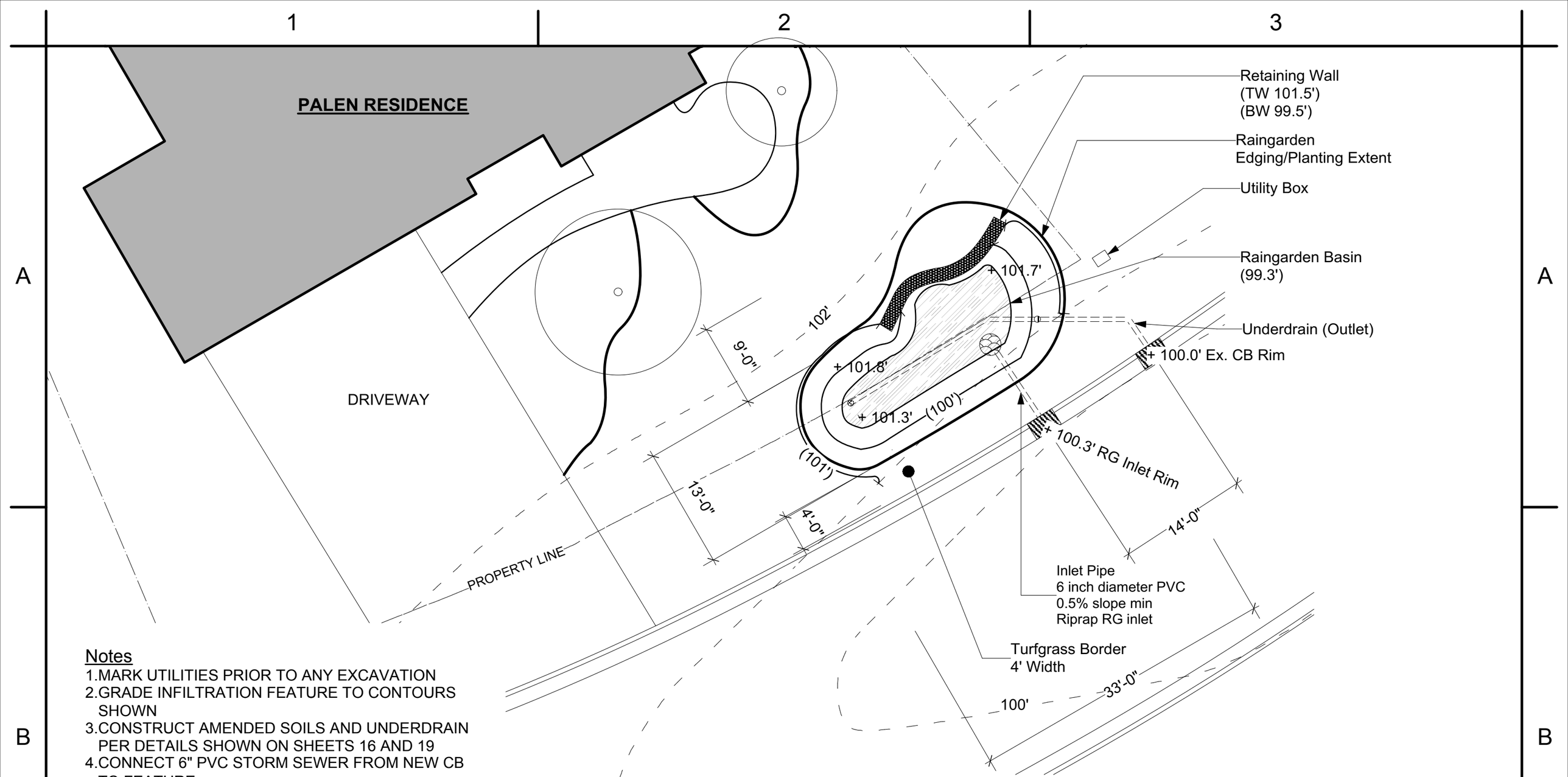
Baumann Residence -
10070 Bridgewater Pkwy

TITLE

Woodbury Roadways BMPs - Grading Plan

SIZE	CAGE CODE	DRAWING NUMBER	REV
1x17	x	4.25.16	

SCALE 1" = 10' | EST. WGT | SHEET 2 OF 19



Notes

1. MARK UTILITIES PRIOR TO ANY EXCAVATION
2. GRADE INFILTRATION FEATURE TO CONTOURS SHOWN
3. CONSTRUCT AMENDED SOILS AND UNDERDRAIN PER DETAILS SHOWN ON SHEETS 16 AND 19
4. CONNECT 6" PVC STORM SEWER FROM NEW CB TO FEATURE
5. RESTORE DISTURBED AREA WITH 3" TOPSOIL/COMPOST MIXTURE AND SOD
6. DETERMINE INLET CATCH BASIN LOCATION IN FIELD

