

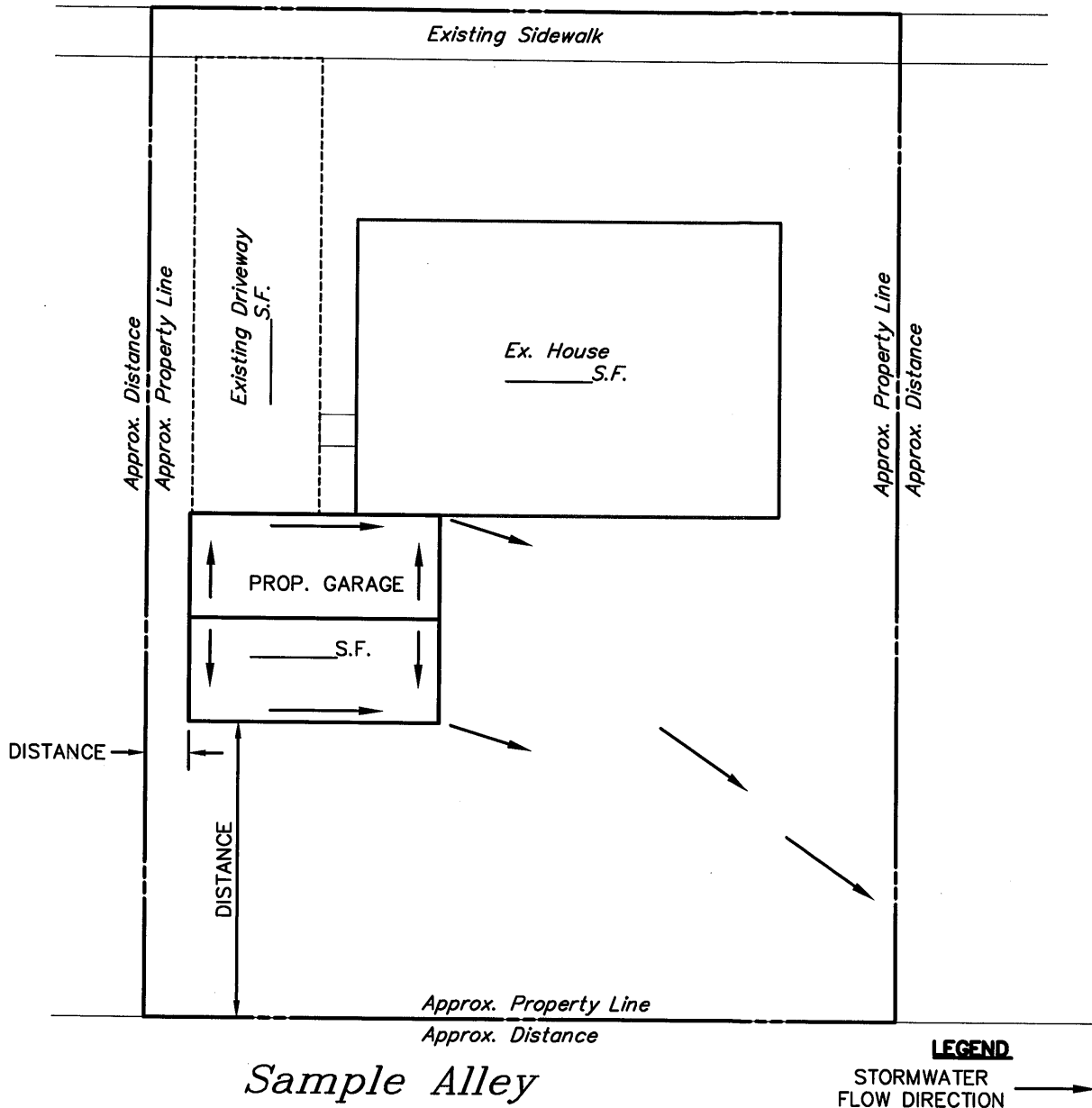
Lower Windsor Township

Stormwater Management Small Projects Guide



NOTE:
THIS PLAN CAN
BE HAND DRAWN.

