

DRAINAGE MANAGEMENT AREAS	
DMA CLASSIFICATION	LEGEND COLOR
DEVELOPED LOT DRAINING TO IMP (ON-LOT SWALE)	Green
SELF TREATING AREA	Blue
DEVELOPED ROADWAY DRAINING TO IMP (INLET FILTER)	Yellow

Otay Ranch Resort Village DMA Summary - AREAS BEING TREATED BY BMPS									
DMA NAME	ROADS	Parkway & S/W (Ac)	Lot (Ac)	Lot - Impervious (Ac)	Lot - Pervious (Ac)	Dev Slope (Ac)	Natural (Ac)	Total Surface Area (Ac)	Total Surface Area (Ac)
BASIN 1	15.79	9.87	77.16	34.72	42.44	22.66	79.52	205.00	205.00
BASIN 2	4.41	2.60	29.48	13.27	16.21	5.44	93.07	135.00	135.00
BASIN 3	29.86	15.66	140.04	63.02	77.02	39.07	94.07	318.70	318.70
BASIN 4	15.57	8.89	84.04	37.82	46.22	7.60	0.00	116.10	116.10
BASIN 5	11.18	11.83	46.32	20.84	25.48	10.25	12.74	92.32	92.32
BASIN 6	2.46	0.37	0.00	0.00	0.00	5.56	0.00	8.39	8.39
BASIN 7	8.75	4.58	48.01	21.60	26.41	2.43	58.73	122.50	122.50
CULVERT 1a	3.87	0.00	0.00	0.00	0.00	0.00	25.69	29.56	29.56
CULVERT 1b	1.42	0.00	0.00	0.00	0.00	0.00	4.73	6.15	6.15
CULVERT 2	2.12	0.00	0.00	0.00	0.00	0.00	29.68	31.80	31.80
CULVERT 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 4	6.72	0.00	0.00	0.00	0.00	2.22	6.92	15.86	15.86
CULVERT 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 6	15.79	9.87	77.16	34.72	42.44	22.66	79.52	205.00	205.00
CULVERT 7	4.40	0.36	0.00	0.00	0.00	3.85	644.39	653.00	653.00
CULVERT 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 9	1.22	0.68	0.00	0.00	0.00	5.42	9.7	133.10	133.10
CULVERT 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 12	1.35	0.71	0.00	0.00	0.00	4.66	1.74	8.46	8.46
CULVERT 13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 14	1.61	0.00	0.00	0.00	0.00	3.88	4.38	10.71	10.71
CULVERT 15	2.91	1.94	0.00	0.00	0.00	10.48	226.23	241.56	241.56
CULVERT 16a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 16b	2.13	1.61	0.00	0.00	0.00	7.34	31.22	129.60	129.60
CULVERT 17a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 17b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 18a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 18b	17.48	11.56	75.07	33.78	41.29	25.00	867.09	996.20	996.20
CULVERT 19	0.51	0.41	0.00	0.00	0.00	2.85	0.70	4.47	4.47
CULVERT 20	1.15	0.88	0.00	0.00	0.00	4.57	13.96	20.56	20.56

Outfall	Tributary Area (acres)	Q _{wo} (cfs)	V _{wo} (ft)
BASIN 1	205.0		176,600
BASIN 2	135.0		74,904
BASIN 3	318.7		305,679
BASIN 4	116.1		159,655
BASIN 5	92.3		114,903
BASIN 6	8.4		7,989
BASIN 7	122.5		103,086
CULVERT 1a	29.6	0.8***	
CULVERT 1b	6.2	0.3***	
CULVERT 2	31.8	0.4***	
CULVERT 4	15.9	1.3***	
CULVERT 6**	205.0		
CULVERT 7	653.0	1.08***	
CULVERT 9	133.1	0.70***	
CULVERT 12	8.5	0.4***	
CULVERT 14	10.7	0.5***	
CULVERT 15	241.6	1.0***	
CULVERT 16	129.6	0.7***	
CULVERT 18	996.2	5.8***	
CULVERT 19	4.5	0.2***	
CULVERT 20	20.6	0.2***	

*Cells that have been left blank are not applicable for the BMP proposed.
 **Culvert 6 is the outlet for treated flows from Basin 1
 ***Applicable to untreated street portion only.

