BMP Sizing Spreadsheet V1.04			
Project Name:	Otay 250	Hydrologic Unit:	911 Tijuana Watershed
Project Applicant:	Stevens Cresto Engineering	Rain Gauge:	Lindbergh
Jurisdiction:	County of San Diego	Total Project Area:	253 AC
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	BF 5	BMP Type:	Bioretention
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	0.024

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
PER TO IMP	377008	D	Flat	ASPHALT	1.0	0.08	0.0667	0.048	30161	25146	18096
PER TO PER	1987510	D	Flat	LANDSCAPE	0.1	0.08	0.0667	0.048	15900	13257	9540
BF 5	32300	D	Flat	BIOFILTER	0.1	0.08	0.0667	0.048	258	215	155
Total BMP Area	2396818										
									Minimum BMP Size	46319.12	38619	27791
									Proposed BMP Size*	32300	48450	19380
									Soil Matrix Depth		18.00	in
									Minimum Ponding Depth		14.35	in
									Maximum Ponding Depth		168.10	in
									Selected Ponding Depth		18.00	in

Total
66410
67830

Describe the BMP's in sufficient detail in your SWMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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Designated Staff have final review and approval authority over the project design.

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NOTE: BMP IS ADEQUATELY SIZED TO PROVIDE HYDROMODIFICATION MITIGATION VOLUMES REQUIRED AND PROVIDED AREA IS ADEQUATE FOR POLLUTANT CONTROL (SEE ATTACHMENT 1a). CONTINUOUS SIMULATION MODELING WILL BE UTILIZED AT FINAL ENGINEERING TO REFINE BMP DESIGN AND MINIMIZE PONDING DEPTH.

BMP Sizing Spreadsheet V1.04			
Project Name:	Otay 250	Hydrologic Unit:	911 Tijuana Watershed
Project Applicant:	tevens Cresto Engineerir	Rain Gauge:	Lindbergh
Jurisdiction:	County of San Diego	Total Project Area:	253 AC
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	BF 5	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
PER TO IMP	Lindbergh	D	Scrub	Flat	0.05	8.655	0.216	**5.28**
PER TO PER	Lindbergh	D	Scrub	Flat	0.05	45.627	1.141	**27.85**
BF 5	Lindbergh	D	Scrub	Flat	0.05	0.742	0.019	**0.45**

1.376	**33.59**	**6.54**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

1.158	**28.27**	6.00
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	11.6

BMP Sizing Spreadsheet V1.04			
Project Name:	Otay 250	Hydrologic Unit:	911 Tijuana Watershed
Project Applicant:	Stevens Cresto Engineering	Rain Gauge:	Lindbergh
Jurisdiction:	County of San Diego	Total Project Area:	253 AC
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	BF 6	BMP Type:	Bioretention
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	0.024

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
PER TO IMP	152441	D	Flat	ASPHALT	1.0	0.08	0.0667	0.048	12195	10168	7317
PER TO PER	881342	D	Flat	LANDSCAPE	0.1	0.08	0.0667	0.048	7051	5879	4230
BF 6	13150	D	Flat	BIOFILTER	0.1	0.08	0.0667	0.048	105	88	63
Total BMP Area	1046933										

Minimum BMP Size	19351.216	16134	11611
Proposed BMP Size*	13150	19944	7890
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		14.72	in
Maximum Ponding Depth		183.22	in
Selected Ponding Depth		18.20	in

Total
2774
2783

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BMP Sizing Spreadsheet V1.04			
Project Name:	Otay 250	Hydrologic Unit:	911 Tijuana Watershed
Project Applicant:	tevens Cresto Engineerir	Rain Gauge:	Lindbergh
Jurisdiction:	County of San Diego	Total Project Area:	253 AC
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	BF 6	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
PER TO IMP	Lindbergh	D	Scrub	Flat	0.05	3.500	0.087	**2.14**
PER TO PER	Lindbergh	D	Scrub	Flat	0.05	20.233	0.506	**12.35**
BF 6	Lindbergh	D	Scrub	Flat	0.05	0.302	0.008	**0.18**