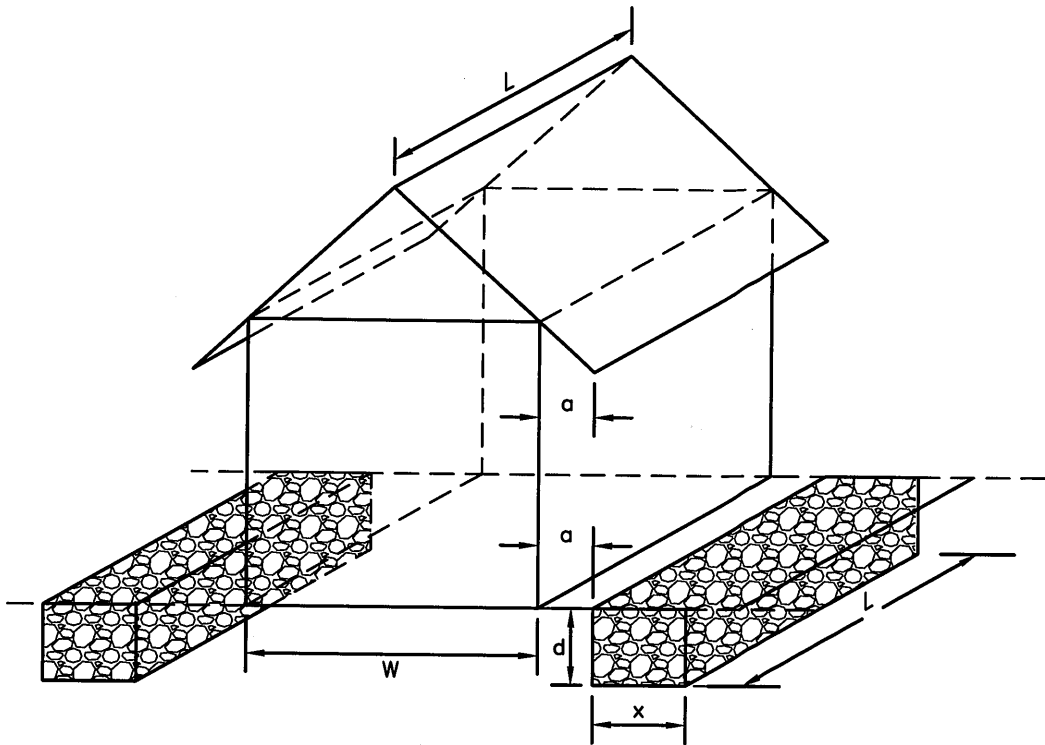
Main Street



Sample Alley

LEGEND
STORMWATER
FLOW DIRECTION →

SAMPLE SKETCH/ SITE PLAN



KEY

- L = LENGTH OF STRUCTURE = LENGTH OF SEEPAGE TRENCH (FT.)
- W = WIDTH STRUCTURE (FT)
- a = EAVE OVERHANG (FT) = TRENCH DISTANCE FROM STRUCTURE (FT)
- x = WIDTH OF SEEPAGE TRENCH (FT)
- d = DEPTH OF SEEPAGE TRENCH (FT)