N

0 3 5 8 10 FT

DESIGNED BY	AJS
DRAWN BY	AJS
CHECKED BY	SWWD
APPROVED BY	SWWD
OTHER APPROVALS	Other Approvals
CAD FILE NAME	File Name

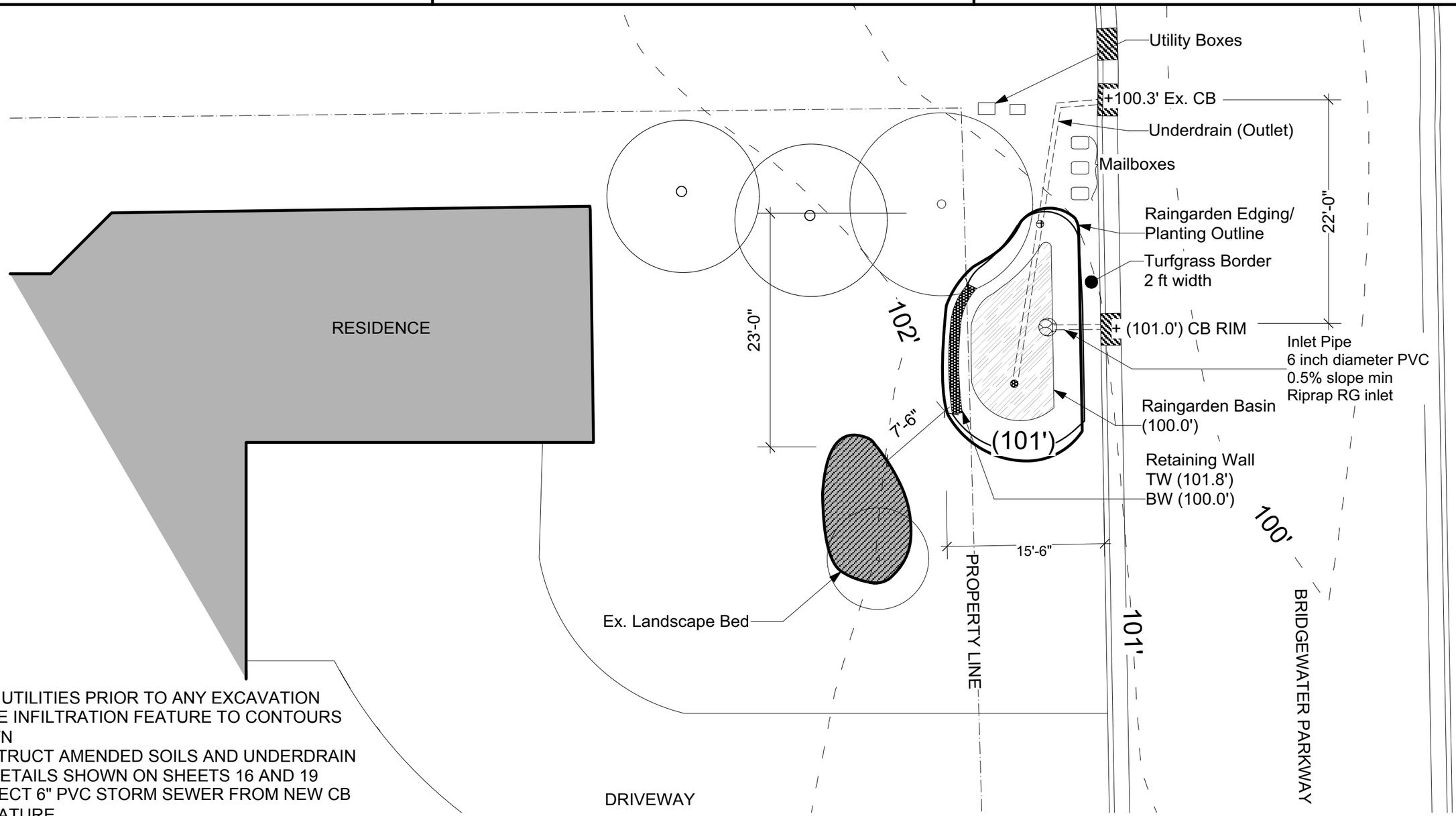
Palen Residence - 10151 Bridgewater Ct

TITLE

Woodbury Roadways BMPs - Grading Plan

SIZE	CAGE CODE	DRAWING NUMBER	REV
11x17	X	4.25.16	

SCALE 1" = 10' | EST. WGT | SHEET 3 OF 19



Notes

1. MARK UTILITIES PRIOR TO ANY EXCAVATION
2. GRADE INFILTRATION FEATURE TO CONTOURS SHOWN
3. CONSTRUCT AMENDED SOILS AND UNDERDRAIN PER DETAILS SHOWN ON SHEETS 16 AND 19
4. CONNECT 6" PVC STORM SEWER FROM NEW CB TO FEATURE
5. RESTORE DISTURBED AREA WITH 3" TOPSOIL/COMPOST MIXTURE AND SOD
6. DETERMINE INLET CATCH BASIN LOCATION IN FIELD

N 0 3 5 8 10 FT

DESIGNED BY	AJS
DRAWN BY	AJS
CHECKED BY	SWWD
APPROVED BY	SWWD
OTHER APPROVALS	Other Approvals
CAD FILE NAME	File Name

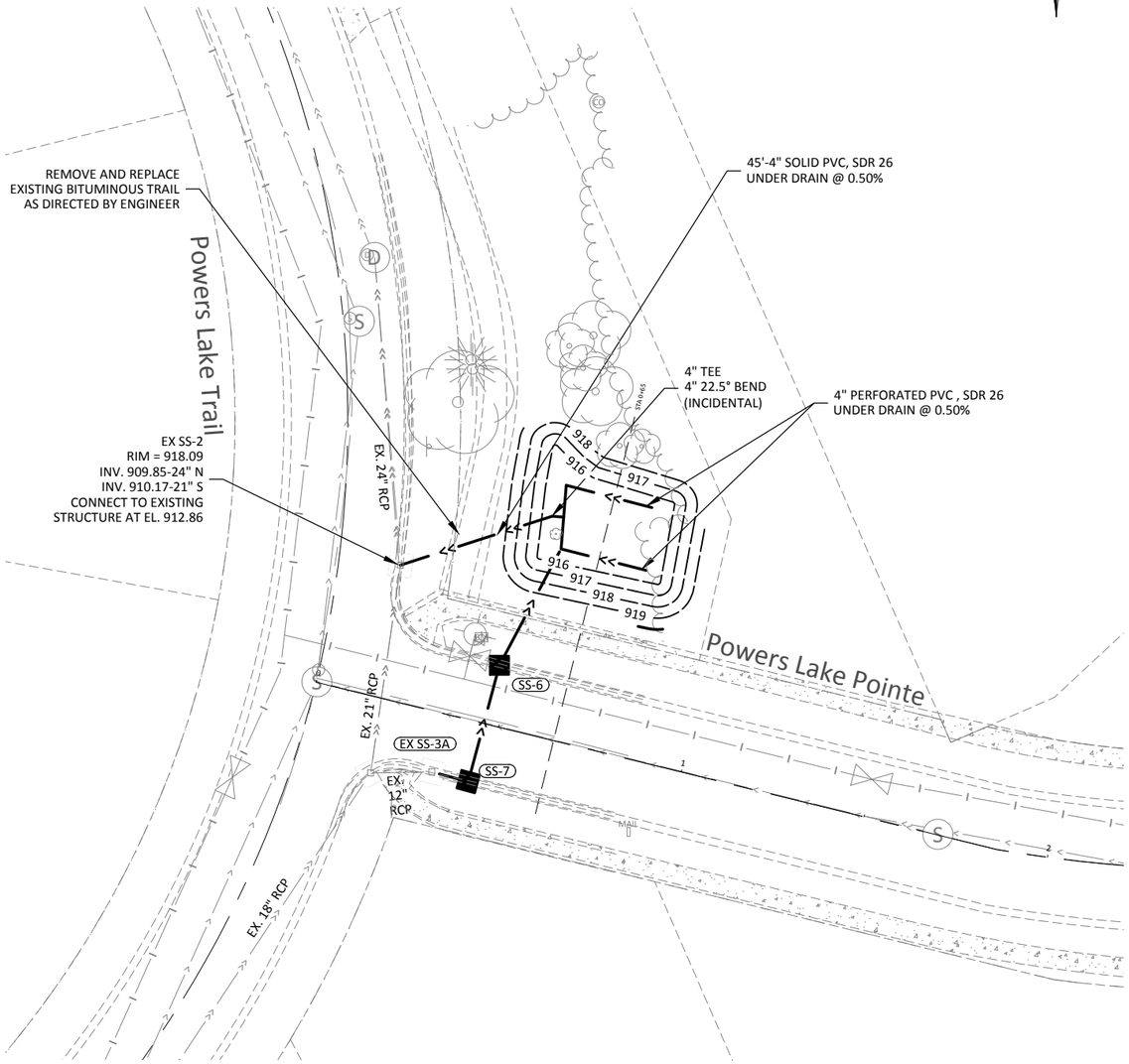
Pelke Residence - 10041 Bridgewater Pkwy