0.601	**14.67**	**4.32**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.581	**14.19**	4.25
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	9.5

BMP Sizing Spreadsheet V1.04			
Project Name:	Otay 250	Hydrologic Unit:	911 Tijuana Watershed
Project Applicant:	Stevens Cresto Engineering	Rain Gauge:	Lindbergh
Jurisdiction:	County of San Diego	Total Project Area:	253 AC
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name:	BF 7	BMP Type:	Bioretention
BMP Native Soil Type:	D	BMP Infiltration Rate (in/hr):	0.024

Areas Draining to BMP						HMP Sizing Factors			Minimum BMP Size		
DMA Name	Area (sf)	Soil Type	Slope	Post Project Surface Type	Runoff Factor (Table 4-2)	Surface Area	Surface Volume	Subsurface Volume	Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)
PER TO IMP	49262	D	Flat	ASPHALT	1.0	0.08	0.0667	0.048	3941	3286	2365
PER TO PER	109463	D	Flat	LANDSCAPE	0.1	0.08	0.0667	0.048	876	730	525
BF 7	4800	D	Flat	BIOFILTER	0.1	0.08	0.0667	0.048	38	32	23
Total BMP Area	163525										

Minimum BMP Size	4855.064	4048	2913
Proposed BMP Size*	4800	4800	2880
Soil Matrix Depth		18.00	in
Minimum Ponding Depth		10.12	in
Maximum Ponding Depth		73.38	in
Selected Ponding Depth		12.00	in

Total
6961
7680

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BMP Sizing Spreadsheet V1.04			
Project Name:	Otay 250	Hydrologic Unit:	911 Tijuana Watershed
Project Applicant:	tevens Cresto Engineerir	Rain Gauge:	Lindbergh
Jurisdiction:	County of San Diego	Total Project Area:	253 AC
Parcel (APN):		Low Flow Threshold:	0.5Q2
BMP Name	BF 7	BMP Type:	Bioretention

DMA Name	Rain Gauge	Existing Condition			Q2 Sizing Factor (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	**Orifice Area (in2)**
		Soil Type	Cover	Slope				
PER TO IMP	Lindbergh	D	Scrub	Flat	0.05	1.131	0.028	**0.69**
PER TO PER	Lindbergh	D	Scrub	Flat	0.05	2.513	0.063	**1.53**
BF 7	Lindbergh	D	Scrub	Flat	0.05	0.110	0.003	**0.07**