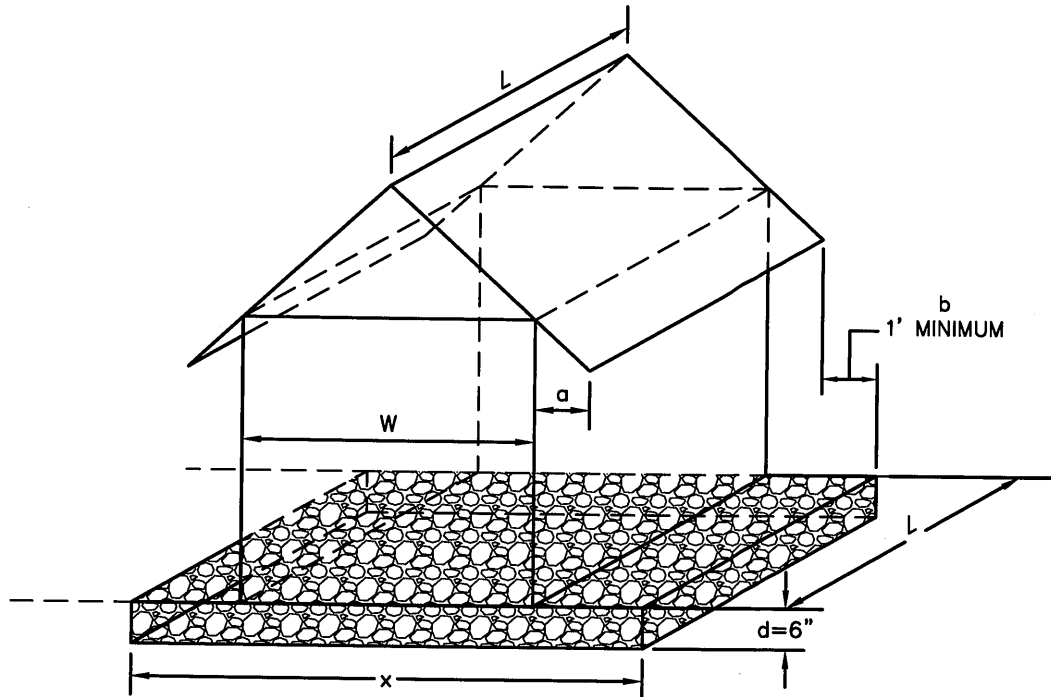
REQUIRED STORAGE VOLUME																					
Impervious Area (Square Feet)	25	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Total Required Storage Volume (Cubic Feet)	4	8	17	25	33	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167
Required Storage Volume Per Pit	2	4	8	13	17	21	25	29	33	38	42	46	50	54	58	63	67	71	75	79	83

		Width "W"									
		1	2	3	4	5	6	7	8	9	10
Trench Length [Equals Length of Structure (L)]	5	4	8	12	16	20	24	28	32	36	40
	6	4.8	9.6	14	19	24	29	34	38	43.2	48
	7	5.6	11	17	22	28	34	39	45	50.4	56
	8	6.4	13	19	26	32	38	45	51	57.6	64
	9	7.2	14	22	29	36	43	50	58	64.8	72
	10	8	16	24	32	40	48	56	64	72	80
	15	12	24	36	48	60	72	84	96	108	120
	20	16	32	48	64	80	96	112	128	144	--
	25	20	40	60	80	100	120	--	--	--	--
	30	24	48	72	96	120	--	--	--	--	--
	40	32	64	96	128	--	--	--	--	--	--
50	40	80	120	--	--	--	--	--	--	--	

NOTES

1. TRENCH MUST BE PROVIDED ON EACH SIDE OF STRUCTURE.
2. SIDE OF TRENCH TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
3. TRENCH TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
4. TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
5. TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITHOUT GUTTERS A



KEY

- L = LENGTH OF STRUCTURE = LENGTH OF SEEPAGE BED (FT.)
- W = WIDTH OF STRUCTURE (FT)
- a = EAVE OVERHANG (FT)
- b = DISTANCE FROM EAVE OVERHANG TO EDGE OF SEEPAGE BED (FT) = 1' MINIMUM
- x = WIDTH OF SEEPAGE BED (FT)
- x = W + 2 FT
- d = DEPTH OF SEEPAGE BED = 6'