Otay Ranch Resort Village

DMA Summary - AREAS BEING TREATED BY BMPS

DMA NAME	ROADS	Parkway & S/W (Ac)	Lot (Ac)	Lot - Impervious (Ac)	Lot - Pervious (Ac)	Dev Slope (Ac)	Natural (Ac)	Total Surface Area (Ac)
BASIN 1	15.79	9.87	77.16	34.72	42.44	22.66	79.52	205.00
BASIN 2	4.41	2.60	29.48	13.27	16.21	5.44	93.07	135.00
BASIN 3	29.86	15.66	140.04	63.02	77.02	39.07	94.07	318.70
BASIN 4	15.57	8.89	84.04	37.82	46.22	7.60	0.00	116.10
BASIN 5	11.18	11.83	46.32	20.84	25.48	10.25	12.74	92.32
BASIN 6	2.46	0.37	0.00	0.00	0.00	5.56	0.00	8.39
BASIN 7	8.75	4.58	48.01	21.60	26.41	2.43	58.73	122.50
CULVERT 1a	3.87	0.00	0.00	0.00	0.00	0.00	25.69	29.56
CULVERT 1b	1.42	0.00	0.00	0.00	0.00	0.00	4.73	6.15
CULVERT 2	2.12	0.00	0.00	0.00	0.00	0.00	29.68	31.80
CULVERT 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 4	6.72	0.00	0.00	0.00	0.00	2.22	6.92	15.86
CULVERT 5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 6	15.79	9.87	77.16	34.72	42.44	22.66	79.52	205.00
CULVERT 7	4.40	0.36	0.00	0.00	0.00	3.85	644.39	653.00
CULVERT 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 9	1.22	0.68	0.00	0.00	0.00	5.42	9.7	133.10
CULVERT 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 12	1.35	0.71	0.00	0.00	0.00	4.66	1.74	8.46
CULVERT 13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 14	1.61	0.84	0.00	0.00	0.00	3.88	4.38	10.71
CULVERT 15	2.91	1.94	0.00	0.00	0.00	10.48	226.23	241.56
CULVERT 16a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 16	2.13	1.61	0.00	0.00	0.00	7.34	31.22	129.60
CULVERT 17a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 18a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULVERT 18	17.48	11.56	75.07	33.78	41.29	25.00	867.09	996.20
CULVERT 19	0.51	0.41	0.00	0.00	0.00	2.85	0.70	4.47
CULVERT 20	1.15	0.88	0.00	0.00	0.00	4.57	13.96	20.56



**Table 1: Filterra® Quick Sizing Table
(Southern California - 0.2 in/hr Uniform Intensity Approach)**

Available Filterra® Box Sizes (feet)	Recommended <u>Commercial</u> Contributing Drainage Area (acres) where C = 0.85	Outlet Pipe
4x4	up to 0.22	4" SDR-35 PVC
4x6.5 or 6.5x4	0.23 to 0.35	4" SDR-35 PVC
4x8 or 8x4	0.36 to 0.44	4" SDR-35 PVC
Standard 6x6	0.45 to 0.49	4" SDR-35 PVC
6x8 or 8x6	0.50 to 0.65	4" SDR-35 PVC
6x10 or 10x6	0.66 to 0.82	6" SDR-35 PVC
6x12 or 12x6	0.83 to 0.98	6" SDR-35 PVC

Available Filterra® Box Sizes (feet)	Recommended <u>Residential</u> Contributing Drainage Area (acres) where C = 0.50	Outlet Pipe
4x4	up to 0.37	4" SDR-35 PVC
4x6.5 or 6.5x4	0.38 to 0.60	4" SDR-35 PVC
4x8 or 8x4	0.61 to 0.74	4" SDR-35 PVC
Standard 6x6	0.75 to 0.83	4" SDR-35 PVC
6x8 or 8x6	0.84 to 1.11	4" SDR-35 PVC
6x10 or 10x6	1.12 to 1.39	6" SDR-35 PVC
6x12 or 12x6	1.40 to 1.67	6" SDR-35 PVC

Notes:

1. All boxes are a standard 3.5 feet depth (INV to TC)
2. A standard SDR-35 PVC pipe coupling is cast into the wall for easy connection to discharge drain
3. Dimensions shown are internal. Please add 1' to each external (using 6" walls)
4. In line with TR55 data, for Commercial Developments a minimum (runoff coefficient) C factor of 0.85 is recommended. For Residential Developments, use of C factors less than 0.5 require individual site review by Filterra.
5. Please ask for Sizing Tables for other target treatment goals, e.g. 0.3 in/hr
6. This sizing table is valid only for Southern California.

Cross Section for BIORETENTION AREA TO CULV-1a (POC 3)

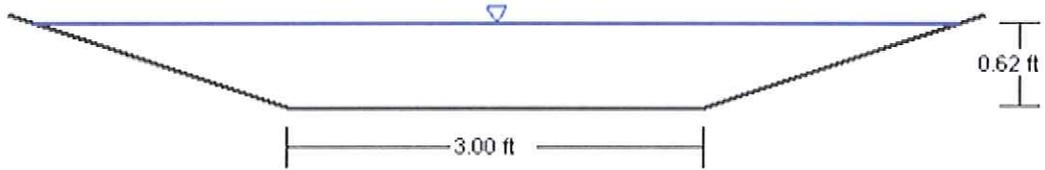
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.450
Channel Slope	0.02000 ft/ft
Normal Depth	0.62 ft
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Bottom Width	3.00 ft
Discharge	0.80 ft ³ /s

Cross Section Image



V: 1
H: 1

Cross Section for *BIORETENTION AREA TO CULV-1b (POC 3)*

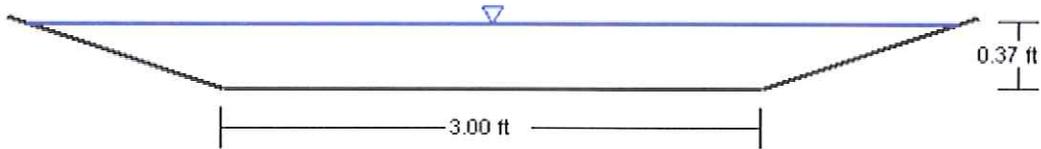
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.450
Channel Slope	0.02000 ft/ft
Normal Depth	0.37 ft
Left Side Slope	3.00 H:V
Right Side Slope	3.00 H:V
Bottom Width	3.00 ft
Discharge	0.30 ft ³ /s

