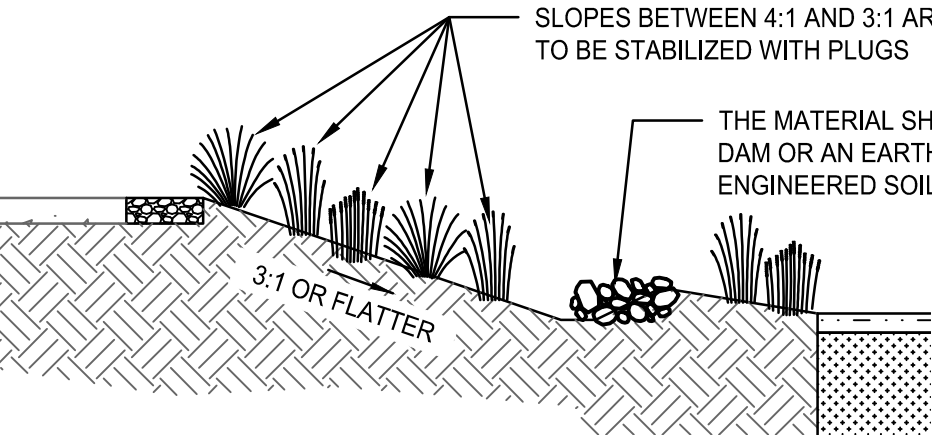


NOTES

- 1) THE DRAINAGE AREA TRIBUTARY TO EACH BIORETENTION FEATURE SHALL BE NO MORE THAN 2 ACRES.
- 2) AVERAGE SLOPE OF DRAINAGE AREA FLOW PATH SHALL BE NO MORE THAN 6%.
- 3) BIORETENTION IS CONSIDERED TO HAVE A LENGTH TO WIDTH RATIO BETWEEN 2:1 (LENGTH TO WIDTH) OR GREATER THAN 3:1. GI DESIGNED WITH A LONGER LENGTH TO WIDTH RATIO SHALL BE CONSIDERED A BIOSWALE.
- 4) USE NATIVE PLANTS, SELECTED BASED UPON HARDINESS AND HYDRIC TOLERANCE. SEE APPENDIX C FOR ACCEPTABLE SPECIES.
- 5) TREES SHALL NOT BE WITHIN 10 FEET OF UNDERDRAINS, STORM STRUCTURES, AND PIPES.
- 6) FILTER STRIP REQUIREMENT PER 6.4.1 (L) (3) - 5 FT AROUND PERIMETER.
- 7) GREEN INFRASTRUCTURE PLANTINGS SHALL BE PLUGS

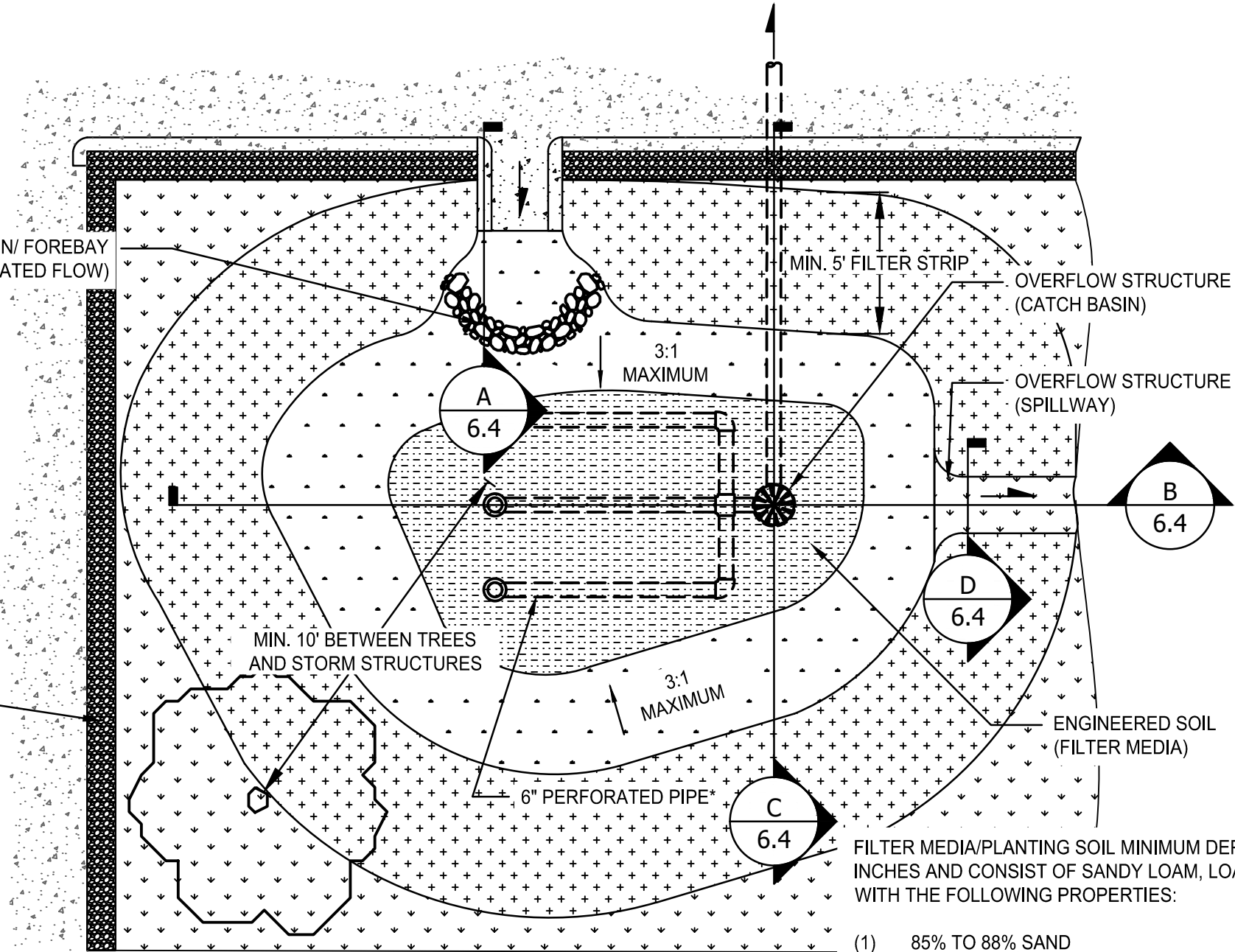
STORAGE VOLUME EQUIVALENT TO AT LEAST 15% OF WQV WITH A 2:1 LENGTH-TO-WIDTH RATIO.