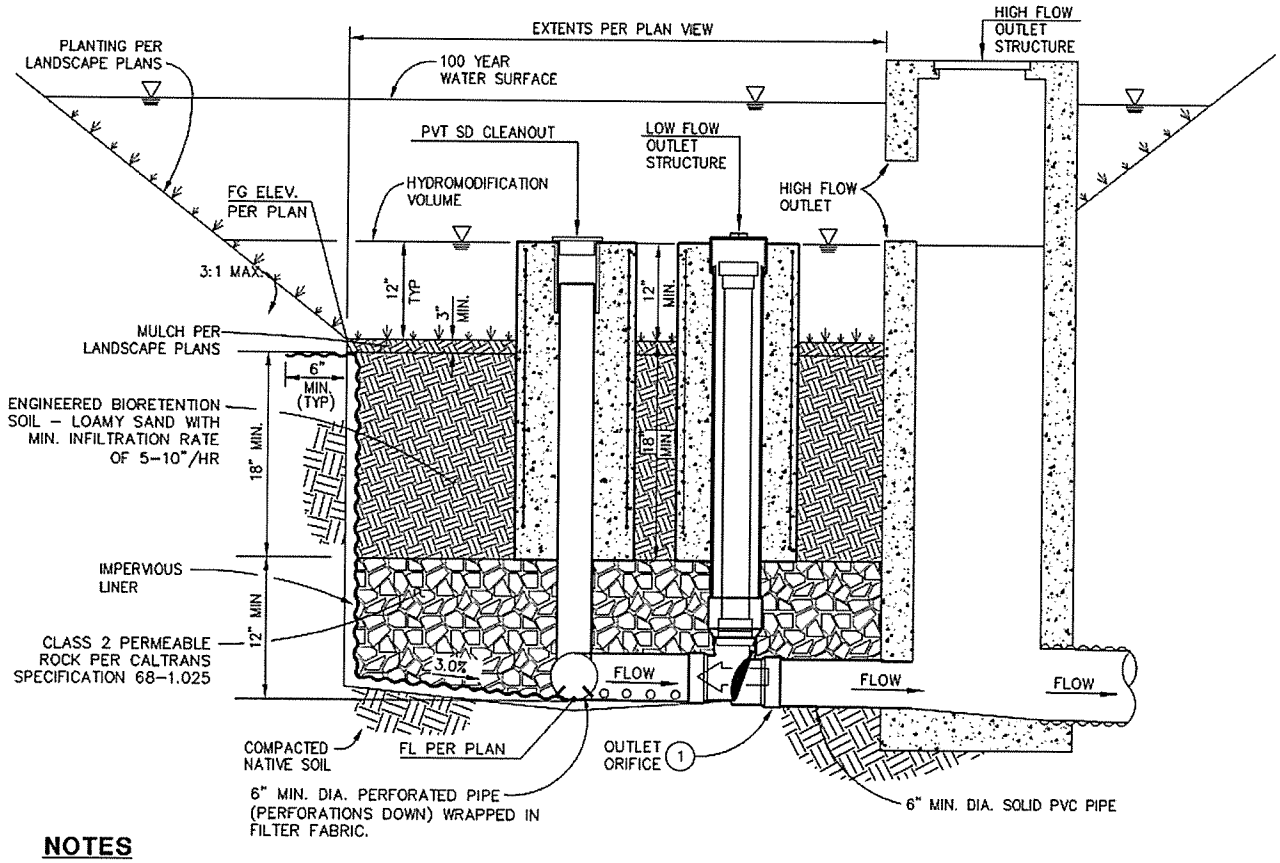
0.094	**2.29**	**1.71**
Tot. Allowable Orifice Flow (cfs)	**Tot. Allowable Orifice Area (in2)**	**Max Orifice Diameter (in)**

0.085	**2.07**	1.63
Actual Orifice Flow (cfs)	Actual Orifice Area (in2)	Selected Orifice Diameter (in)