Cross Section Image



V: 1
H: 1

PROJECT NAME: Otay Ranch Resort Village
 PROJECT LOCATION: Chula Vista

85TH PERCENTILE
 PRECIPITATION DEPTH (IN): 0.65

BASIN 1							
TOTAL DRAINAGE AREA :	AREA (SQ FT)	AREA (AC)					
	8,929,800	205.00					
SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS(PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Landscape	VEGETATED	6,299,428	144.61	0.1	0.65	34,122	2.89
ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Road/Sidewalk	IMPERVIOUS	2,630,372	60.39	1	0.65	142,478.50	12.08
Column Total						176,600	14.97

WQ Ponding Depth = h_{BMP} = 6.50 ft.
 BMP Area Provided = A_{BMP} = 22,050 ft.²

Volume Storage Capacity:

$V_{85} = V_{TOP} + V_{UNDERGROUND}$

Ponding Area at h_{BMP} = 30,448

$V_{TOP} = \text{Volume at } h_{BMP} = 170,617 \text{ ft.}^3$

Volume Above Ground @ h_{BMP} assuming 2:1 sideslopes

Below Ground Volume:

$D_{SOIL MIX}$ = 1.5 ft.
 $n_{soil mix}$ = 0.3 unitless porosity

D_{gravel} = 1.00 ft.
 n_{gravel} = 0.4 unitless porosity

$V_{total \text{ underground volume provided}} = A_{BMP} (D_{SOIL MIX} * n + D_{GRAVEL} * n)$

$V_{total \text{ underground volume provided}} = 18,743 \text{ ft.}^3$

Total Volume Provided = 189,360 cf = 4.35 ac.-ft.

189,360 > 176,600 Therefore Capacity OK

BASIN 1 DRAWDOWN CALCULATIONS
 OUTLET LOCATED AT BOTTOM OF BASIN

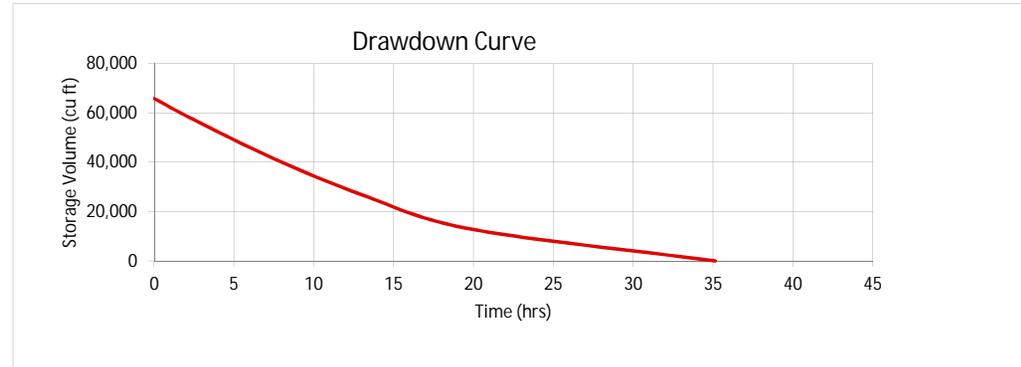
ORIFICE EQUATION

$$Q = C \cdot A \cdot (2gd)^{0.5}$$

C	0.67
d (in)	4
A (sq ft)	0.09
g (ft/s ²)	32.2

DRAWDOWN TIME (HR) = $(\Sigma (\Delta V / Q_{avg}) / 3600)$

d (ft)	Qout (CFS)	V in basin (CU FT)	DRAW DOWN TIME (HR)
6.5	1.2	170,617	0
6	1.1	154,835	3.74
5	1.0	125,766	11.08
4	0.9	98,045	18.83
3	0.8	71,640	27.21
2	0.7	46,519	36.66
1	0.5	22,649	48.37
0	0.0	0	75.19



50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)

PROJECT NAME: Otay Ranch Resort Village

PROJECT LOCATION: Chula Vista

85TH PERCENTILE

PRECIPITATION DEPTH (IN): 0.65

BASIN 2							
TOTAL DRAINAGE AREA :	AREA (SQ FT)	AREA (AC)					
	5,880,600	135.00					
SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS(PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Landscape	VEGETATED	4,997,513	114.73	0.1	0.65	27,070	2.29
ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Road/Sidewalk	IMPERVIOUS	883,087	20.27	1	0.65	47,833.89	4.05
Column Total						74,904	6.35

WQ Ponding Depth = h_{BMP} = 4.50 ft.
 BMP Area Provided = A_{BMP} = 12,475 ft.²

Volume Storage Capacity:

$V_{85} = V_{TOP} + V_{UNDERGROUND}$

Ponding Area at h_{BMP} = 16,820

V_{TOP} = Volume at h_{BMP} = 65,914 ft.³

Volume Above Ground @ h_{BMP} assuming 2:1 sideslopes

Below Ground Volume:

$D_{SOIL MIX}$ = 1.5 ft.
 $n_{soil mix}$ = 0.3 unitless porosity

D_{gravel} = 1.00 ft.
 n_{gravel} = 0.4 unitless porosity

$V_{total\ underground\ volume\ provided} = A_{BMP}(D_{SOIL\ MIX} * n + D_{GRAVEL} * n)$

$V_{total\ underground\ volume\ provided} = 10,604\ ft.^3$

Total Volume Provided = 76,517 cf = 1.76 ac.-ft.

