Independent Expert Panel
Public Meeting for

Santa Susana Field Laboratory
Engineered Natural Treatment Systems

January 22, 2008

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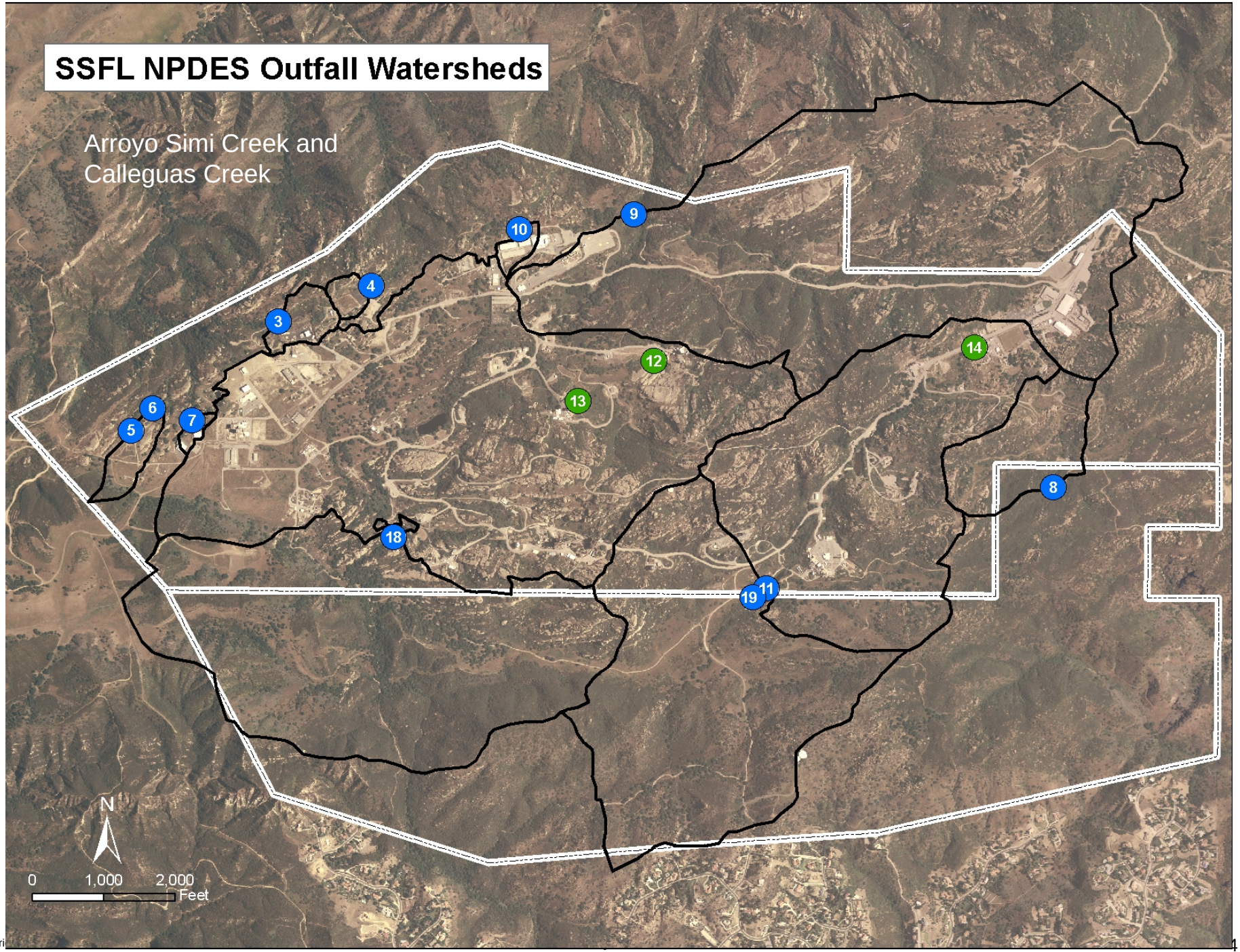
Presentation Overview

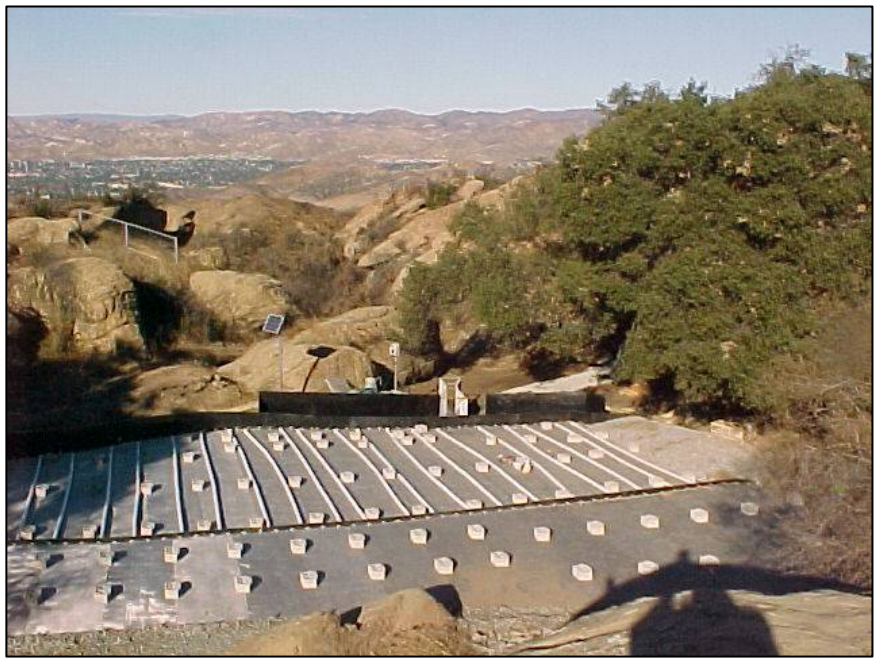
- Introduction
- Meeting Objective
- Overview of Stormwater Discharges at Santa Susana
- Independent Expert Panel
  - Selection Process
  - Introduction of Panel
- Public Input
- Schedule for Future Activities

