

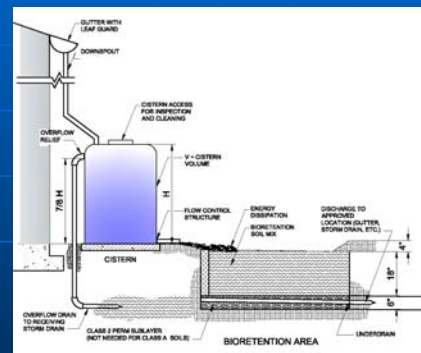
# San Diego HMP Overview

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Brown and Caldwell

San Diego Copermittees Meeting  
San Diego, California  
December 17, 2009

## Topics To Be Covered

- Literature Review
- Methodology and Technical Approach
- Project Standards and Requirements
- BMP Selection
- Monitoring Plan
- Appendices



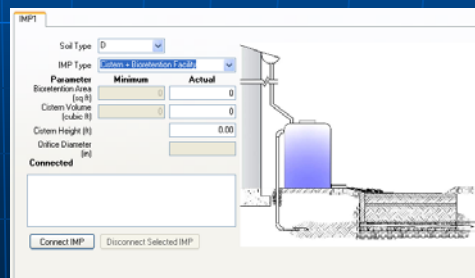
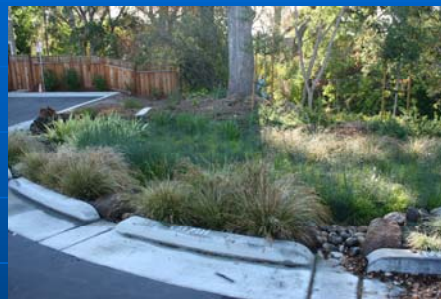
# Literature Review

- Flow Control Approach
- Continuous Simulation Modeling
- Rainfall Data
- Infiltration Losses
- Evapotranspiration Losses



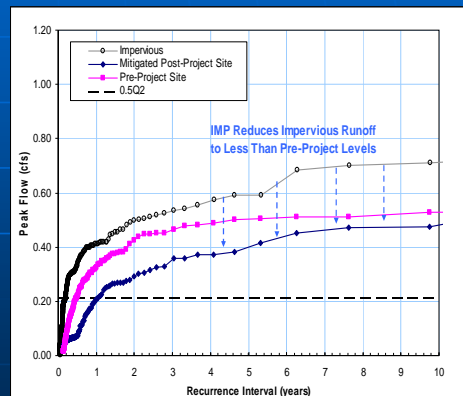
# Literature Review

- Stream stability
- Hydromodification management
- Flow frequency and flow duration statistics
- San Diego rainfall stations



# Methodology and Technical Approach

- Continuous simulation modeling with HSPF
- Match pre-project flows and durations in the geomorphically significant flow range
- Low flow threshold identification
- Critical flow calculator



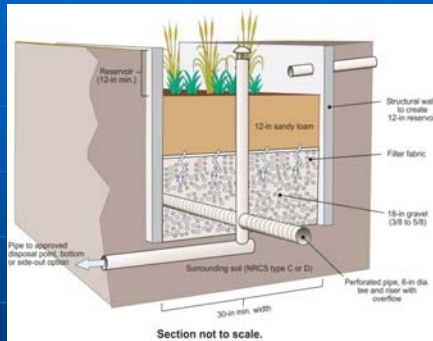
# Methodology and Technical Approach

- Categorization of streams
- Lateral and vertical susceptibility
- Final low flow limit determination
- Cumulative watershed impacts





# BMP Selection and Implementation



Integrated Management Practice Calculator [example.mxd]

File Tools Help

Project Information  
 All of the project information is required. Please fill in all of the information before editing the DMA's and BMP's.

Project Name: [Sacramento Estuary] Design Goal:  Treatment Plus Flow Control  
 Treatment Only

Location: [Sacramento, California] Treatment Drop:

APN: [ ] Mean Annual Precip: [20 in.]

Total Area: 200000 sq. ft.

Drainage Management Areas (DMA's)	Integrated Management Practices (BMP's)	Calculation/Usage(s)	Summary Report
Total	10.000	1.000	Area or Volume
Area	0.000	1.000	Area
Surface Volume	0.000	1.000	Volume
Subsurface Volume	0.000	1.000	Volume
			Maximum Underdrain Flow (cfs)
			Orifice Diameter (in.)

IMP Name: IMP3 (Soil Type: C)  
 IMP Type: Bioretention Facility  
 Soil Type: C

DMA Name	DMA Area (sq. ft.)	Project Surface Type	DMA Storm Factor	DMA Runoff Factor	IMP Sizing	Minimum Area or Volume	Proposed Area or Volume
DMA3	60,000	Concrete or Asphalt	1.00	0.50	IMP Sizing	7,500	7,500
DMA4	70,000	Lawn/Golf	0.95	0.50	IMP Sizing	8,750	8,750
Total					Area	16,250	16,250
					Surface Volume	7,640	7,640
					Subsurface Volume	0.00	0.00
					Maximum Underdrain Flow (cfs)	0.21	0.21
					Orifice Diameter (in.)	2.80	2.80

Total Area Calculated: 197,400 sq. ft.  
 Drainage Management Areas: 3600 sq. ft.  
 Integrated Management Practices: 200,000 sq. ft.  
 Total: 197,400 sq. ft.