76,517 > 74,904 Therefore Capacity OK

BASIN 2 DRAWDOWN CALCULATIONS
 OUTLET LOCATED AT BOTTOM OF BASIN

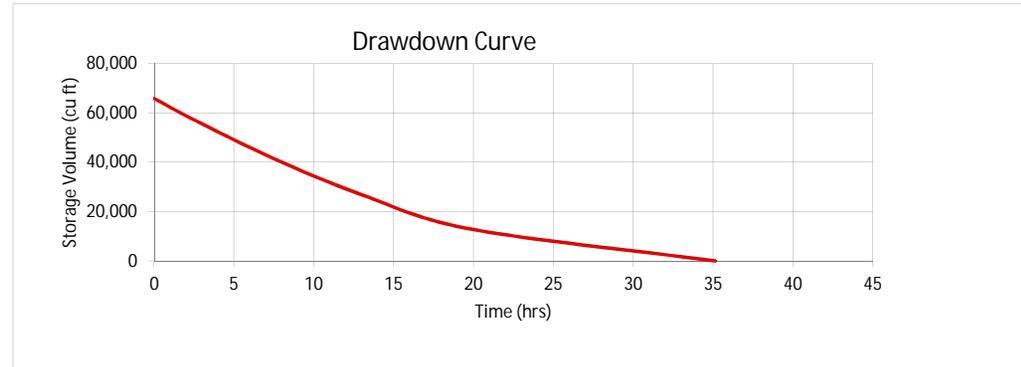
ORIFICE EQUATION

$$Q = C \cdot A \cdot (2gd)^{0.5}$$

C	0.67
d (in)	4
A (sq ft)	0.09
g (ft/s ²)	32.2

DRAWDOWN TIME (HR) = $(\Sigma (\Delta V / Q_{avg}) / 3600)$

d (ft)	Qout (CFS)	V in basin (CU FT)	DRAW DOWN TIME (HR)
4.5	1.0	65,914	0
4	0.9	57,390	2.45
3	0.8	41,590	7.46
2	0.7	26,780	13.04
1	0.5	12,927	19.83
0	0.0	0	35.14



50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)

PROJECT NAME: Otay Ranch Resort Village

PROJECT LOCATION: Chula Vista

85TH PERCENTILE

PRECIPITATION DEPTH (IN): 0.65

BASIN 3							
TOTAL DRAINAGE AREA :	AREA (SQ FT)	AREA (AC)					
	13,882,572	318.70					
SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS(PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Landscape	VEGETATED	9,154,742	210.16	0.1	0.65	49,588	4.20
ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Road/Sidewalk	IMPERVIOUS	4,727,830	108.54	1	0.65	256,090.81	21.71
Column Total						305,679	25.91

WQ Ponding Depth = h_{BMP} = 6.20 ft.
 BMP Area Provided = A_{BMP} = 39,969 ft.²

Volume Storage Capacity:

$V_{85} = V_{TOP} + V_{UNDERGROUND}$

Ponding Area at h_{BMP} = 50,500

V_{TOP} = Volume at h_{BMP} = 280,455 ft.³

Volume Above Ground @ h_{BMP} assuming 2:1 sideslopes

Below Ground Volume:

$D_{SOIL MIX}$ = 1.5 ft.
 $n_{soil mix}$ = 0.3 unitless porosity
 D_{gravel} = 1.00 ft.
 n_{gravel} = 0.4 unitless porosity

$V_{total\ underground\ volume\ provided} = A_{BMP}(D_{SOIL\ MIX} * n + D_{GRAVEL} * n)$

$V_{total\ underground\ volume\ provided} = 33,974\ ft.^3$

Total Volume Provided = 314,428 cf = 7.22 ac.-ft.

314,428 > 305,679 Therefore Capacity OK

BASIN 3 DRAWDOWN CALCULATIONS
 OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

$$Q = C \cdot A \cdot (2gd)^{0.5}$$

C	0.67
d (in)	6
A (sq ft)	0.20
g (ft/s ²)	32.2

DRAWDOWN TIME (HR) = $(\Sigma (\Delta V / Q_{avg}) / 3600)$

d (ft)	Qout (CFS)	V in basin (CU FT)	DRAW DOWN TIME (HR)
6.2	2.6	280,455	0
6	2.6	269,755	1.14
5	2.4	220,504	6.67
4	2.1	159,103	14.30
3	1.8	127,248	18.79
2	1.5	83,179	26.16
1	1.1	40,774	35.40
0	0.0	0	56.86



50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)

PROJECT NAME: Otay Ranch Resort Village

PROJECT LOCATION: Chula Vista

85TH PERCENTILE

PRECIPITATION DEPTH (IN): 0.65

BASIN 4							
TOTAL DRAINAGE AREA :	AREA (SQ FT)	AREA (AC)					
	5,057,316	116.10					
SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS(PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Landscape	VEGETATED	2,344,272	53.82	0.1	0.65	12,698	1.08
ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Road/Sidewalk	IMPERVIOUS	2,713,044	62.28	1	0.65	146,956.53	12.46
Column Total						159,655	13.53