FOREBAY SECTION A

GRAVEL DIAPHRAGMS (SHEET FLOW)

ENERGY DISSIPATION/ FOREBAY (CONCENTRATED FLOW)



PLAN VIEW

FILTER MEDIA/PLANTING SOIL MINIMUM DEPTH SHALL BE 24 INCHES AND CONSIST OF SANDY LOAM, LOAMY SAND OR LOAM WITH THE FOLLOWING PROPERTIES:

- (1) 85% TO 88% SAND
- (2) 8% TO 12% FINES
- (3) 3% TO 5% ORGANIC MATTER
- (4) LESS THAN 6% CLAY
- (5) PH BETWEEN 5.5 AND 6.5
- (6) MINIMUM INFILTRATION RATE OF 0.5 INCHES/HOUR
- (7) MAXIMUM SOLUBLE SALT CONCENTRATION OF 500PPM

NO.	REVISION	DATE



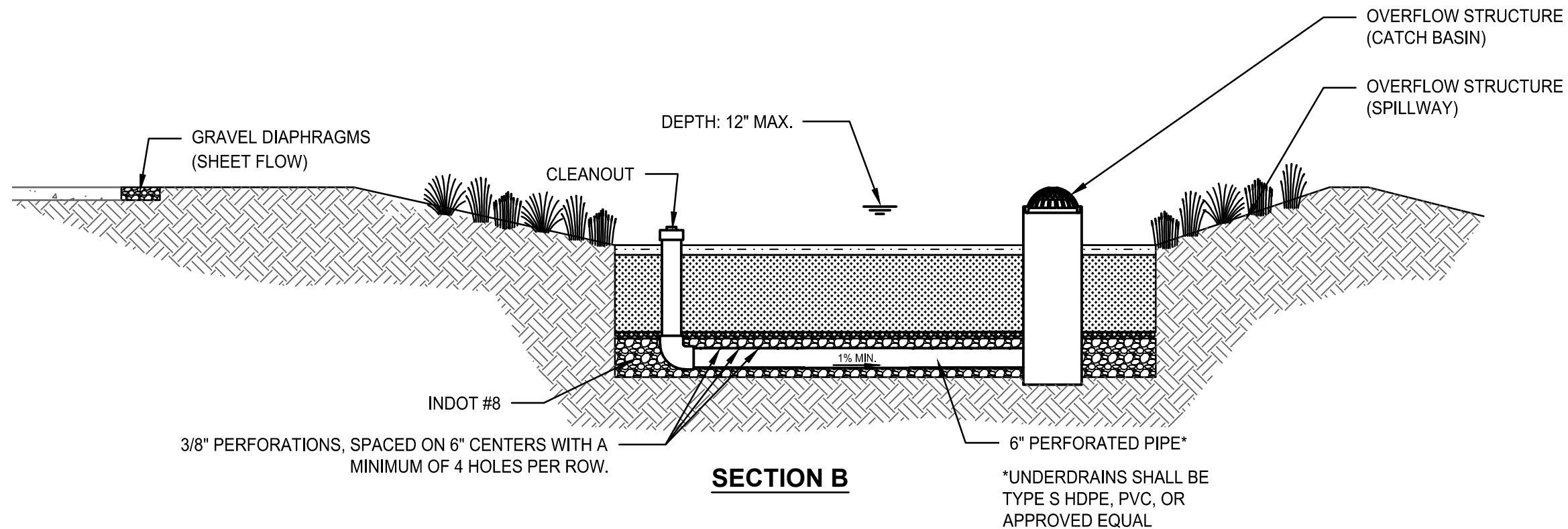
GREEN INFRASTRUCTURE DESIGN STANDARDS

STORMWATER QUALITY REQUIREMENTS
BIORETENTION - PLAN

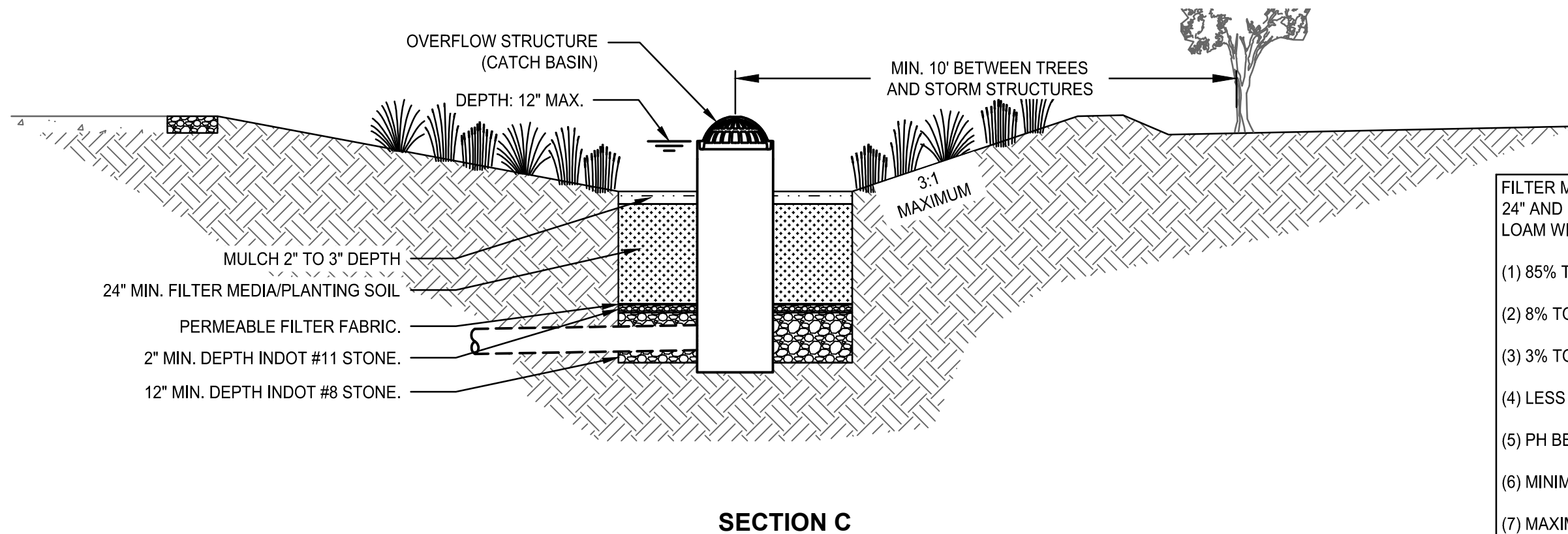
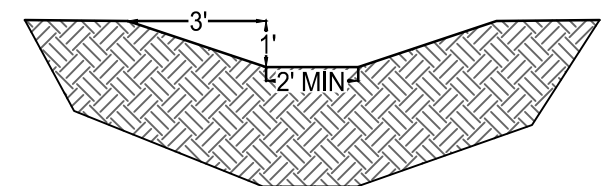
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DATE OF ORIGINAL ISSUE:2025

STANDARD #: 6.4



SPILLWAY SHALL BE TRAPEZOIDAL SHAPE WITH SIDE SLOPES 3:1 OR LESS WITH A MIN. 2' BOTTOM WIDTH AND BE EROSION-RESISTANT.