TITLE

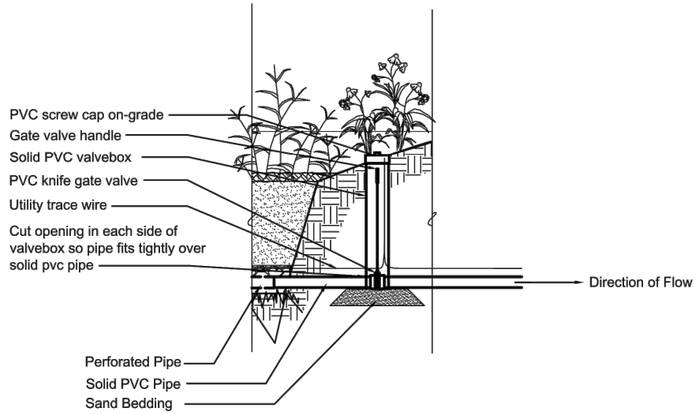
Woodbury Roadways BMPs - Grading Plan

SIZE	CAGE CODE	DRAWING NUMBER	REV
11x17	x	4.25.16	

SCALE 1" = 10' | EST. WGT | SHEET 4 OF 19

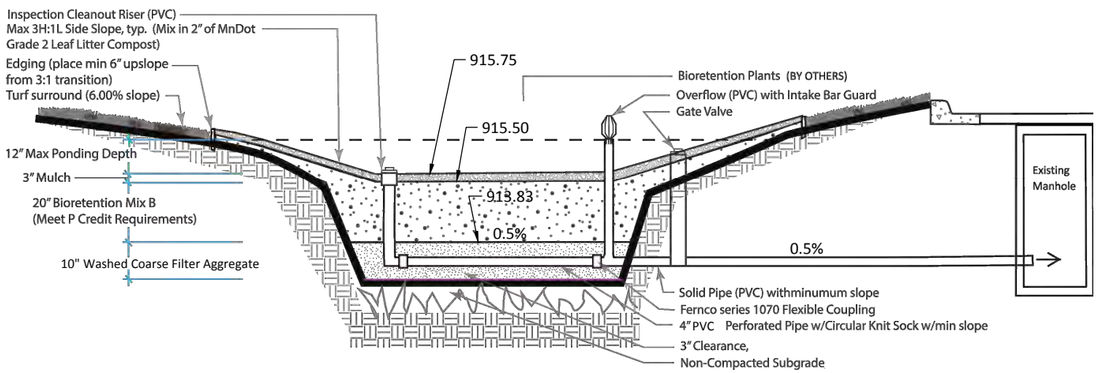


NOTES:
1. FINAL LOCATION OF UNDERDRAIN SYSTEM TO BE DETERMINED IN THE FIELD BY ENGINEER.
2. SEE SHEET G0.03 FOR BIORETENTION INSTALLATION NOTES.



Underdrain Valve

Not To Scale



Biofiltration with Underdrain

Cross Section

Not to Scale

HORZ. SCALE 0 20 40 FEET

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

MICHAEL S. NILL
LIC. NO. 26914 DATE 01/12/2016

DESIGNED MSN
DRAWN DJT
CHECKED MSN

BOLTON & MENK, INC.
Consulting Engineers & Surveyors
2035 County Road D East, Suite B - Maplewood, Minnesota 55109
Phone: 651-704-9970 Email: Maplewood@bolton-menk.com
www.bolton-menk.com

REV.	BY	DATE

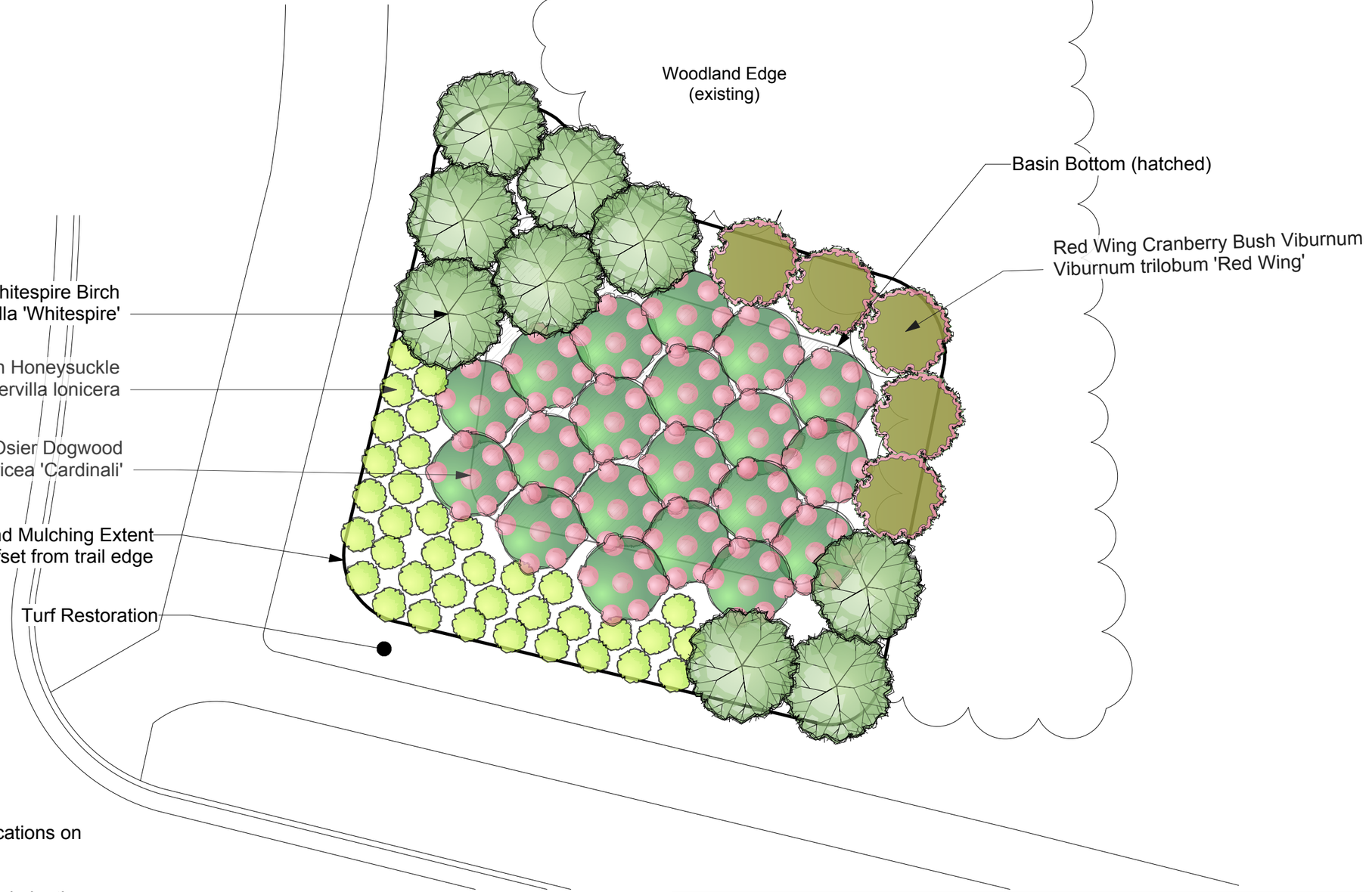
WOODBURY, MINNESOTA
2016 ROADWAY REHABILITATION PROJECT - RESIDENTIAL AREA
UNDER DRAIN DETAIL