WQ Ponding Depth = h_{BMP} = 4.70 ft.
 BMP Area Provided = A_{BMP} = 26,580 ft.²

Volume Storage Capacity:

$V_{85} = V_{TOP} + V_{UNDERGROUND}$
 Ponding Area at h_{BMP} = 33,064
 $V_{TOP} = \text{Volume at } h_{BMP} = 140,162 \text{ ft.}^3$ Volume Above Ground @ h_{BMP} assuming 2:1 sideslopes

Below Ground Volume:

$D_{SOIL MIX}$ = 1.5 ft.
 $n_{soil mix}$ = 0.3 unitless porosity
 D_{gravel} = 1.00 ft.
 n_{gravel} = 0.4 unitless porosity

$V_{total \text{ underground volume provided}} = A_{BMP} (D_{SOIL MIX} * n + D_{GRAVEL} * n)$
 $V_{total \text{ underground volume provided}} = 22,593 \text{ ft.}^3$

Total Volume Provided = 162,755 cf = 3.74 ac.-ft.
 162,755 > 159,655 Therefore Capacity OK

BASIN 4 DRAWDOWN CALCULATIONS
 OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

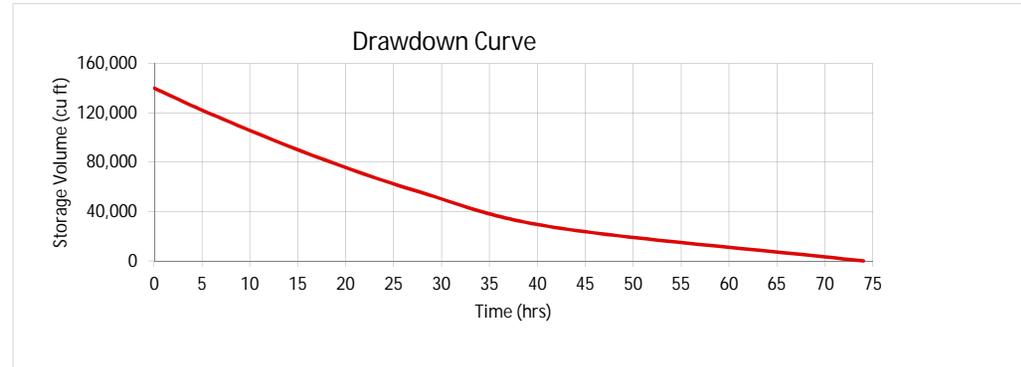
$$Q = C * A * (2gd)^{0.5}$$

C	0.67
d (in)	4
A (sq ft)	0.09
g (ft/s ²)	32.2

DRAWDOWN TIME (HR) = $(\Sigma (\Delta V / Q_{avg}) / 3600)$

d (ft)	Qout (CFS)	V in basin (CU FT)	DRAW DOWN TIME (HR)
4.7	1.0	140,162	0
4	0.9	117,096	6.55
3	0.8	85,753	16.50
2	0.7	55,811	27.76
1	0.5	27,237	41.78
0	0.0	0	74.03

50% OF VOLUME DRAINS W/IN 24 HOURS



DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)

PROJECT NAME: Otay Ranch Resort Village

PROJECT LOCATION: Chula Vista

85TH PERCENTILE

PRECIPITATION DEPTH (IN): 0.65

BASIN 5							
TOTAL DRAINAGE AREA :	AREA (SQ FT)	AREA (AC)					
	4,021,459	92.32					
SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS(PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Landscape	VEGETATED	2,111,312	48.47	0.1	0.65	11,436	0.97
ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Road/Sidewalk	IMPERVIOUS	1,910,147	43.85	1	0.65	103,466.31	8.77
Column Total						114,903	9.74

WQ Ponding Depth = h_{BMP} = 5.00 ft.
 BMP Area Provided = A_{BMP} = 18,152 ft.²

Volume Storage Capacity:

$V_{85} = V_{TOP} + V_{UNDERGROUND}$

Ponding Area at h_{BMP} = 23,941

V_{TOP} = Volume at h_{BMP} = 105,233 ft.³

Volume Above Ground @ h_{BMP} assuming 2:1 sideslopes

Below Ground Volume:

$D_{SOIL MIX}$ = 1.5 ft.
 $n_{soil mix}$ = 0.3 unitless porosity

D_{gravel} = 1.00 ft.
 n_{gravel} = 0.4 unitless porosity

$V_{total\ underground\ volume\ provided} = A_{BMP}(D_{SOIL\ MIX} * n + D_{GRAVEL} * n)$

$V_{total\ underground\ volume\ provided} = 15,429\ ft.^3$

Total Volume Provided = 120,662 cf = 2.77 ac.-ft.