- FILTER MEDIA/PLANTING SOIL MINIMUM DEPTH SHALL BE 24" AND CONSIST OF SANDY LOAM, LOAMY SAND OR LOAM WITH THE FOLLOWING PROPERTIES
- (1) 85% TO 88% SAND
 - (2) 8% TO 12% FINES
 - (3) 3% TO 5% ORGANIC MATTER
 - (4) LESS THAN 6% CLAY
 - (5) PH BETWEEN 5.5 AND 6.5
 - (6) MINIMUM INFILTRATION RATE OF 0.5 INCHES/HOUR
 - (7) MAXIMUM SOLUBLE SALT CONCENTRATION OF 500PPM

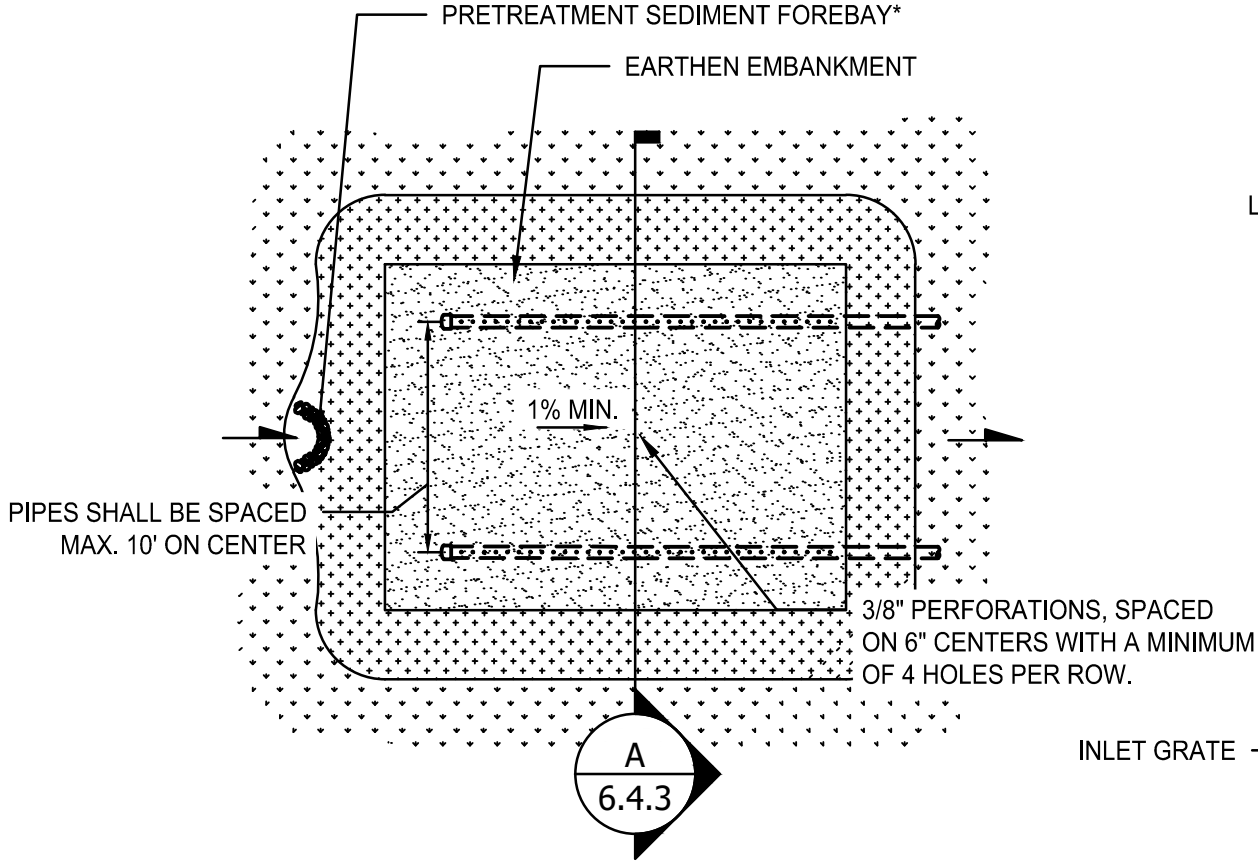
NO.	REVISION	DATE

NOTES

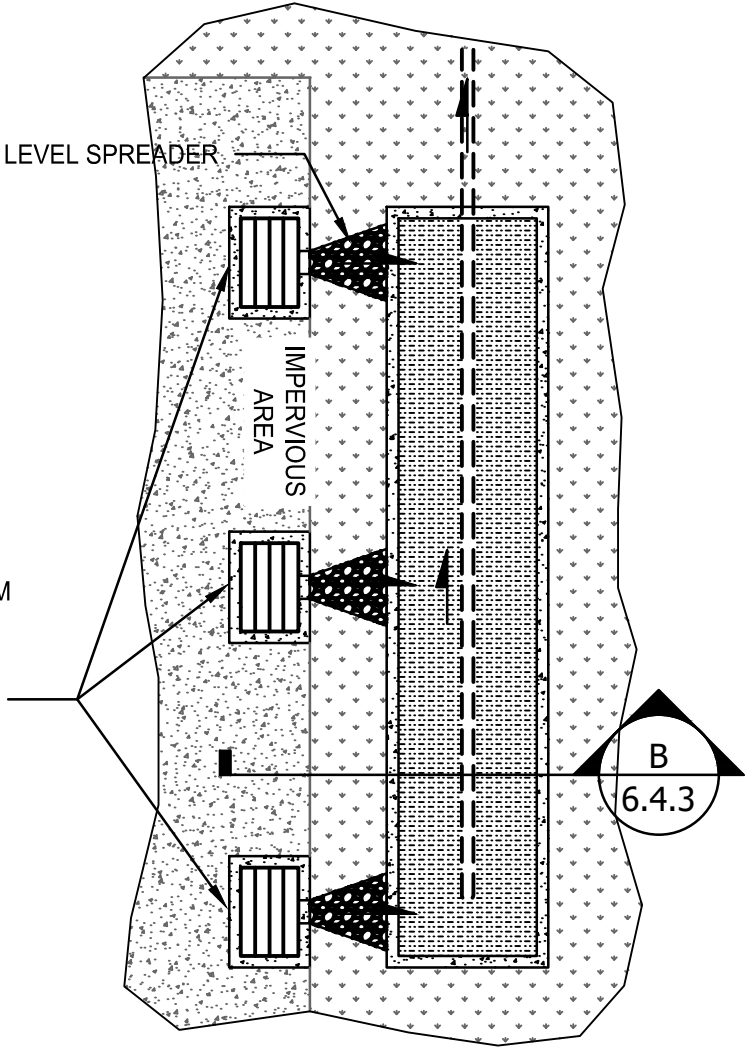
- 1) THE DRAINAGE AREA OF SAND FILTERS SHALL BE NO MORE THAN 10 ACRES.
- 2) SHALL DRAIN WITHIN 36 HOURS AFTER THE END OF RAINFALL.
- 3) UNDERDRAINS ARE NOT REQUIRED WHEN AN INFILTRATION RATE TEST DETERMINES NATIVE SOIL INFILTRATION TO BE MORE THAN 1-INCH/HOUR. UNDERDRAINS SHALL BE INSTALLED WITHIN THE INDOT #8 STONE AGGREGATE LAYER.
- 4) *A PRESETTING BASIN AND/OR BIOFILTRATION BIOSWALE IS RECOMMENDED TO PRETREAT RUNOFF DISCHARGING TO THE SAND FILTER.
- 5) **IF TRENCHES ARE USED FOR UNDERDRAINS, FILTER FABRIC SHALL LINE THE TRENCH BOTTOM AND SIDES.