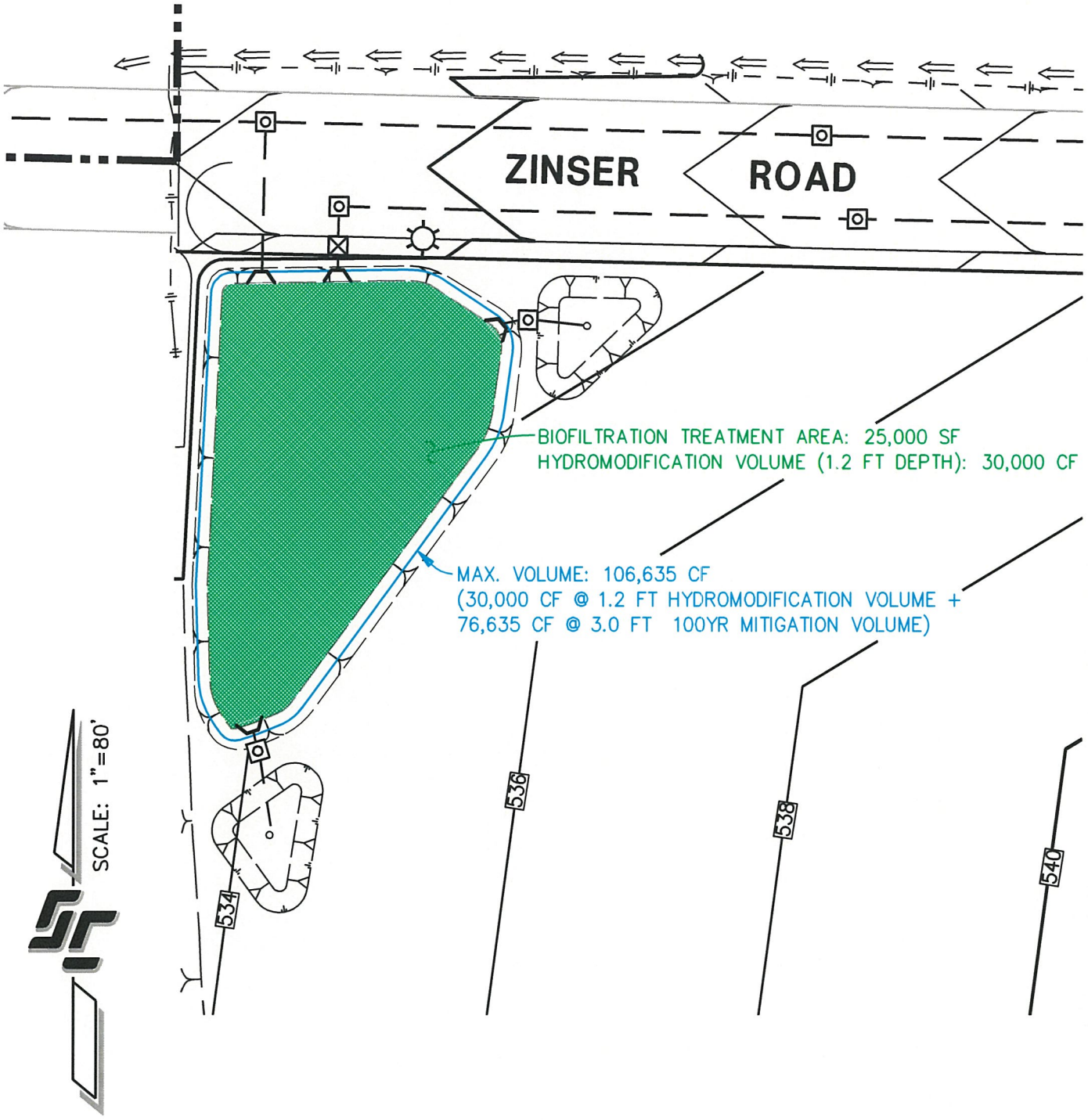
Drawdown (Hrs)	15.7

Dual Purpose Biofiltration Sizing Confirmation

Sunroad Otay 250 proposes to use dual purpose biofiltration/detention basins to provide pollutant control, hydromodification, and 100yr peak mitigation. It is anticipated that the basins will be constructed with a total ponded depth of 3-4 feet. The bottom of the basin will be constructed as a biofiltration planter. The facility will be designed to provide hydromodification storage within the biofiltration media and on the surface. Ponded depth for hydromodification purposes, storms up to a 10 year design storm, will be approximately 12"-18". A hydromodification control structure (surface maintainable), at the downstream end of the biofiltration underdrain system, will restrict low flows. Flows greater than those generated by a 10 year storm will enter the high flow outlet, a weir set above the hydromodification ponded depth. The high flow outlet will be sized for the peak design storm to ensure that post-project peak discharge rates do not exceed pre-project rates for storms up to a 100 year design storm. See figure below for a typical section of a dual purpose biofiltration facility. The calculations and exhibits within this section demonstrate that the basin sizes shown on the preliminary grading plan conservatively address both hydromodification and peak detention needs. Continuous simulation modeling will be used at final engineering to minimize treatment area and reduce ponded depths.