120,662 > 114,903 Therefore Capacity OK

BASIN 5 DRAWDOWN CALCULATIONS
 OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

$$Q = C * A * (2gd)^{0.5}$$

C	0.67
d (in)	4
A (sq ft)	0.09
g (ft/s ²)	32.2

DRAWDOWN TIME (HR) = $(\Sigma (\Delta V / Q_{avg}) / 3600)$

d (ft)	Qout (CFS)	V in basin (CU FT)	DRAW DOWN TIME (HR)
5	1.0	105,233	0
4	0.9	81,572	6.61
3	0.8	59,450	13.63
2	0.7	38,502	21.52
1	0.5	18,696	31.23
0	0.0	0	53.37



50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010
 COUNTY OF SD SUSMP)

PROJECT NAME: Otay Ranch Resort Village

PROJECT LOCATION: Chula Vista

85TH PERCENTILE

PRECIPITATION DEPTH (IN): 0.65

BASIN 6							
TOTAL DRAINAGE AREA :	AREA (SQ FT)	AREA (AC)					
	365,468	8.39					
SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS(PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Landscape	VEGETATED	242,194	5.56	0.1	0.65	1,312	0.11
ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Road/Sidewalk	IMPERVIOUS	123,275	2.83	1	0.65	6,677.39	0.57
Column Total						7,989	0.68

WQ Ponding Depth = h_{BMP} = 5.00 ft.
 BMP Area Provided = A_{BMP} = 3,643 ft.²

Volume Storage Capacity:

$V_{85} = V_{TOP} + V_{UNDERGROUND}$
 Ponding Area at h_{BMP} = 6,457
 V_{TOP} = Volume at h_{BMP} = 25,251 ft.³ Volume Above Ground @ h_{BMP} assuming 2:1 sideslopes

Below Ground Volume:

$D_{SOIL MIX}$ = 1.5 ft.
 $n_{soil mix}$ = 0.3 unitless porosity
 D_{gravel} = 1.00 ft.
 n_{gravel} = 0.4 unitless porosity

$V_{total\ underground\ volume\ provided} = A_{BMP}(D_{SOIL\ MIX} * n + D_{GRAVEL} * n)$
 $V_{total\ underground\ volume\ provided} = 3,097\ ft.^3$

Total Volume Provided = 28,347 cf = 0.65 ac.-ft.
 28,347 > 7,989 Therefore Capacity OK

BASIN 6 DRAWDOWN CALCULATIONS
 OUTLET LOCATED AT BOTTOM OF BASIN

ORIFICE EQUATION

$$Q = C * A * (2gd)^{0.5}$$

C	0.67
d (in)	2
A (sq ft)	0.02
g (ft/s ²)	32.2

DRAWDOWN TIME (HR) = $(\Sigma (\Delta V / Q_{avg}) / 3600)$

d (ft)	Qout (CFS)	V in basin (CU FT)	DRAW DOWN TIME (HR)
5	0.3	25,251	0
4	0.2	18,776	7.24
3	0.2	13,246	14.26
2	0.2	8,294	21.71
1	0.1	3,890	30.35
0	0.0	0	48.77



50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)

PROJECT NAME: Otay Ranch Resort Village

PROJECT LOCATION: Chula Vista

85TH PERCENTILE

PRECIPITATION DEPTH (IN): 0.65

BASIN 7							
TOTAL DRAINAGE AREA :	AREA (SQ FT)	AREA (AC)					
	5,336,100	122.50					
SELF-TREATING VEGETATED/LANDSCAPED AREAS DRAINING TO IMPS(PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Landscape	VEGETATED	3,814,425	87.57	0.1	0.65	20,661	1.75
ROOFS, SIDEWALKS, AND STREETS DRAINING TO IMPS (PLANTER AREA)							
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE PRECIPITATION DEPTH (IN)	85TH PERCENTILE VOLUME (CU FT)	85TH PERCENTILE FLOW (CFS)
Road/Sidewalk	IMPERVIOUS	1,521,675	34.93	1	0.65	82,424.04	6.99
Column Total						103,086	8.74

WQ Ponding Depth = h_{BMP} = 5.50 ft.
 BMP Area Provided = A_{BMP} = 14,971 ft.²

Volume Storage Capacity:

$V_{85} = V_{TOP} + V_{UNDERGROUND}$
 Ponding Area at h_{BMP} = 20,839
 V_{TOP} = Volume at h_{BMP} = 98,477 ft.³ Volume Above Ground @ h_{BMP} assuming 2:1 sideslopes

Below Ground Volume:

$D_{SOIL MIX}$ = 1.5 ft.
 $n_{soil mix}$ = 0.3 unitless porosity
 D_{gravel} = 1.00 ft.
 n_{gravel} = 0.4 unitless porosity

$V_{total\ underground\ volume\ provided} = A_{BMP}(D_{SOIL\ MIX} * n + D_{GRAVEL} * n)$
 $V_{total\ underground\ volume\ provided} = 12,725\ ft.^3$

Total Volume Provided = 111,202 cf = 2.55 ac.-ft.
 111,202 > 103,086 Therefore Capacity OK