- 6) ***UNDERDRAINS SHALL BE TYPE S HDPE, PVC, OR APPROVED EQUAL

ACCEPTABLE SAND FILTER VARIATIONS

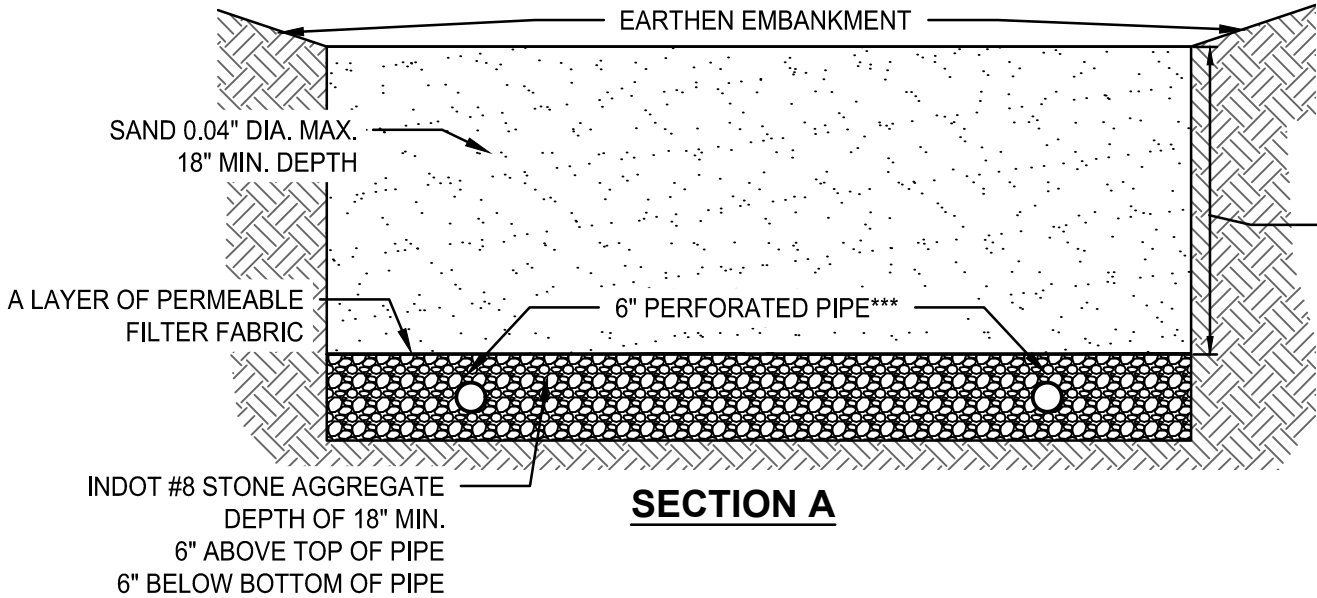
- (A) SURFACE SAND FILTER - THE SURFACE SAND FILTER IS A GROUND-LEVEL OPEN-AIR STRUCTURE THAT CONSISTS OF A PRETREATMENT SEDIMENT FOREBAY AND A FILTER BED CHAMBER. THIS SYSTEM CAN TREAT DRAINAGE AREAS UP TO 10 ACRES IN SIZE AND IS TYPICALLY LOCATED OFF-LINE. SURFACE SAND FILTERS CAN BE DESIGNED AS AN EXCAVATION WITH AN EARTHEN EMBANKMENT OR AS A CONCRETE STRUCTURE.
- (B) PERIMETER SAND FILTER - THE PERIMETER SAND FILTER IS AN ENCLOSED FILTER SYSTEM TYPICALLY CONSTRUCTED JUST BELOW GRADE IN A VAULT ALONG THE EDGE OF AN IMPERVIOUS AREA SUCH AS A PARKING LOT. THE SYSTEM CONSISTS OF A SEDIMENTATION CHAMBER AND A SAND BED FILTER. RUNOFF FLOWS INTO THE STRUCTURE THROUGH A SERIES OF INLET GRATES LOCATED ALONG THE TOP OF THE CONTROL.
- (C) UNDERGROUND SAND FILTER - THE UNDERGROUND SAND FILTER IS INTENDED PRIMARILY FOR EXTREMELY SPACE-LIMITED AND HIGH-DENSITY AREAS.