SHEET C5.16

Plant Schedule - All Locations*					
ID	**Qty**	**Latin Name**	**Common Name**	**Scheduled Size**	**Spacing**
AnPD	54	Aster novae angliae 'purple dome'	Purple Dome Aster	#1	24"
At	51	Asclepias tuberosa	Butterfly Milkweed	4" pot	24"
BpW	9	Betula platyphylla 'Whitespire'	Whitespire Birch	#15 - TF	96"
Cb	58	Carex bebbi	Bebb's Sedge	4" pot	24"
Cg	34	Chelone glabra	Turtlehead	4" pot	24"
CsAF-1	22	Cornus sericea 'Arctic Fire'	Arctic Fire Dogwood	#2	48"
CSC	20	Cornus sericea 'Cardinali'	Cardinal Red-Osier Dogwood	#2	72-84"
CvM	7	Coreopsis verticillata 'Moonbeam'	Moonbeam Coreopsis	#1	24"
Ep	55	Echinacea purpurea	Purple Coneflower	4" pot	24"
ET	70	Calamagrostis x acutifolia	Karl Foerster Grass	#1	24"
Gt	56	Rudbeckia fulgida 'Goldsturm'	Goldsturm Black Eyed Susan	#1	24"
Gtr	10	Geum triflorum	Prairie Smoke	4" pot	18"
iv	80	Iris versicolor	Blue Flag Iris	4" pot	24"
Je	94	Juncus effusus	Soft Rush	4" pot	24"
MS 02	43	Diervilla lonicera	Dwarf Bush Honeysuckle	#1	36"
Pa	24	Perovski atriplicifolia	Russian Sage	#1	30"
PsCB	48	Phlox subulata 'Crimson Beauty'	Creeping Phlox	#1	24"
Sh	63	Sporobolus heterolepis	Prairie Dropseed	4" pot	24"
ToB	3	Thuja occidentalis 'Bobozam'	Mr. Bowling Ball Arborvitae	#2	36"
VTRW	5	Viburnum trilobum 'Red Wing'	Red Wing Cranberry Bush Viburnum	#5	72"-84"

*Includes plant quantities from three raingarden locations not in Powers Lake neighborhood.

DESIGNED BY AJS	**PLANT SCHEDULE**
DRAWN BY AJS	TITLE: Woodbury Roadways BMPs
CHECKED BY SWWD	
APPROVED BY SWWD	
OTHER APPROVALS Other Approvals	SIZE 11x17 · CAGE CODE x · DRAWING NUMBER 4.25.16 · REV
CAD FILE NAME File Name	SCALE 1" = 10' · EST. WGT · SHEET 8 OF 19



Notes

1. Install Plants according to details and specifications on sheets 17-19
2. Water in plants at time of installation
3. Rake mulch aside to plant; reset mulch around plantings to 2-3" depths

N

0 3 5 8 10 FT

DESIGNED BY: AJS	**Powers Lake Trail Bioretention Basin -Planting Plan Only -**
DRAWN BY: AJS	
CHECKED BY: SWWD	TITLE: **Woodbury Roadways BMPs - Planting Plan**
APPROVED BY: SWWD	
OTHER APPROVALS: Other Approvals	SIZE: 11x17 · CAGE CODE: x · DRAWING NUMBER: 4.25.16 · REV:
CAD FILE NAME: File Name	SCALE: 1" = 10' · EST. WGT: · SHEET: 9 OF 19

Notes

1. Install Plants according to details and specifications on sheets 17-19
2. Water in plants at time of installation
3. Rake mulch aside to plant; reset mulch around plantings to 2-3" depths

DESIGNED BY	AJS
DRAWN BY	AJS
CHECKED BY	SWWD
APPROVED BY	SWWD
OTHER APPROVALS	Other Approvals
CAD FILE NAME	File Name

Baumann Residence - 10070
Bridgewater Parkway

TITLE

Woodbury Roadways BMPs - Planting Plan

SIZE	CAGE CODE	DRAWING NUMBER	REV
11x17	X	4.25.16	

SCALE 1" = 10' | EST. WGT | SHEET 10 OF 19

Notes

1. Install Plants according to details and specifications on sheets 17-19
2. Water in plants at time of installation
3. Rake mulch aside to plant; reset mulch around plantings to 2-3" depths

N

0 3 5 8 10 FT

DESIGNED BY AJS	**Palen Residence - 10151 Bridgewater Court**
DRAWN BY AJS	
CHECKED BY SWWD	TITLE Woodbury Roadways BMPs - Planting Plan
APPROVED BY SWWD	
OTHER APPROVALS Other Approvals	SIZE 11x17 · CAGE CODE x · DRAWING NUMBER 4.25.16 · REV
CAD FILE NAME File Name	SCALE 1" = 10' · EST. WGT · SHEET 11 OF 19