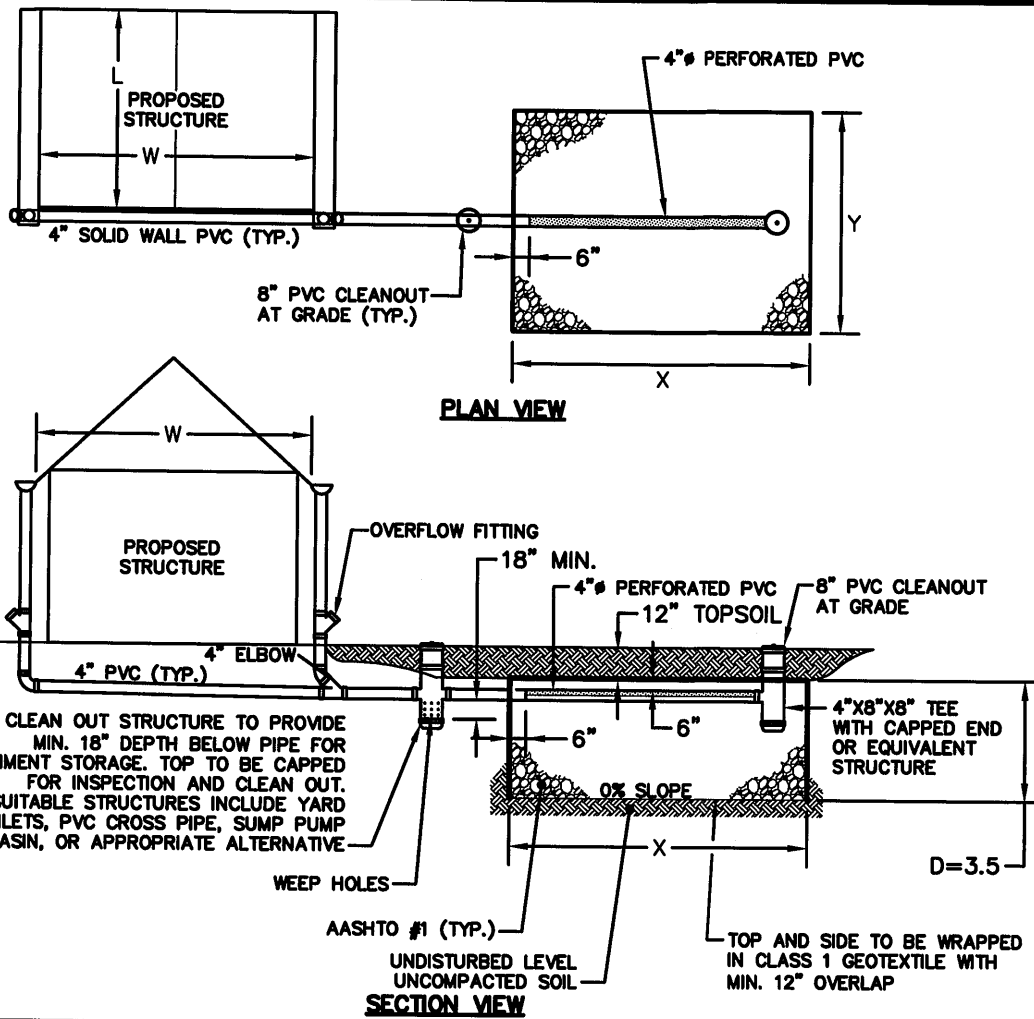
REQUIRED STORAGE VOLUME																					
Impervious Area (Square Feet)	25	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Volume of Seepage Pit (Cubic Feet)	4	8	17	25	33	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

		SEEPAGE BED VOLUME															
		Width "X"															
		5	6	7	8	9	10	15	20	25	30	40					
Bed Length [Equals Length of Structure (L)]	5	5	6	7	8	9	10	15	20	25	30	40					
	6	6	7.2	8.4	9.6	11	12	18	24	30	36	48					
	7	7	8.4	9.8	11	13	14	21	28	35	42	56					
	8	8	9.6	11	13	14	16	24	32	40	48	64					
	9	9	11	13	14	16	18	27	36	45	54	72					
	10	10	12	14	16	18	20	30	40	50	60	80					
	12	12	14	17	19	22	24	36	48	60	72	96					
	15	15	18	21	24	27	30	45	60	75	90	120					
	18	18	22	25	29	32	36	54	72	90	108	144					
	20	20	24	28	32	36	40	60	80	100	120	160					
	25	25	30	35	40	45	50	75	100	125	150	200					
	30	30	36	42	48	54	60	90	120	150	180	--					
35	35	42	49	56	63	70	105	140	175	--	--						
40	40	48	56	64	72	80	120	160	200	--	--						
45	45	54	63	72	81	90	135	180	--	--	--						
50	50	60	70	80	90	100	150	200	--	--	--						