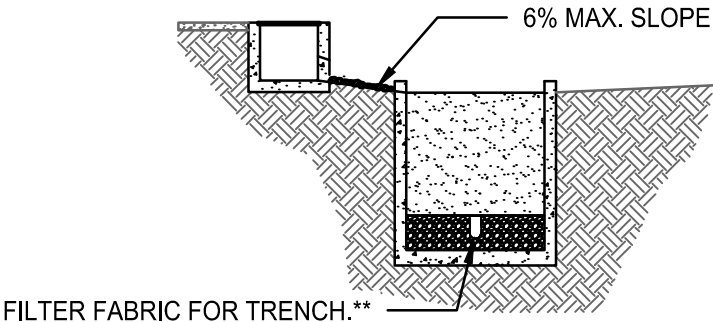
SURFACE SAND FILTER
PLAN VIEW



PERIMETER SAND FILTER
PLAN VIEW



SECTION A



SECTION B

NO.	REVISION	DATE



GREEN INFRASTRUCTURE DESIGN STANDARDS

STORMWATER QUALITY REQUIREMENTS
BIORETENTION SAND FILTERS

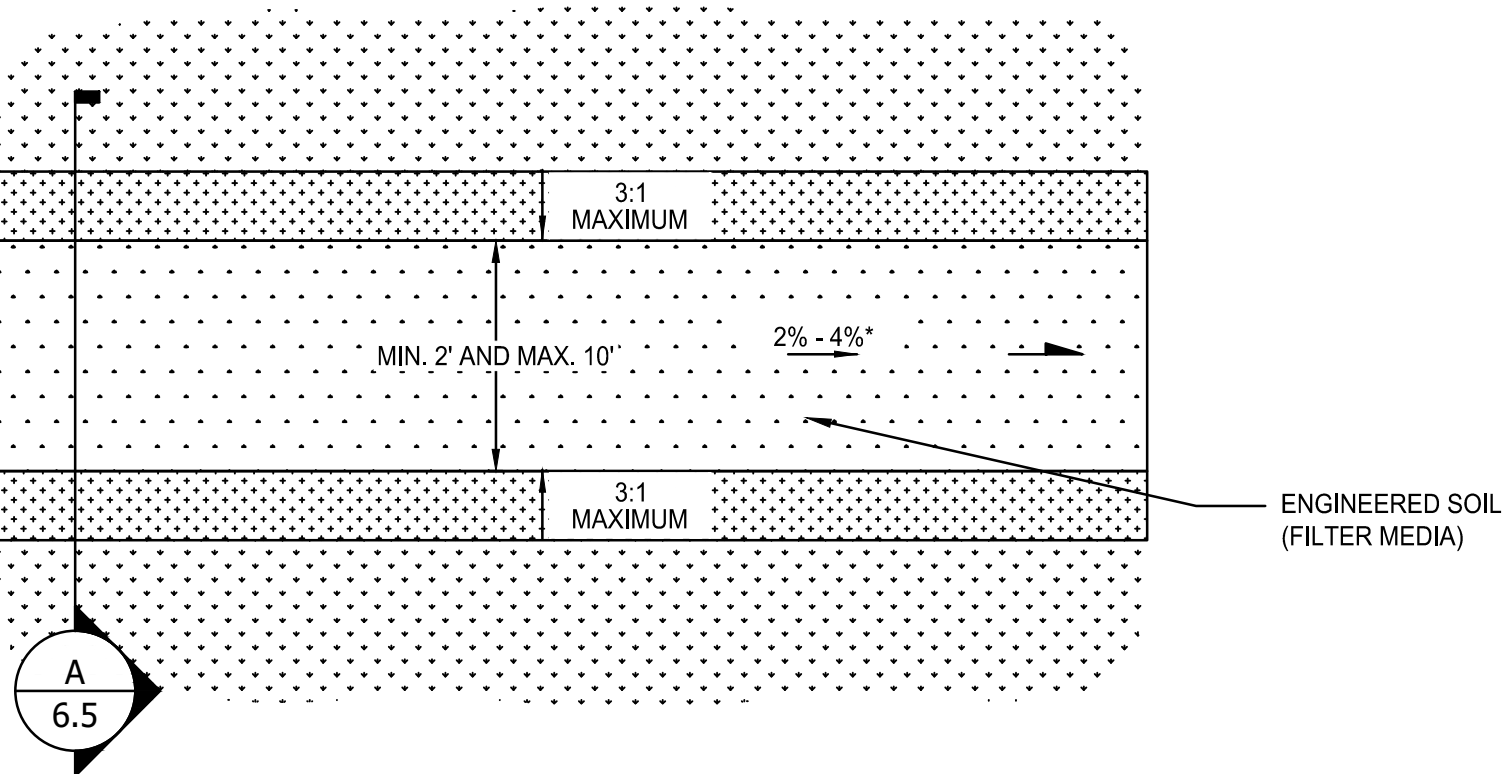
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DATE OF ORIGINAL ISSUE:2025