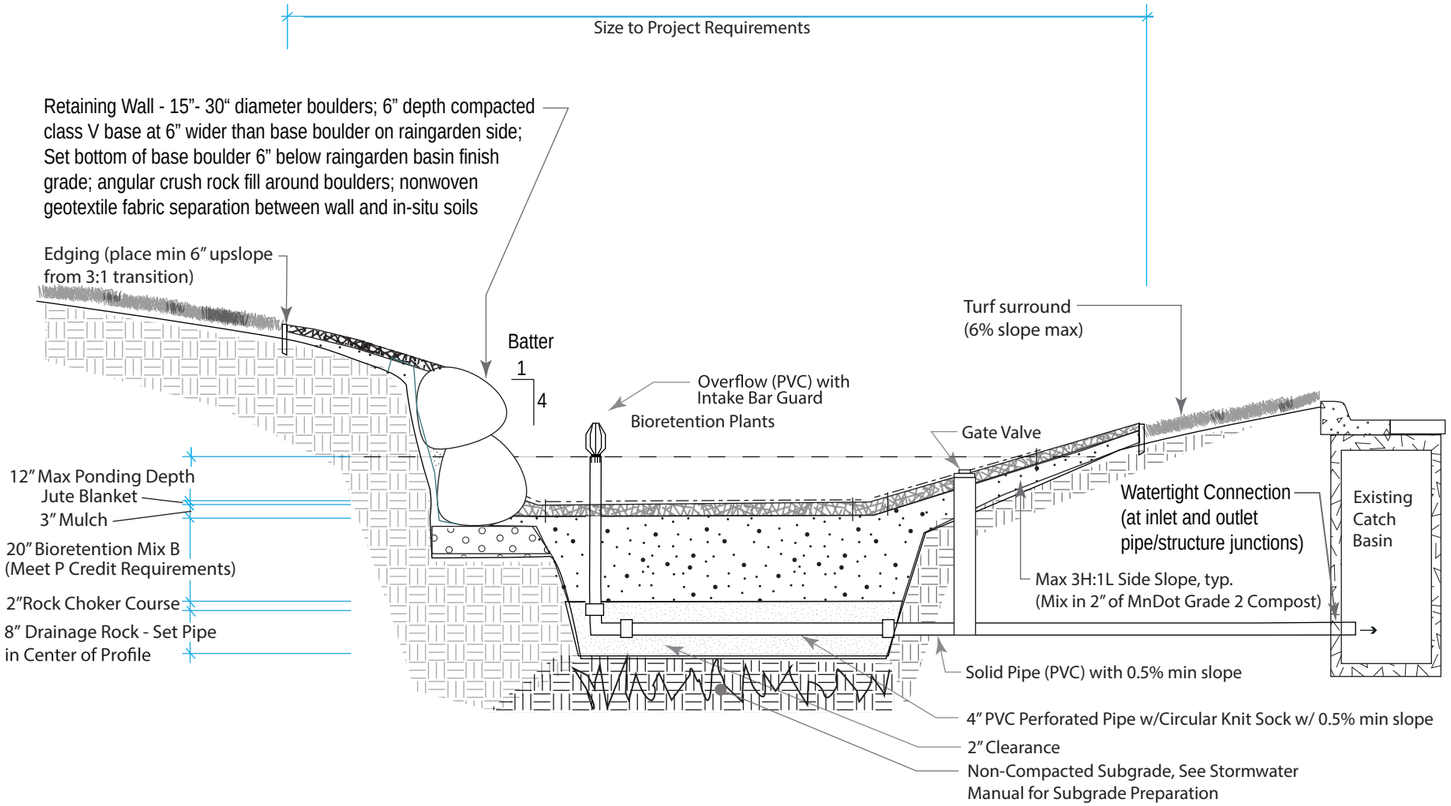
Notes

1. Install Plants according to details and specifications on sheets 17-19
2. Water in plants at time of installation
3. Rake mulch aside to plant; reset mulch around plantings to 2-3" depths

N

0 3 5 8 10 FT

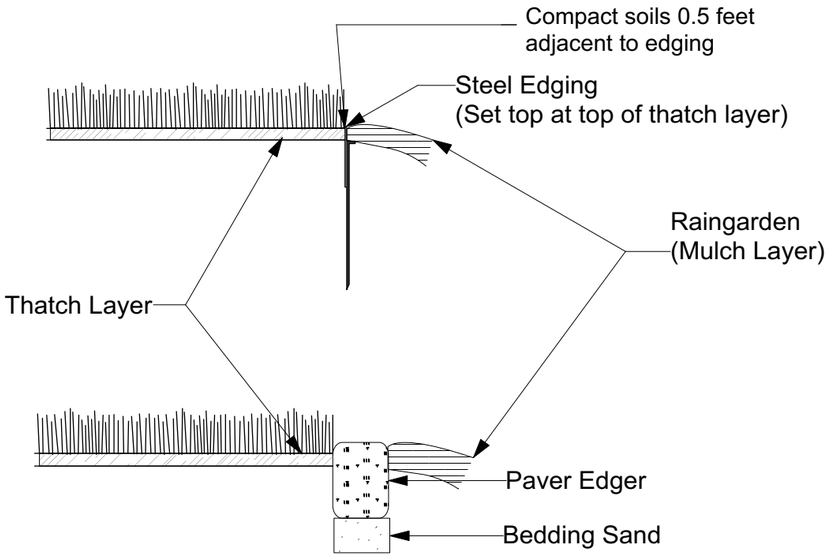
DESIGNED BY: AJS	**Pelke Residence - 10041 Bridgewater Parkway**
DRAWN BY: AJS	
CHECKED BY: SWWD	TITLE: Woodbury Roadways BMPs - Planting Plan
APPROVED BY: SWWD	
OTHER APPROVALS: Other Approvals	SIZE: 11x17 · CAGE CODE: x · DRAWING NUMBER: 4.25.16 · REV:
CAD FILE NAME: File Name	SCALE: 1" = 10' · EST. WGT · SHEET 12 OF 19



Biofiltration with Underdrain

Cross Section Typical

Not to Scale



Edging Configuration

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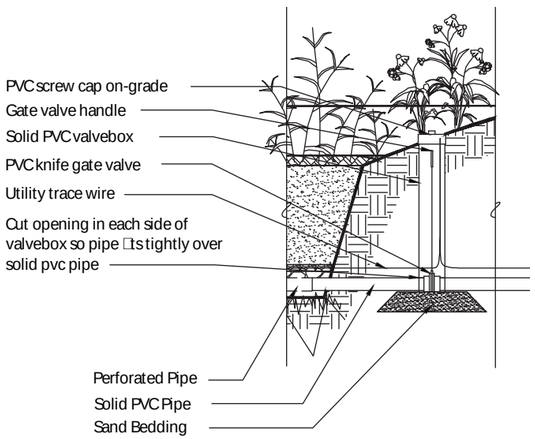
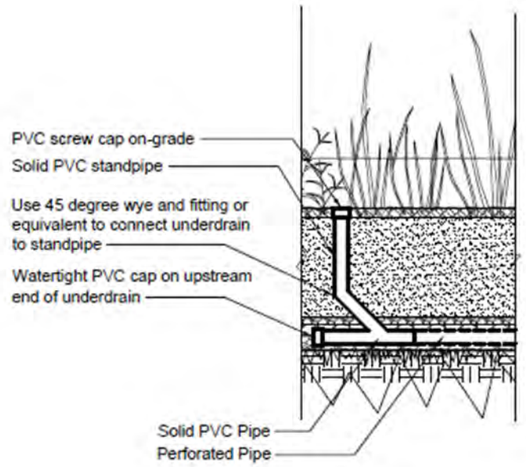


Underdrain Valve

not to scale



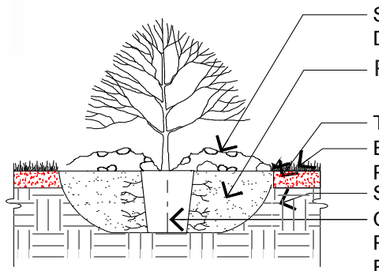
Cleanout

not to scale

DESIGNED BY: AJS	Raingarden Details 1
DRAWN BY: AJS	TITLE: Woodbury Roadways BMPs
CHECKED BY: SWWD	
APPROVED BY: SWWD	
OTHER APPROVALS: Other Approvals	SIZE: 11x17 · CAGE CODE: x · DRAWING NUMBER: 4.25.16 · REV:
CAD FILENAME: File Name	SCALE: 1" = 10' · EST. WGT: · SHEET: 16 OF 19

HAND LOOSEN ROOTS OF CONTAINERIZED MATERIAL, TYP.