# BMP Selection and Implementation

- Bioretention basins
- Flow-through planter boxes
- Dry wells
- Bioretention in combination with cistern
- Bioretention in combination with vault
- Self-retaining areas
- Extended detention basins

## BMP Selection and Implementation

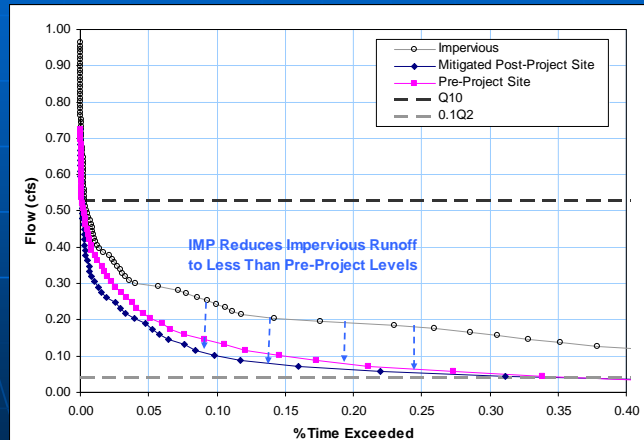
- Locate LID in areas of pervious (A or B) soils
- Surface reservoir must fill
- Drawdown time requirement
- Offsite area restrictions
- Dispersed facilities – minimize contributing drainage area



## Sizing Factor Development

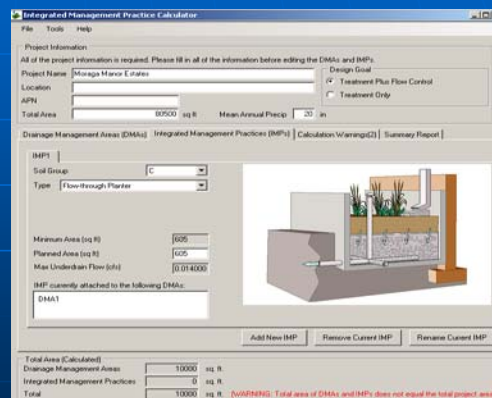
Treatment & Flow Control	NRCS Soil Group			
	A	B	C	D
Bioretention Facility				
A	0.07	0.11	0.06	0.05
V <sub>1</sub>	0.058	0.092	0.050	0.042
V <sub>2</sub>	N/A	N/A	0.066	0.055
Flow-through Planter				
A	N/A	N/A	0.06	0.05
V <sub>1</sub>	N/A	N/A	0.050	0.042
V <sub>2</sub>	N/A	N/A	0.066	0.055
Dry Well				
A	0.05	0.06	N/A	N/A
V	0.130	0.204	N/A	N/A
Cistern + bioretention facility				
A (bioretention facility)	0.04	0.04	0.04	0.04
V (cistern)	0.193	0.228	0.088	0.060

# Sizing Factor Development – Flow Duration Curves



# San Diego Sizing Calculator

- Detention basin calculator (low flow orifice and overflow weir)
- Pond configuration and outlet structure criteria
- Graphical output of peak flow frequency and flow duration response
- Automated rainfall gage selection
- Varying lower flow thresholds
- Ease of use for project applicants and plan reviewers



## Monitoring Plan

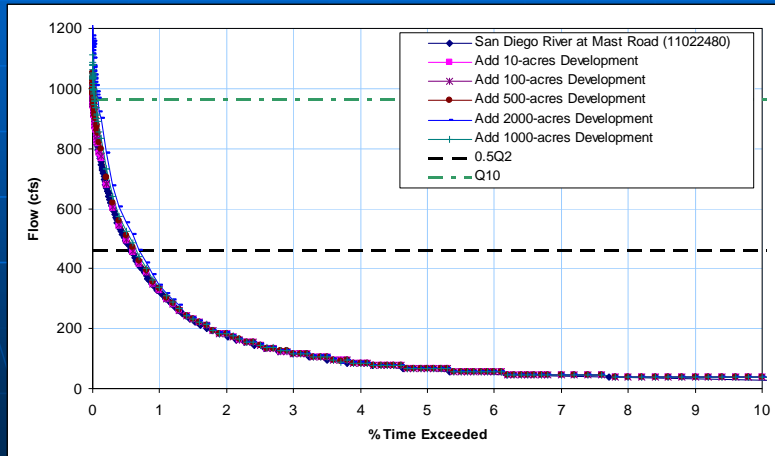
- Types of monitoring activities
- Identification of monitoring sites
- Pre-project monitoring
- Design of monitoring sites
- Post-project monitoring
- Evaluation of data
- Coordination with concurrent SCCWRP monitoring plan

## Appendix A Flow Threshold Analysis

- Presentation by Andy Collison of PWA
- Critical flow calculator
- Lower flow threshold determination
- Lower flow threshold groups (10%, 30% and 50% of  $Q_2$ )



## Appendix F HSPF Modeling Analysis



## Proposed Enhancements to San Diego County Calculator

- Infiltration Devices for Parking Lots (scaling factor that varies with depth / bottom area ratio)
- Infiltration strips and tree wells
- Treatment only option for vegetated swales
- Extended detention basin option
- Pervious pavement

# Questions?

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