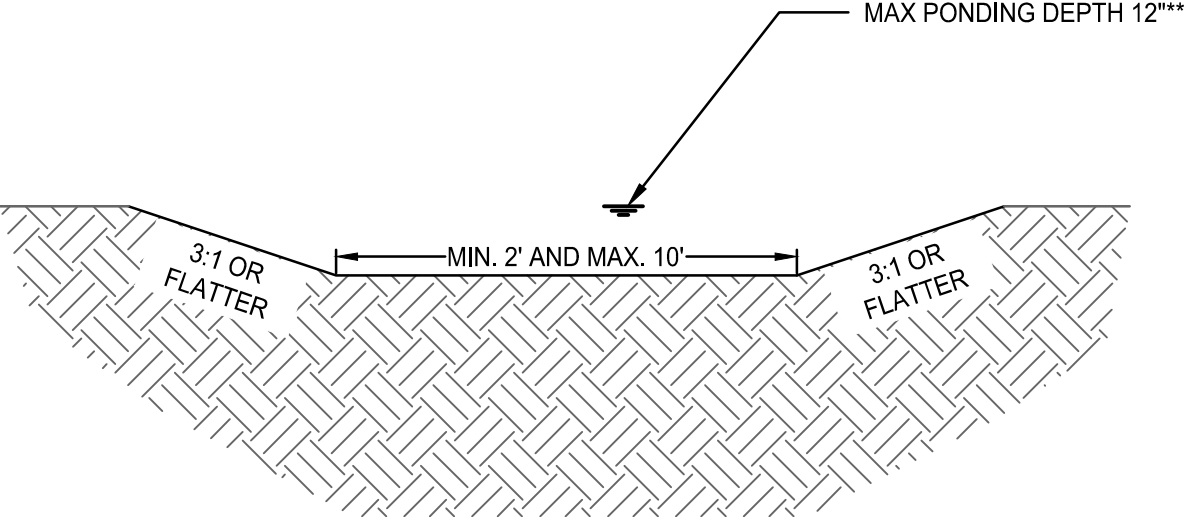
STANDARD #: 6.4.3

NOTES

- 1) MAXIMUM DRAINAGE AREA OF 5 ACRES.
- 2) *LONGITUDINAL SLOPES EXCEEDING 4% WILL BE PERMITTED FOR CONVEYANCE BUT NOT CREDITED FOR WATER QUALITY VOLUME.
- 4) LONGITUDINAL SLOPE BETWEEN 1% AND 2% IS ACCEPTABLE IF UNDERDRAIN IS PROVIDED.
- 3) **MAX. PONDING DEPTH OF 18" IS PERMITTED AT THE DOWNSTREAM END
- 4) MAXIMUM DURATION OF PONDING 24 HOURS. 48 HOURS PONDING TIME WILL BE PERMITTED WITH WET-TOLERANT VEGETATION.
- 5) ALLOW 12" BETWEEN PLANTINGS (PLUGS)
- 6) PLANTING SOIL MINIMUM DEPTH SHALL BE 24" AND CONSIST OF SANDY LOAM, LOAMY SAND, OR LOAM.



PLAN VIEW



SECTION A

NO.	REVISION	DATE



GREEN INFRASTRUCTURE DESIGN STANDARDS

STORMWATER QUALITY REQUIREMENTS
BIOSWALE

NOT TO SCALE

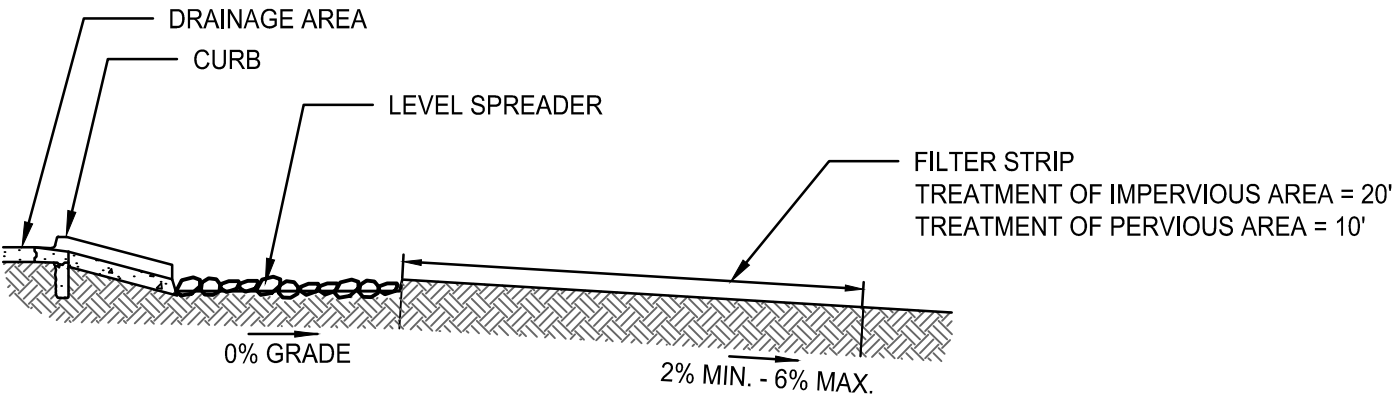
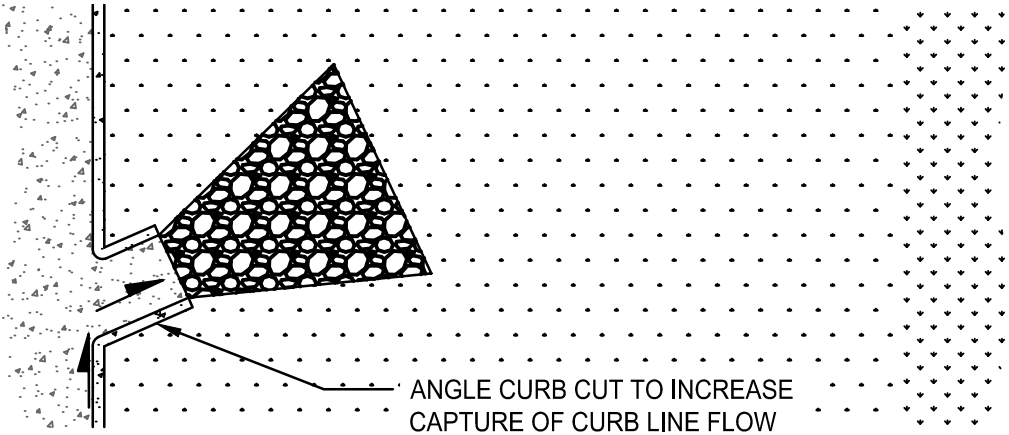
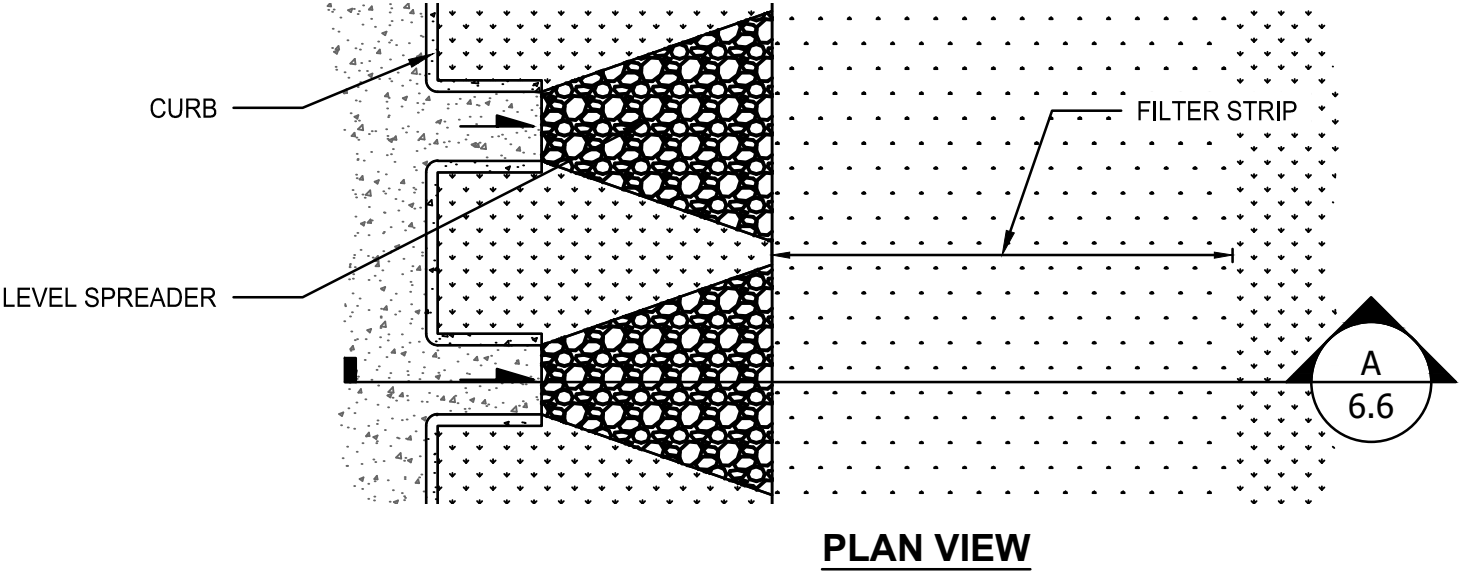
DATE OF ORIGINAL ISSUE:2025