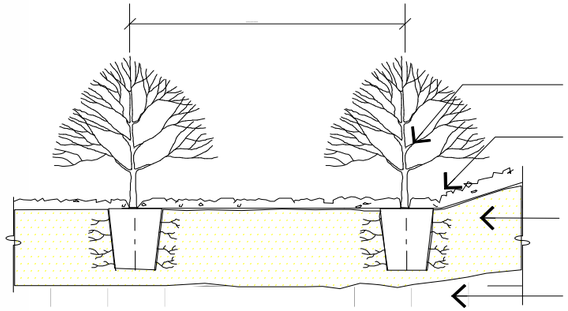
SCARIFY BOTTOM AND SIDES OF PLANTING PIT PRIOR TO INSTALLATION



1/05 SHRUB PLANTING DETAIL

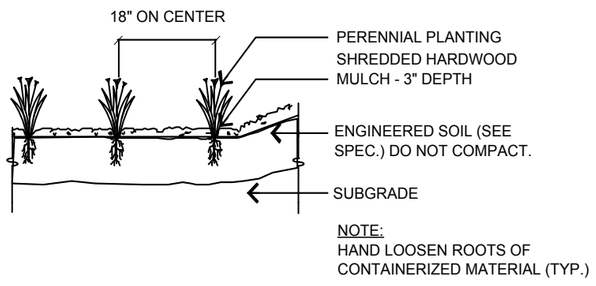
n.t.s.

NOTE:
HAND LOOSEN ROOTS OF CONTAINERIZED MATERIAL (TYP.)



2/05 SHRUB PLANTING IN BASIN

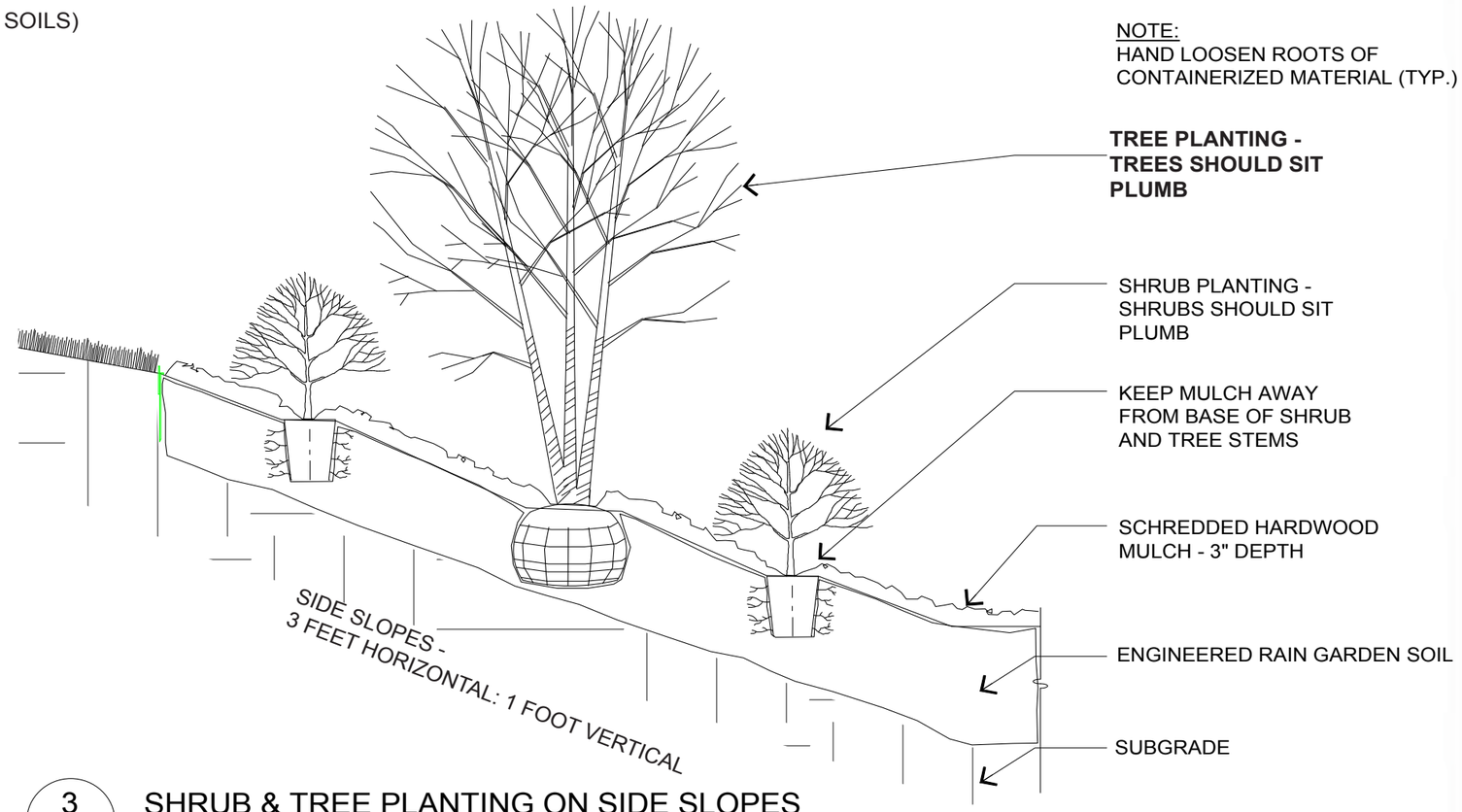
n.t.s.



NOTE:
HAND LOOSEN ROOTS OF CONTAINERIZED MATERIAL (TYP.)

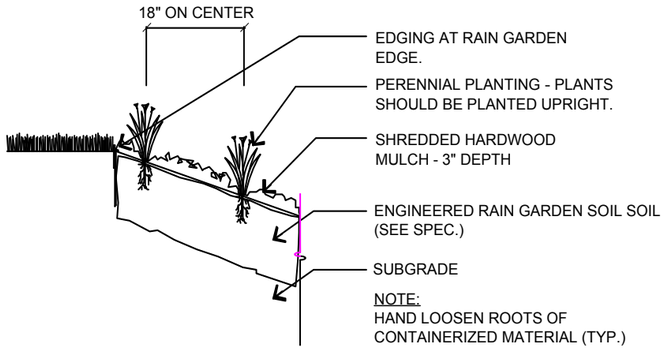
4/05 PERENNIAL PLANTING IN BASIN

NOTE:
HAND LOOSEN ROOTS OF CONTAINERIZED MATERIAL (TYP.)



3/05 SHRUB & TREE PLANTING ON SIDE SLOPES

n.t.s.



NOTE:
HAND LOOSEN ROOTS OF CONTAINERIZED MATERIAL (TYP.)