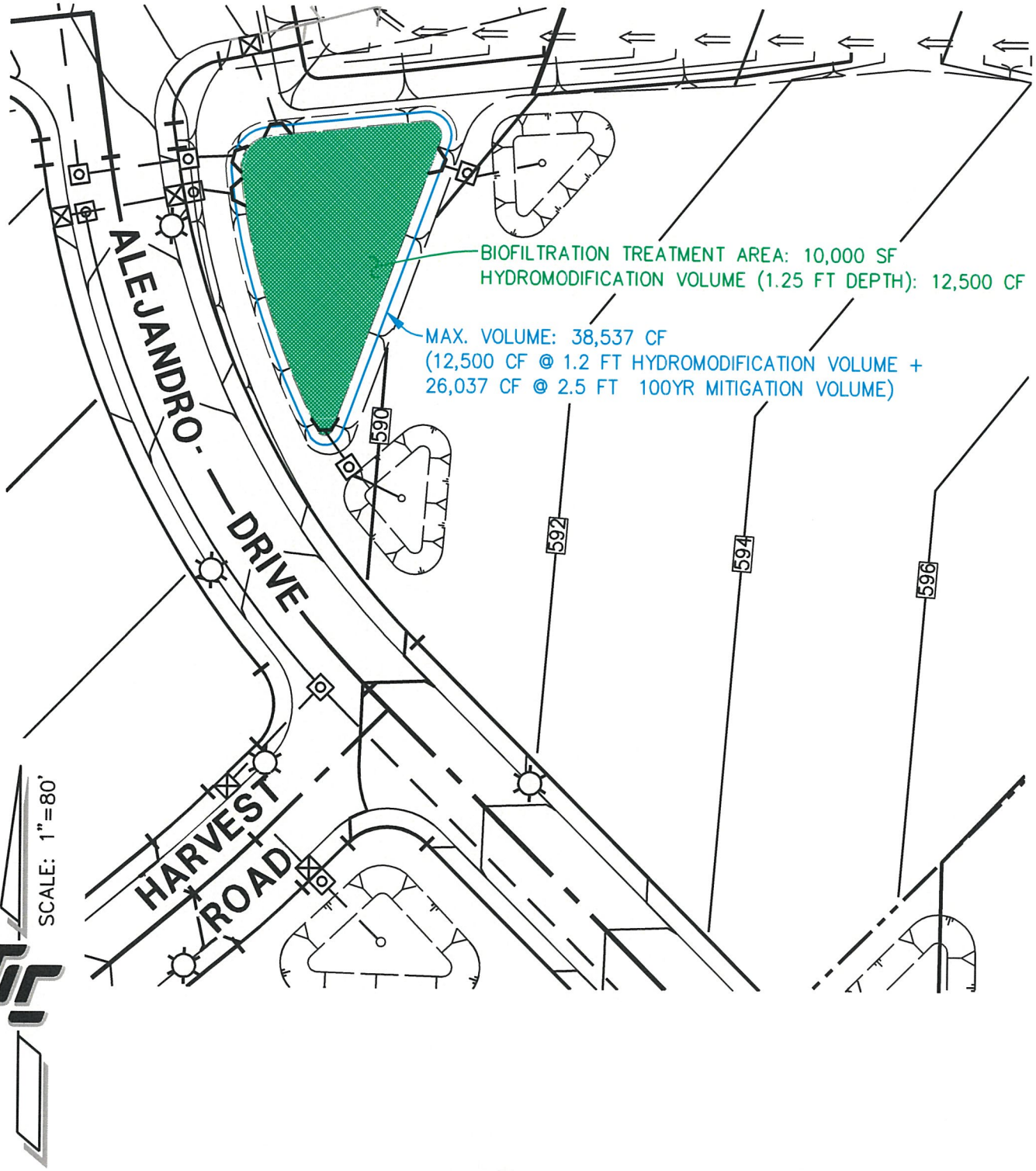


Typical Section of a Biofiltration/Detention Basin