STANDARD #: 6.5

LEVEL SPREADER

- 1) LEVEL SPREADER: THE GRADE OF A LEVEL SPREADER SHALL BE 0%. THE CHANNEL GRADE FOR THE LAST 20 FEET OF THE DIKE OR DIVERSION ENTERING THE LEVEL SPREADER MUST BE LESS THAN OR EQUAL TO 1% AND DESIGNED TO PROVIDE A SMOOTH TRANSITION INTO SPREADER. THE DEPTH OF A LEVEL SPREADER AS MEASURED FROM THE LIP MUST BE AT LEAST 6 INCHES. THE LEVEL SPREADER LIP MUST BE CONSTRUCTED ON UNDISTURBED SOIL (NOT FILL MATERIAL) TO UNIFORM HEIGHT AND ZERO GRADE OVER THE LENGTH OF THE SPREADER. THE MAXIMUM DRAINAGE AREA TO THE LEVEL SPREADER SHALL BE 10 ACRES OR LESS WITH THE OPTIMAL SIZE BEING LESS THAN 5 ACRES. THE MAXIMUM FLOW RATE INTO THE LEVEL SPREADER IS 30 CFS.
- 2) APPROPRIATE LENGTH, WIDTH, AND DEPTH OF LEVEL SPREADERS SHALL BE SELECTED FROM TABLE 6-2 IN THE DESIGN MANUAL.
- 3) THE RELEASED RUNOFF TO THE OUTLET SHALL BE ON UNDISTURBED STABILIZED AREAS IN SHEET FLOW AND NOT ALLOWED TO RE-CONCENTRATE BELOW THE STRUCTURE.
- 4) SLOPE OF THE FILTER STRIP FROM A LEVEL SPREADER MUST NOT EXCEED 10 PERCENT.
- 5) RIPRAP TYPE SHALL BE SIZED ACCORDING TO INFLOW VELOCITY

EROSION-PROTECTION METHOD	VELOCITY, v (ft/s)
REVTMENT RIPRAP	≤ 6.5
CLASS 1 RIPRAP	$6.5 \leq v < 13$
CLASS 2 RIPRAP	$10 \leq v \leq 13$
ENERGY DISSIPATOR	>13