5/05 PERENNIAL PLANTING ON SIDE SLOPES

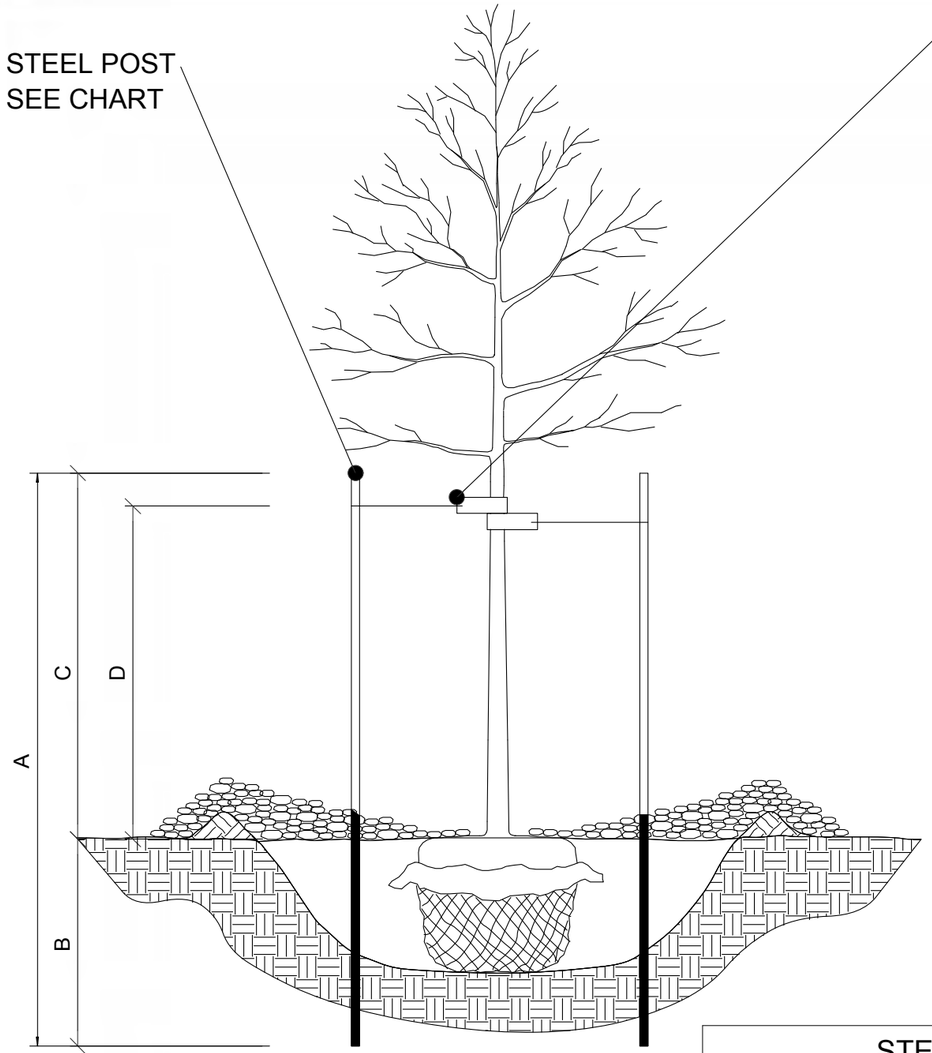
DESIGNED BY	AJS
DRAWN BY	AJS
CHECKED BY	SWWD
APPROVED BY	SWWD
OTHER APPROVALS	Other Approvals
CAD FILE NAME	File Name

Planting Details 1

TITLE: Woodbury Roadways BMPs

SIZE	CAGE CODE	DRAWING NUMBER	REV
11x17	x	4.25.16	

SCALE 1" = 10' | EST. WGT | SHEET 17 OF 19



16" LONG POLYROPYLENE OR POLYETHYLENE, 40 MIL. THICK AND 1.5" WIDE STRAPS. ATTACH WITH 10 ga WIRE.

1.**STEEL POSTS TO BE NOTCHED OR DRILLED TO RETAIN GUY WIRES. PLACE OUTSIDE OF ROOT BALL. DRIVE PLUMB REGARDLESS OF GROUND SLOPE.

2.**REQUESTS TO SUBSTITUTE RUBBER HOSE AND WIRE GUYING SYSTEMS WILL NOT BE APPROVED.

3.**TREE STAKING IS NOT REQUIRED UNLESS SPECIFIED OR NECESSARY TO MAINTAIN TREES IN A PLUMB CONDITION WHERE VANDALISM, SOIL, OR WIND CONDITIONS ARE A PROBLEM, OR AS REQUESTED BY THE ENGINEER.

4.**REMOVE WITHIN ONE YEAR.

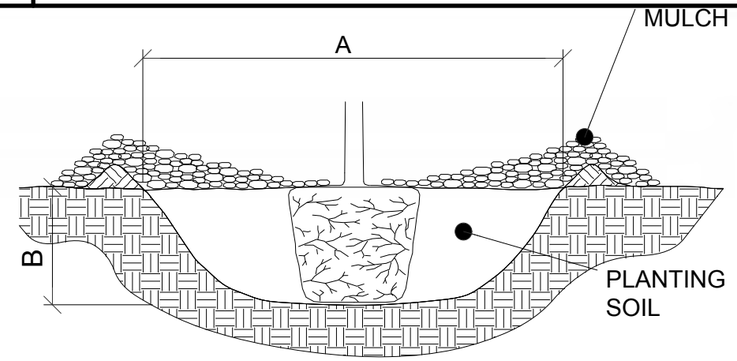
STEEL POST SIZING

CALIPER	STEEL POST TYPE	A	B	C	D
LESS THEN 4 INCHES	ROLLED STEEL FENCE POST (Mn/DOT 3403) OR APPROVED EQUAL.	7'-0"	3'-0" MIN.	4'-0"	3'-0"
GREATER THEN 4 INCHES	10', 2.2 LB. FLANGED CHANNEL STEEL SIGN POST (Mn/DOT 3401) OR APPOVED EQUAL.	10'-0"	4'-0" MIN.	6'-0"	5'-0"

1/06 STAKING AND GUYING

(Mn/DOT 2571.3I1)

CONTAINER STOCK PLANTING GUIDELINES



CONTAINER STOCK

1.**SCARIFY SIDES AND BOTTOM OF HOLE.

2.**PROCEED WITH CORRECTIVE PRUNING OF TOP AND ROOT.

3.**REMOVE CONTAINER AND SCORE OUTSIDE OF SOIL MASS TO REDIRECT AND PREVENT CIRCLING FIBROUS ROOTS. REMOVE OR CORRECT STEM GIRDLING ROOTS.

4.**SET PLANT ON UNDISTURBED NATIVE SOIL OR THOROUGHLY COMPACTED PLANTING SOIL. INSTALL PLANT SO THE TOP OF THE ROOT FLARE IS AT OR UP TO 2" ABOVE THE FINISHED GRADE.

5.**PLUMB AND BACKFILL WITH PLANTING SOIL.

6.**WATER THOROUGHLY WITHIN 2 HOURS TO SETTLE PLANTS AND FILL VOIDS.

7.**BACK FILL VOIDS AND WATER SECOND TIME.

8.**PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.

PLANTING HOLE DIMENSIONS

HOLE DEPTH FOR B&B AND CONTAINER PLANTS SHALL NOT EXCEED MEASURMENT FROM ROOT FLAIR TO BOTTOM OF SOIL BALL.