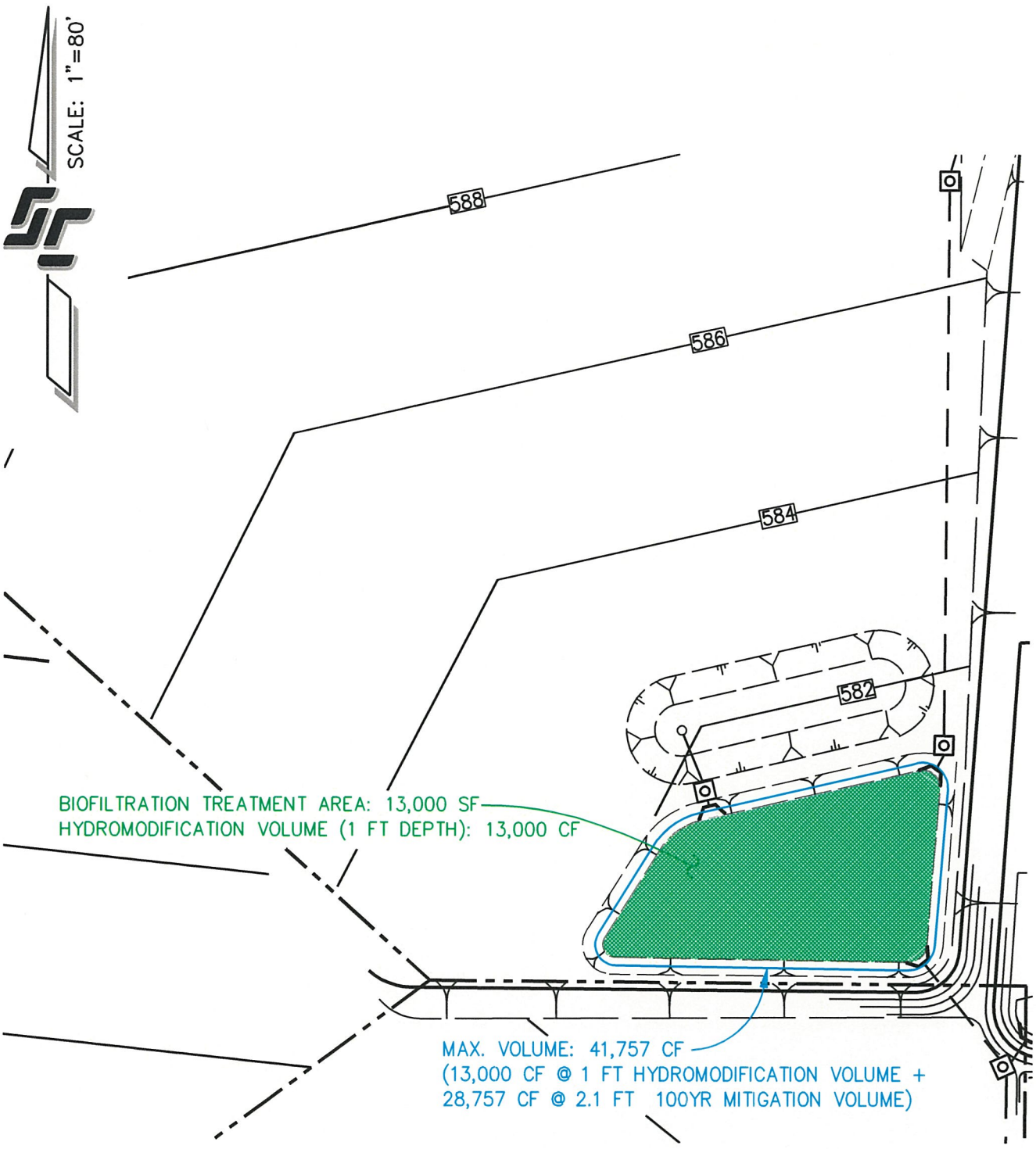
BF-1
DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'