NOTES

- 1.) SIDE OF BED TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
- 2.) BED TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
- 3.) BED TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
- 4.) BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITHOUT GUTTERS B



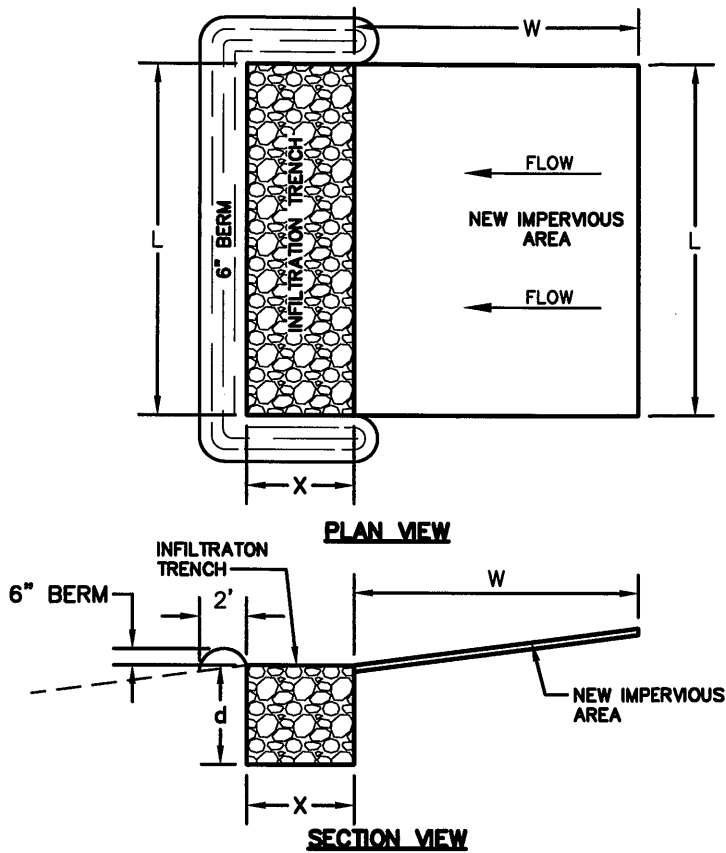
REQUIRED STORAGE VOLUME																					
Impervious Area (Square Feet)	25	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Volume of Seepage Pit (Cubic Feet)	4	8	17	25	33	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

SEEPAGE BED STORAGE												
		Bed Width "X"										
		2	3	4	5	6	7	8	9	10	15	20
Bed Length "Y"	2	11	13	16	19	22	25	27	30	33	47	61
	3	13	18	22	26	30	34	39	43	47	68	89
	4	16	22	27	33	39	44	50	55	61	89	117
	5	19	26	33	40	47	54	61	68	75	110	145
	6	22	30	39	47	55	64	72	81	89	131	173
	7	25	34	44	54	64	74	83	93	103	152	--
	8	27	39	50	61	72	83	95	106	117	173	--
	9	30	43	55	68	81	93	106	118	131	194	--
	10	33	47	61	75	89	103	117	131	145	215	--
	15	47	68	89	110	131	152	173	194	215	--	--
	20	61	89	117	145	173	--	--	--	--	--	--

NOTES

1. BOTTOM OF BED ELEVATION TO BE 4.5' BELOW SURFACE TO ACCOUNT FOR 1' OF TOPSOIL OVER INFILTRATION BED.
2. PIPE TO BE APPROPRIATELY SIZED TO CARRY ROOF WATER. PVC PIPE SHALL HAVE A MIN. DIAMETER OF 4".
3. PIPING AND CLEANOUTS TO BE CENTERED WITHIN INFILTRATION BED.
4. BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITH GUTTERS