BASIN 7 DRAWDOWN CALCULATIONS
 OUTLET LOCATED AT BOTTOM OF BASIN

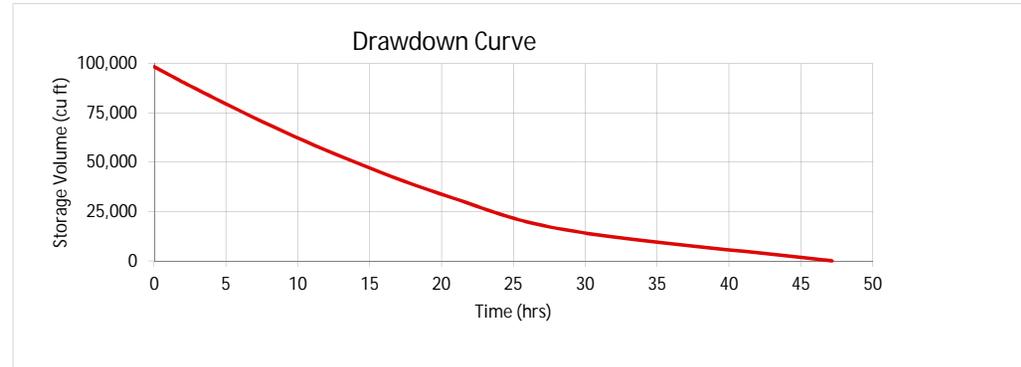
ORIFICE EQUATION

$$Q = C * A * (2gd)^{0.5}$$

C	0.67
d (in)	4
A (sq ft)	0.09
g (ft/s ²)	32.2

DRAWDOWN TIME (HR) = $(\Sigma (\Delta V / Q_{avg}) / 3600)$

d (ft)	Qout (CFS)	V in basin (CU FT)	DRAW DOWN TIME (HR)
5.5	1.1	98,477	0
5	1.0	87,757	2.77
4	0.9	68,056	8.28
3	0.8	49,462	14.18
2	0.7	31,942	20.77
1	0.5	15,466	28.85
0	0.0	0	47.16



50% OF VOLUME DRAINS W/IN 24 HOURS

DRAWDOWN SHOULD OCCUR BETWEEN 24 AND 96 HOURS (PAGE 65 MARCH 2010 COUNTY OF SD SUSMP)

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN):

0.65

AREA DRAINING TO CULVERT 1a									
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)		AREA (AC)					
		1,287,634		29.6					
I. SELF-TREATING AREAS									
SELF-TREATING VEGETATED/LANDSCAPED AREAS									
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)			
1	VEGETATED	1,119,056	25.7	0.1	0.2	0.51			
II. AREAS DRAINING TO IMPS									
ROADS DRAINING TO ALTERNATIVE IMPS (ROADSIDE SWALES)									
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	SWALE LENGTH (FT)	V (ft/s) (1)	MINIMUM RETENTION TIME (MIN)
2	PAVED	168,577	3.9	1	0.2	0.8	500	0.27	31

(1) From Flowmaster Calculations

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN):

0.65

AREA DRAINING TO CULVERT 1b									
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)		AREA (AC)					
		267,894		6.2					
I. SELF-TREATING AREAS									
SELF-TREATING VEGETATED/LANDSCAPED AREAS									
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)			
1	VEGETATED	206,039	4.7	0.1	0.2	0.09			
II. AREAS DRAINING TO IMPS									
ROADS DRAINING TO ALTERNATIVE IMPS (ROADSIDE SWALES)									
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	SWALE LENGTH (FT)	V (ft/s) (1)	MINIMUM RETENTION TIME (MIN)
2	PAVED	61,855	1.4	1	0.2	0.3	150	0.20	13

(1) From Flowmaster Calculations

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 2								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:			AREA (SQ FT)	AREA (AC)				
			1,385,208	31.8				
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	1,292,861	29.7	0.1	0.2	0.59		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	92,347	2.1	1	0.2	0.4	0.22	10
							0.98	2

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 4								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:			AREA (SQ FT)	AREA (AC)				
			690,862	15.9				
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	398,138	9.1	0.1	0.2	0.18		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	292,723	6.7	1	0.2	1.3	0.22 0.98	31 7

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 7 NOT TRIBUTARY TO BASINS 2 & 3								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)	AREA (AC)					
		28,444,680	653.0					
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	167,706	3.9	0.1	0.2	0.08		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	207,346	4.8	1	0.2	1.0	0.22	22
							0.98	5

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 9								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)	AREA (AC)					
		5,797,836	133.1					
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	657,756	15.1	0.1	0.2	0.30		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	82,764	1.9	1	0.2	0.4	0.22 0.98	9 2

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 12								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)	AREA (AC)					
		368,518	8.5					
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	278,784	6.4	0.1	0.2	0.13		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	89,734	2.1	1	0.2	0.4	0.22 0.98	9 2

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 14								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)			AREA (AC)			
		466,528			10.7			
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	359,806	8.3	0.1	0.2	0.17		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	106,722	2.5	1	0.2	0.5	0.22 0.98	11 3

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 15								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)	AREA (AC)					
		10,522,354	241.6					
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	10,310,916	236.7	0.1	0.2	4.73		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	211,266	4.9	1	0.2	1.0	0.22 0.98	22 5

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 16								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:								
			AREA (SQ FT)			AREA (AC)		
			5,645,376			129.6		
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	1,679,674	38.6	0.1	0.2	0.77		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	162,948	3.7	1	0.2	0.7	0.22	17
							0.98	4

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 18								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)	AREA (AC)					
		43,394,472	996.2					
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	40,657,967	933.4	0.1	0.2	18.67		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	1,264,982	29.0	1	0.2	5.8	0.22 0.98	132 30