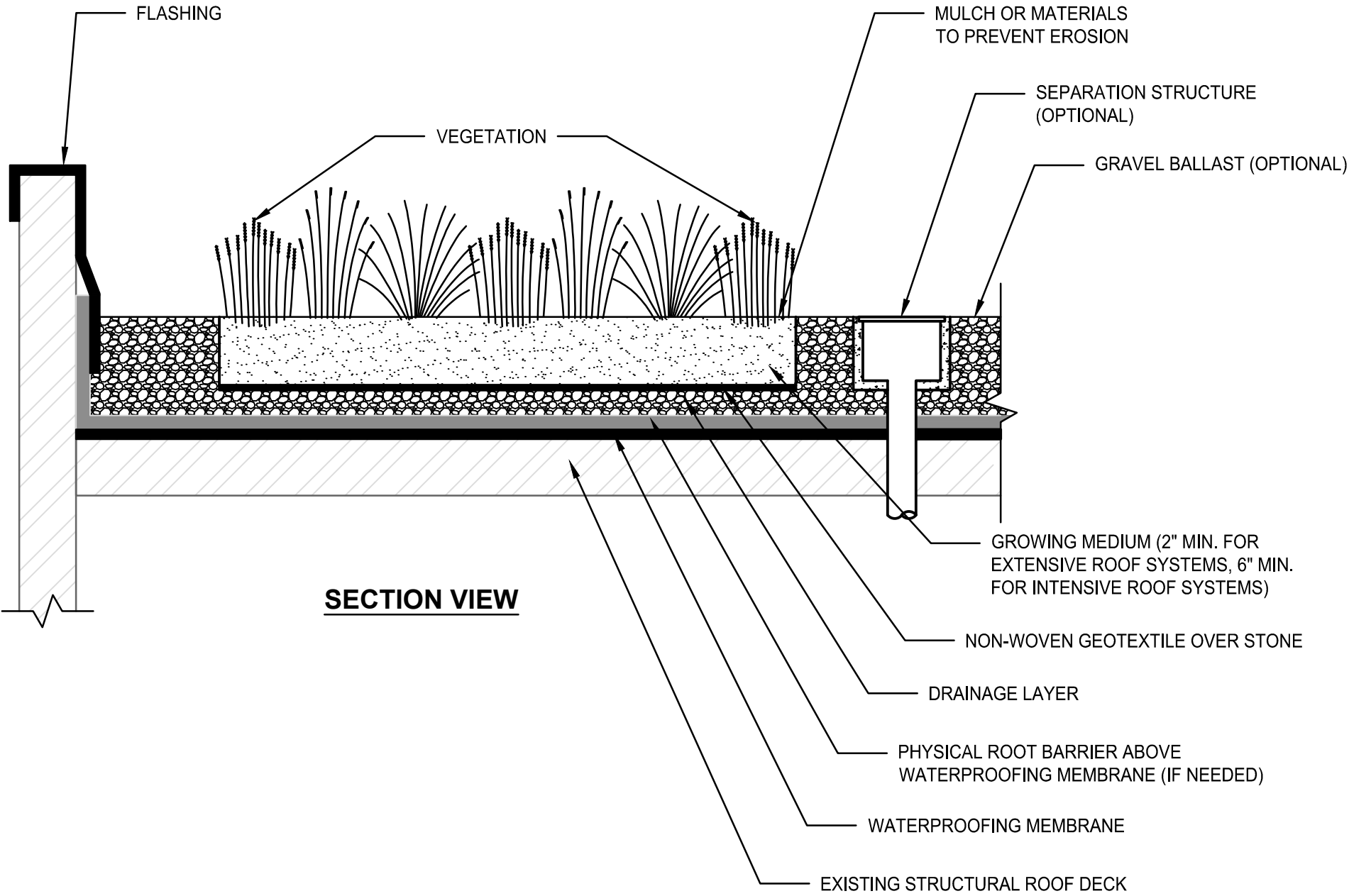


SECTION A

NO.	REVISION	DATE

NOTES:

THE DESIGN AND CONSTRUCTION OF GREEN ROOFS SHALL MEET THE MONROE COUNTY BUILDING CODE AND APPLICABLE SECTIONS OF INDIANA STATE BUILDING CODE.



NO.	REVISION	DATE



CITY OF
BLOOMINGTON
UTILITIES





GREEN INFRASTRUCTURE DESIGN STANDARDS

STORMWATER QUALITY REQUIREMENTS
GREEN ROOFS

NOT TO SCALE

DATE OF ORIGINAL ISSUE:2025

STANDARD #: 6.7

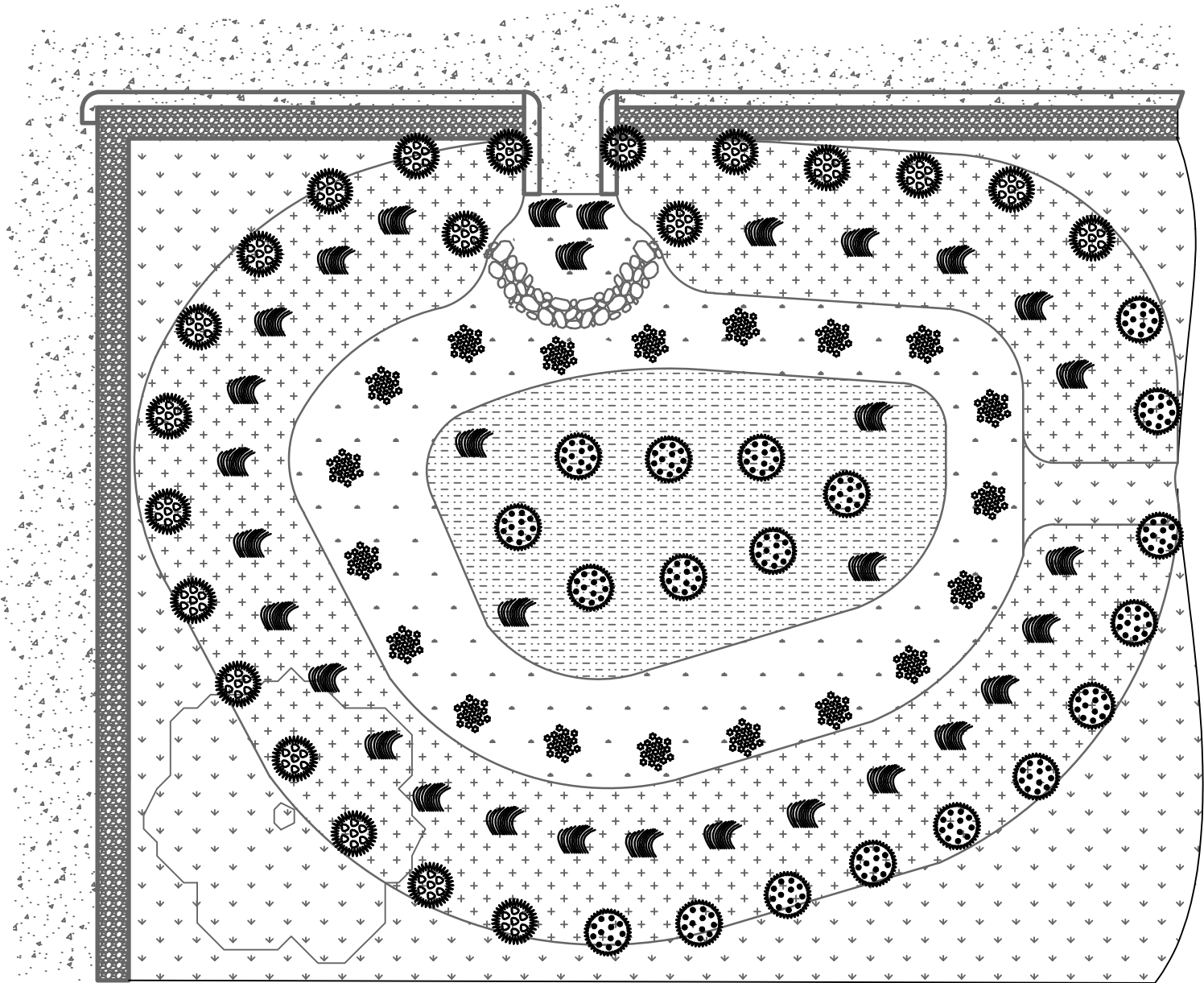
GREEN INFRASTRUCTURE PLANTING PLUG TABLE						
QTY	SYMBOL	TYPE	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
21		PERENNIAL	ASCLEPIA INCARNATA	MARSH MILKWEED	4" PLUGS	18" O.C.
20		PERENNIAL	CALTHA PALUSTRIS	MARSH MARIGOLD		
33		GRASSES	PANICUM VIRGATUM	SWITCH GRASS		AS SHOWN
19		SHRUB	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH		18" O.C.

SEE APPENDIX C FOR PREFERRED SPECIES LIST

PLANTING LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY

PLANTS LISTED IN TABLE ARE EXAMPLES OF ACCEPTABLE SPECIES, NOT A COMPREHENSIVE LIST

ALTERNATE SPECIES, NOT LISTED ABOVE, ARE ALLOWABLE FOR PLANTING PLANS



PLANTING LAYOUT

NO.	REVISION	DATE