PLANT TYPE	PLANT SIZE UP TO AND INCLUDING	(A) MINIMUM HOLE WIDTH	(B) APPROXIMATE HOLE DEPTH(2)
CONTAINER GROWN PLANTS	CELLPACKS / PLUGS	(6")	(2.5")
	(2.25") CONT.	(7")	(3")
	(3.5") CONT.	(10")	(3")
	(4") CONT.	(11")	(4")
	(4.5") CONT.	(13")	(4")
	(6" / 1 QT.) CONT.	(15")	(5.5")
	(#1) CONT.	(18")	(6")
	(#2) CONT.	(23")	(7.5")
	(#3) CONT.	(29")	(8.5")
	(#5) CONT.	(30")	(11")
	(#7) CONT.	(37")	(11")
	(#15) CONT.	(44")	(14")
	(#10) CONT.	(45")	(15")
	(#20) CONT.	(60")	(16")
	(#25) CONT.	(72")	(17")

DESIGNED BY	AJS
DRAWN BY	AJS
CHECKED BY	SWWD
APPROVED BY	SWWD
OTHER APPROVALS	Other Approvals
CAD FILE NAME	File Name

PLANTING DETAILS 2

TITLE: Woodbury Roadways BMPs

SIZE	CAGE CODE	DRAWING NUMBER	REV
11x17	x	4.25.16	

SCALE 1" = 10' | EST. WGT | SHEET 18 OF 19

Bioretention Installation Notes

1) The South Washington Watershed District (SWWD) is providing quality control and field verifications of the bioretention installations. Call the SWWD at (651) 714-3717 to schedule field verifications prior to burying any work and/or installing any concrete, mulch and/or plant materials.

2) The project area must be staked off and marked to keep all construction traffic, equipment and material stockpiles out of the proposed bioretention areas.

3) Bioretention practices shall not be excavated until the contributing drainage areas with exposed soils have been fully stabilized. Divert upland drainage areas to prevent runoff from entering the excavated cell or into the work area. Do not use bioretention cells as temporary sediment basins or allow construction runoff into the cell.

4) Deliver sample materials onsite for SWWD prior approval. Prior to beginning the installation, sufficient material quantities shall be onsite to complete the installation and stabilize exposed soil areas without delay.

5) Care must be taken to avoid contamination of engineered soils with sediment, in-situ or topsoil during and after installation. Materials must be segregated.

6) Installation with dry soil conditions is critical to prevent smearing and compaction. Schedule work for periods of dry weather. Do not work if soil conditions are wet. Excavation, soil placement and rapid stabilization of perimeter slopes with must be completed before the next precipitation event.

7) Do not leave infiltration areas and/or perimeter slopes exposed overnight. Secure the site from risk of precipitation damages at the end of every work day. In the event of rain, take action to divert stormwater away from the work area and temporarily cover of all exposed soils with filter fabric or impermeable sheeting.

8) SWWD field observation of excavation and soil placement is required. Notify SWWD prior to digging. Use backhoe with tooth bucket for cell excavation to avoid compacting or smearing of soils. (Do not use skid steer for excavation within the cell) Use tooth bucket to scarify (rip) underlying soils 9" deep to remove compaction. Gently mix the first lift of engineered soils with the loosened underlying soils to avoid stratification and promote permeability. Use excavator bucket to loosely place materials. (Do not use skid steer to place or spread materials within the cell). Leveling and final grading within the cell must be completed by hand.

9) The sand / compost mixture shall be Minnesota Stormwater Manual 4.1.2 Mix B: Enhanced Filtration Blend Modified to be a well-blended mixture of 75% ASTM C-33 Coarse Washed Sand (MnDot 3126) and 25% MnDot 3890 Grade 2 Leaf Litter Compost AND/OR a mixture of MnDot 3890 Grade 2 Leaf Litter Compost and Sphagnum Peat mix meeting phosphorus index requirements described below.

The material supplier shall provide documentation that the compost/compost peat mix has been sampled and tested as required by the Seal of Testing Assurance (STA) Program of the United States Composting Council (USCC); provide a soil mixture with a phosphorus index of between 10 and 30 millegrams per kilogram (using Mehlich-3 or equivalent test); and provide a gradation sieve analysis for the washed sand. Prior to placement, the SWWD will field test the saturated hydraulic conductivity (Ksat) of the sand / compost/compost peat mixture. Acceptable Ksat values must be at least 20 inches per hour or greater. THE ENGINEERED SOIL SHALL NOT CONTAIN ANY TOPSOIL OR FILTER AGGREGATE WITH FINES.

10) Perforated under-drains shall be slotted PVC with circular knit sock. (MnDot 3733 Type I sewn seam non-woven fabric shall NOT be used.)

11) Notify the SWWD prior to placing any mulch or installing any plantings. The SWWD shall field check elevations, soil compaction and permeability. Note: Depending on conditions observed, compaction removal by hand may be needed prior to placing mulch and/or after plantings.

12) Keep bioretention systems off-line by restricting stormwater inflow until vegetation is well established in the cell and all up gradient areas have been stabilized.

Planting Notes

1. All plants shall be typical of their species or variety and shall have a normal habit of growth. They shall be sound, healthy, vigorous, well branched, and densely foliated when in leaf. They shall be free of disease and insect pests, eggs or larvae. They shall have healthy, well developed root systems.
2. Upon Contract award, the CONTRACTOR shall provide written indication of the name and address of all source nurseries from which plant stock is supplied.
3. Plant materials shall have clearly marked labels stating botanical and common plant name and size.

Plant Care and Handling:

4. Container Plants shall be adequately protected at all times from sun, drying winds and frost.
5. All plants which cannot be planted on the day of delivery shall be placed on unpaved ground (in shade, if possible) and shall have their root zones completely covered with continuously moist soil, mulch or other acceptable material.
6. Handle plants with extreme care using machinery and equipment specifically intended for that purpose. Do not drop plants. Do not pick up balled plants by stems or trunks. Plants with a cracked or broken ball of earth shall not be used. Potted plants shall be tight in their container.
7. Plants are to be protected from wind and direct sunlight during transport.

Plant Installation:

8. Planting pits shall be excavated with vertical side slopes and according to the hole dimension chart shown in the Plans (Exhibit B, sheet 6)
9. Excess soil from crown of plants root ball shall be removed to reveal proper planting depth.
10. Plants shall be set in center of pits, plumb and straight, and at such a level that (after settlement) the crown of the plant will be equal to or one (1) inch higher than the surrounding finished grade.
11. Planting mixture around the roots or balls shall be hand tamped and watered while being cautious not to over-compact. Watering-in of the plants means water has reached all rooting parts of the plant and has saturated a 6” diameter surrounding the rootball.
12. Remove excess soil and any debris from site and dispose of properly.
13. Immediately after planting operations are completed, all tree pits and shrub beds shall be covered with a three (3) inch layer of wood mulch (unless otherwise noted in the Plans). The limit of this mulch for trees shall be the area of the pit.

DESIGNED BY AJS	**RAINGARDEN AND PLANTING SPECIFICATIONS**
DRAWN BY AJS	
CHECKED BY SWWD	TITLE Woodbury Roadways BMPs
APPROVED BY SWWD	
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CAD FILE NAME File Name	SCALE 1" = 10' · EST. WGT · SHEET 19 OF 19