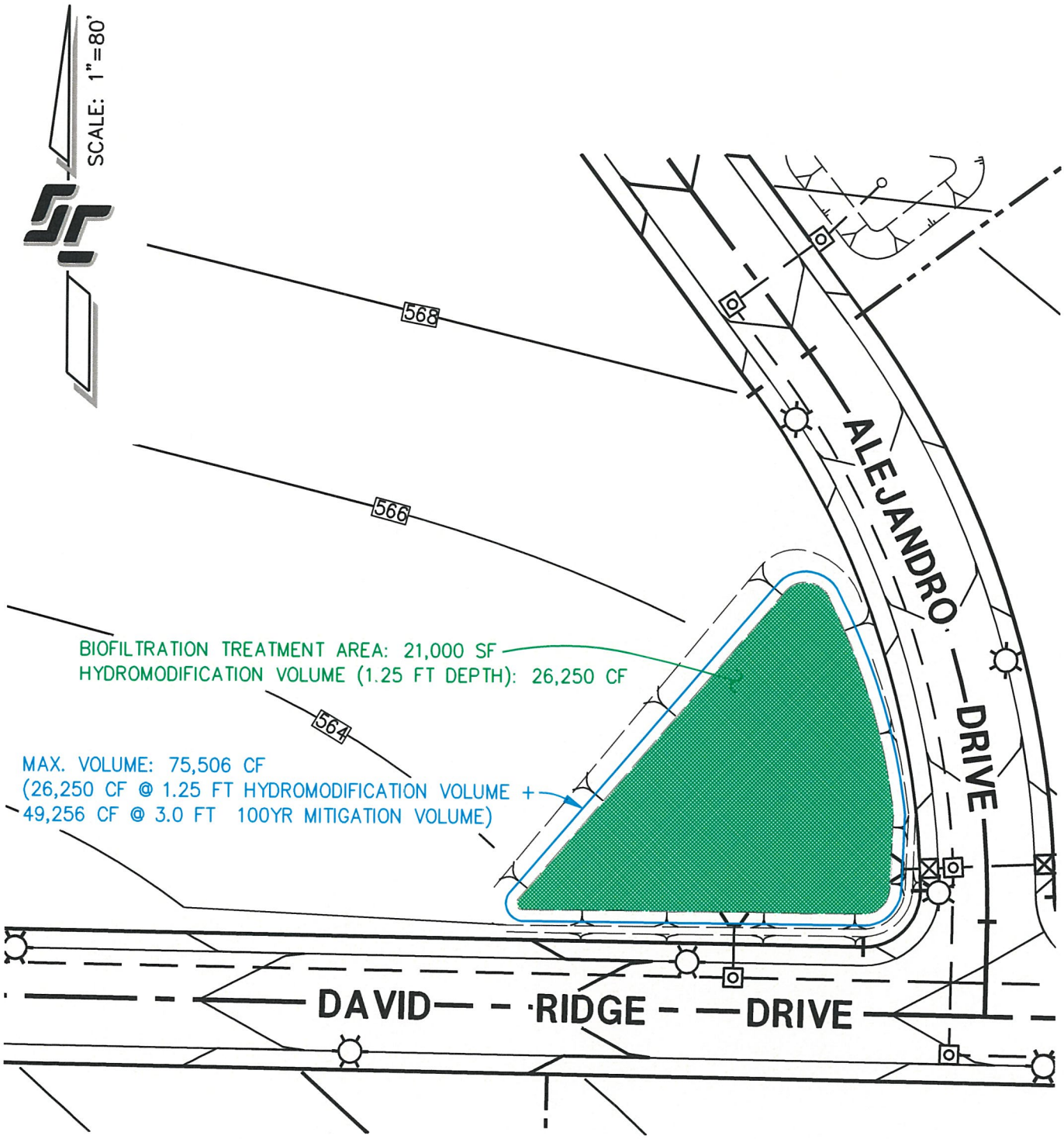
BF-2
DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'



BF-3
DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'



BF-4
DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'