KEY

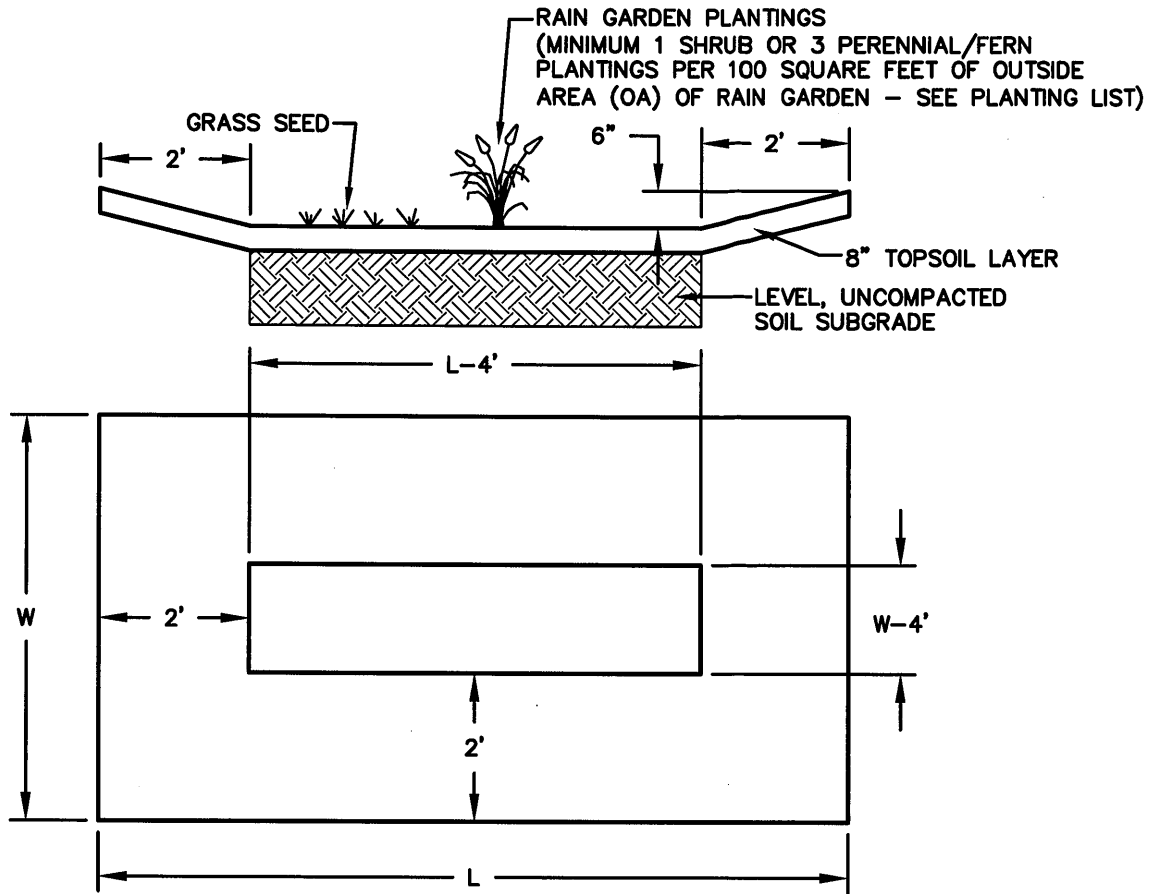
- L = LENGTH OF NEW IMPERVIOUS SURFACE (FT) = LENGTH OF INFILTRATION TRENCH
- W = WIDTH OF NEW IMPERVIOUS SURFACE TRENCH
- X = WIDTH OF SEEPAGE TRENCH (FT)
- d = DEPTH OF SEEPAGE TRENCH (FT) = 2'

NOTES

- 1.) SIDE OF TRENCH TO BE WRAPPED IN PENNDOT CLASS 1 GEOTEXTILE.
- 2.) TRENCH TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
- 3.) TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
- 4.) TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

REQUIRED STORAGE VOLUME																
Impervious Width "W" (Feet)	4	5	6	7	8	9	10	11	12	13	14	15	20	25	30	31
Required Trench Width "X" (Feet)	1	1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	4.2	5.2	6.3	6.5

AT GRADE IMPERVIOUS



REQUIRED STORAGE VOLUME																					
Impervious Area (Square Feet)	25	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Volume of Seepage Pit (Cubic Feet)	4	8	17	25	33	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