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 19								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)			AREA (AC)			
		194,713			4.5			
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	154,512	3.5	0.1	0.2	0.07		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	40,201	0.9	1	0.2	0.2	0.22	4
							0.98	1

OTAY RANCH VILLAGE 13

85TH PERCENTILE PRECIPITATION DEPTH (IN): 0.65

AREA DRAINING TO CULVERT 20								
TOTAL PROJECT AREA THAT PERTAINS TO THIS AMENDMENT:		AREA (SQ FT)	AREA (AC)					
		895,594	20.6					
I. SELF-TREATING AREAS								
SELF-TREATING VEGETATED/LANDSCAPED AREAS								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)		
1	VEGETATED	806,953	18.5	0.1	0.2	0.37		
II. AREAS DRAINING TO IMPS								
ROADS DRAINING TO ALTERNATIVE IMPS (FILTERRA UNIT)								
DMA NAME	SURFACE TYPE	DMA AREA (SQ FT)	DMA AREA (AC)	DMA RUNOFF FACTOR	85TH PERCENTILE INTENSITY (in/hr)	85TH PERCENTILE FLOW (CFS)	FILTERRA DRAINAGE AREA (AC)	# INLET UNITS REQUIRED
2	PAVED	88,641	2.0	1	0.2	0.4	0.22	9
							0.98	2

ATTACHMENT E

Geotechnical Certification Sheet (If applicable)

The design of stormwater treatment and other control measures proposed in this plan requiring specific soil infiltration characteristics and / or geological conditions has been reviewed and approved by a registered Civil Engineer, Geotechnical Engineer, or Geologist in the State of California.

Name and registration #

Date

ATTACHMENT F

Maintenance Plan

(Use Chapter 5 of the SUSMP as guidance in developing your Maintenance Plan)

The following is a general outline to create your project specific Maintenance Plan. A Maintenance Plan is a living document and field conditions may require modifications to the Maintenance Plan.

- I. Inspection, Maintenance Log and Self-Verification Forms (Examples are provided in Appendix F of the San Diego County SUSMP)
- II. Updates, Revisions and Errata
- III. Introduction
 - A. Narrative overview describing the site; drainage areas, routing, and discharge points; and treatment facilities.
- IV. Responsibility for Maintenance
 - A. General
 - (1) Name and contact information for responsible individual(s).
 - (2) Organization chart or charts showing organization of the maintenance function and location within the overall organization.
 - (3) Insert a copy of the recorded maintenance agreement.
 - (4) Maintenance Funding
 - (1) Sources of funds for maintenance
 - (2) Budget category or line item
 - (3) Description of procedure and process for ensuring adequate funding for maintenance
 - B. Staff Training Program
 - C. Records
 - D. Safety
- V. Summary of Drainage Areas and Stormwater Facilities
 - A. Drainage Areas

- (1) Drawings showing pervious and impervious areas (copied or adapted from initial SWMP).
- (2) Designation and description of each drainage area and how flow is routed to the corresponding facility.

B. Treatment and Flow-Control Facilities

- (1) Drawings showing location and type of each facility
- (2) General description of each facility (Consider a table if more than two facilities)
 - (1) Area drained and routing of discharge.
 - (2) Facility type and size

VI. Facility Documentation

- A. “As-built” drawings of each facility (design drawings in the draft Plan)
- B. Manufacturer’s data, manuals, and maintenance requirements for pumps, mechanical or electrical equipment, and proprietary facilities (include a “placeholder” in the draft plan for information not yet available).
- C. Specific operation and maintenance concerns and troubleshooting

VII. Maintenance Schedule or Matrix

- A. Maintenance Schedule for each facility with specific requirements for:
 - (1) Routine inspection and maintenance
 - (2) Annual inspection and maintenance
 - (3) Inspection and maintenance after major storms
- B. Service Agreement Information

Assemble and make copies of your maintenance plan. One copy must be submitted to the County, and at least one copy kept on-site. Here are some suggestions for formatting the maintenance plan:

- Format plans to 8½ x 11” to facilitate duplication, filing, and handling.
- Include the revision date in the footer on each page.
- Scan graphics and incorporate with text into a single electronic file. Keep the electronic file backed-up so that copies of the maintenance plan can be made if the hard copy is lost or damaged.

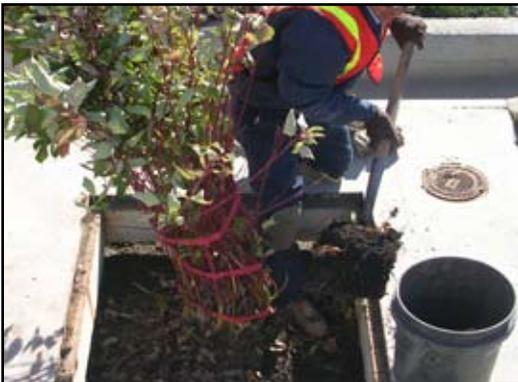
Filterra® Maintenance Steps



1. Inspection of Filterra and surrounding area



2. Removal of tree grate and erosion control stones



3. Removal of debris, trash and mulch



4. Mulch replacement



5. Clean area around Filterra



6. Complete paperwork and record plant height and width

For additional information please contact your local Filterra sales representative.
Eastern Zone: 866-349-3458, Western Zone: 877-345-1450.