RAINGARDEN STORAGE														
		Raingarden Width "W"												
		4	5	6	7	8	9	10	15	20	25	30	35	40
Raingarden Length "L"	4	4	5	6	7	8	9	10	15	20	25	30	35	40
	5	5	7	8	10	11	13	14	22	29	37	44	52	59
	6	6	8	10	12	14	16	18	28	38	48	58	68	78
	7	7	10	12	15	17	20	22	35	47	60	72	85	97
	8	8	11	14	17	20	23	26	41	56	71	86	101	116
	9	9	13	16	20	23	27	30	48	65	83	100	118	135
	10	10	14	18	22	26	30	34	54	74	94	114	134	154
	15	15	22	28	35	41	48	54	87	119	152	184	217	249
	20	20	29	38	47	56	65	74	119	164	209	--	--	--
	25	25	37	48	60	71	83	94	152	209	--	--	--	--
30	30	44	58	72	86	100	114	184	--	--	--	--	--	
35	35	52	68	85	101	118	134	217	--	--	--	--	--	
40	40	59	78	97	116	135	154	249	--	--	--	--	--	

RAIN GARDEN

Rain Garden Native Planting List

Perennials and Ferns:

Blue false indigo (*Baptisia australis*)
Blue flag iris (*Iris versicolor*)
Blue star (*Amsonia tabernaemontana*)
Blue vervain (*Verbena hastata*)
Boltonia (*Boltonia asteroides*)
Boneset (*Eupatorium perfoliatum*)
Bottlebrush grass (*Hystrix patula*)
Broomsedge (*Andropogon virginicus*)
Cardinal flower (*Lobelia cardinalis*)
Cinnamon fern (*Osmunda cinnamomea*)
Culvers root (*Veronicastrum virginicum*)
Golden ragwort (*Senecio aureus*)
Goldenrod (*Solidago patula*, *S. rugosa*)
Great blue lobelia (*Lobelia siphilitica*)
Green bullrush (*Scirpus atrovirens*)
Horsetail (*Equisetum* species)
Marsh marigold (*Caltha palustris*)
Mistflower (*Eupatorium colestinum*)
Monkey flower (*Mimulus ringens*)
New England aster (*Aster novae-anglia*)
New York aster (*Aster novi-belgii*)
Obedient plant (*Physotegia virginiana*)
Royal fern (*Osmunda regalis*)
Seedbox (*Ludwigia alternifolia*)
Sensitive fern (*Onoclea sensibilis*)
Sneezeweed (*Helenium autumnale*)
Soft rush (*Juncus effusus*)
Swamp milkweed (*Asclepias incarnata*)
Swamp rose mallow (*Hibiscus moscheutos*)
Swamp sunflower (*Helianthus angustifolius*)
Switchgrass (*Panicum virgatum*)
Threadleaf coreopsis (*Coreopsis verticillata*)
Tussock sedge (*Carex stricta*)
White turtlehead (*Chelone glabra*)
Woolgrass (*Scirpus cyperinus*)

Shrubs:

American beautyberry (*Callicarpa americana*)
Arrowwood (*Viburnum dentatum*)
Black chokeberry (*Aronia melanocarpa*)
Broad-leaved meadowsweet (*Spirea latifolia*)
Buttonbush (*Cephalanthus occidentalis*)
Elderberry (*Sambucus canadensis*)
Inkberry (*Ilex glabra*)
Narrow-leaved meadowsweet (*Spirea alba*)
Ninebark (*Physocarpus opulifolius*)
Possumhaw (*Viburnum nudum*)
Red-osier dogwood (*Cornus sericea*)
St. Johnswort (*Hypericum densiflorum*)
Silky dogwood (*Cornus amomum*)
Smooth alder (*Alnus serrulata*)
Spicebush (*Lindera benzoin*)
Swamp azalea (*Rhododendron viscosum*)
Swamp rose (*Rosa palustris*)
Sweet pepperbush (*Clethra alnifolia*)
Wild raisin (*Viburnum cassinoides*)
Winterberry (*Ilex verticillata*)
Virginia sweetspire (*Itea virginica*)