Overview of Stormwater Discharges at Santa Susana

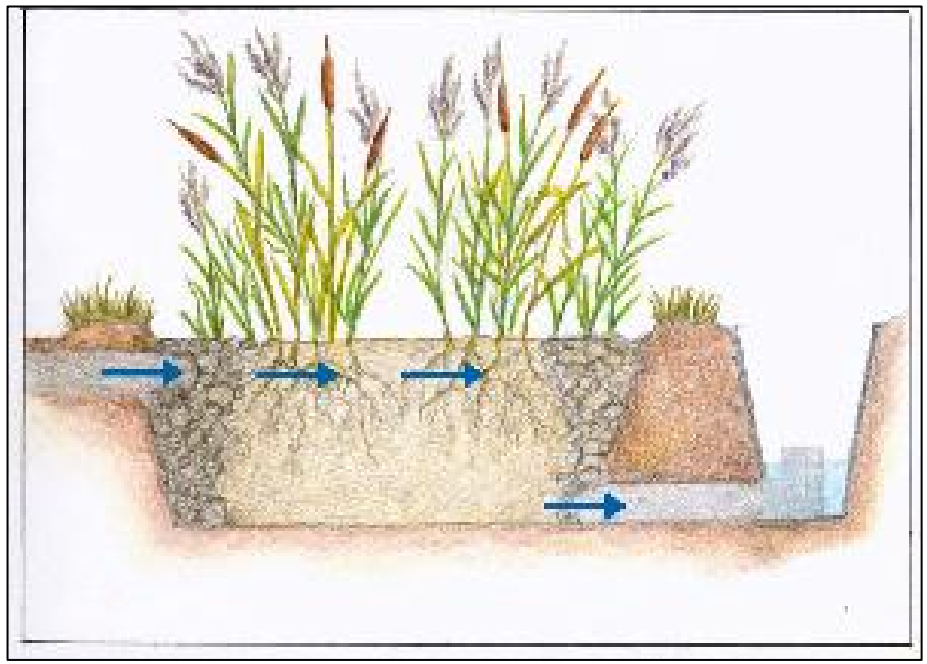

SSFL NPDES Outfall Watersheds
Arroyo Simi Creek and
Calleguas Creek
9
10
4
3
12
14
13
6
5
7
8
18
19
11
N
0
1,000
2,000
Feet

Preferred Approaches

Storm Water Filtration Systems



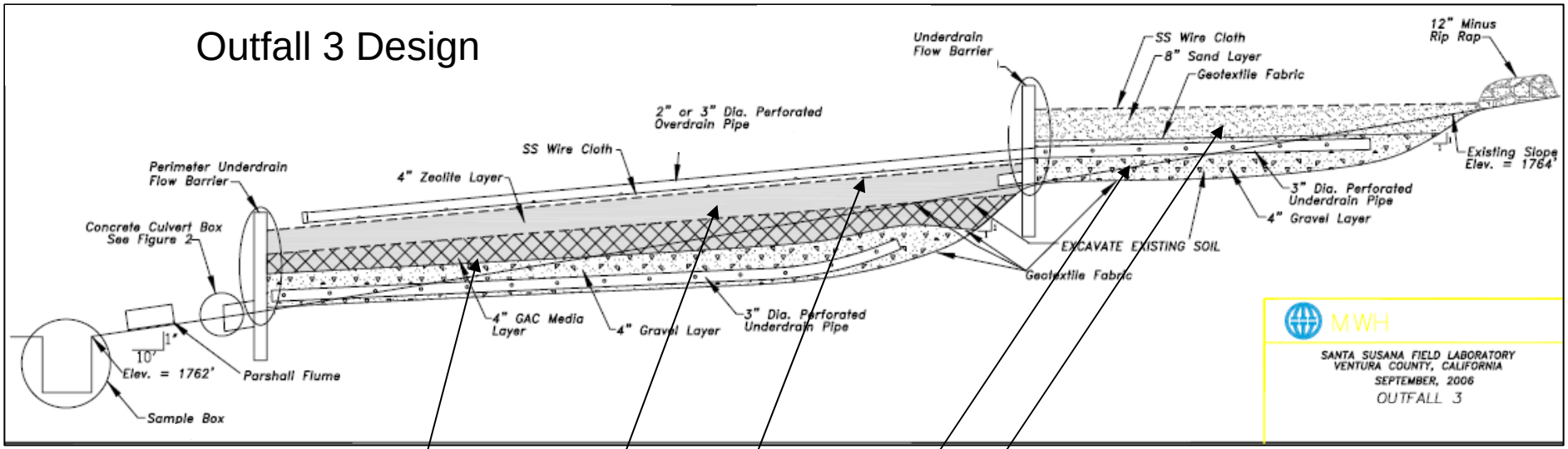
Engineered Natural Treatment Systems



Purpose of a Design Storm

- **Balances the need for treatment with impacts caused by treatment system**
- **Largest storms occur infrequently but require large containment and treatment systems**

Current Stormwater Filtration System



The Conceptual Design includes a multi-layer filter system consisting of the following components and purposes:

Sand – Removes Sediments

Underdrain – carries water to next filter

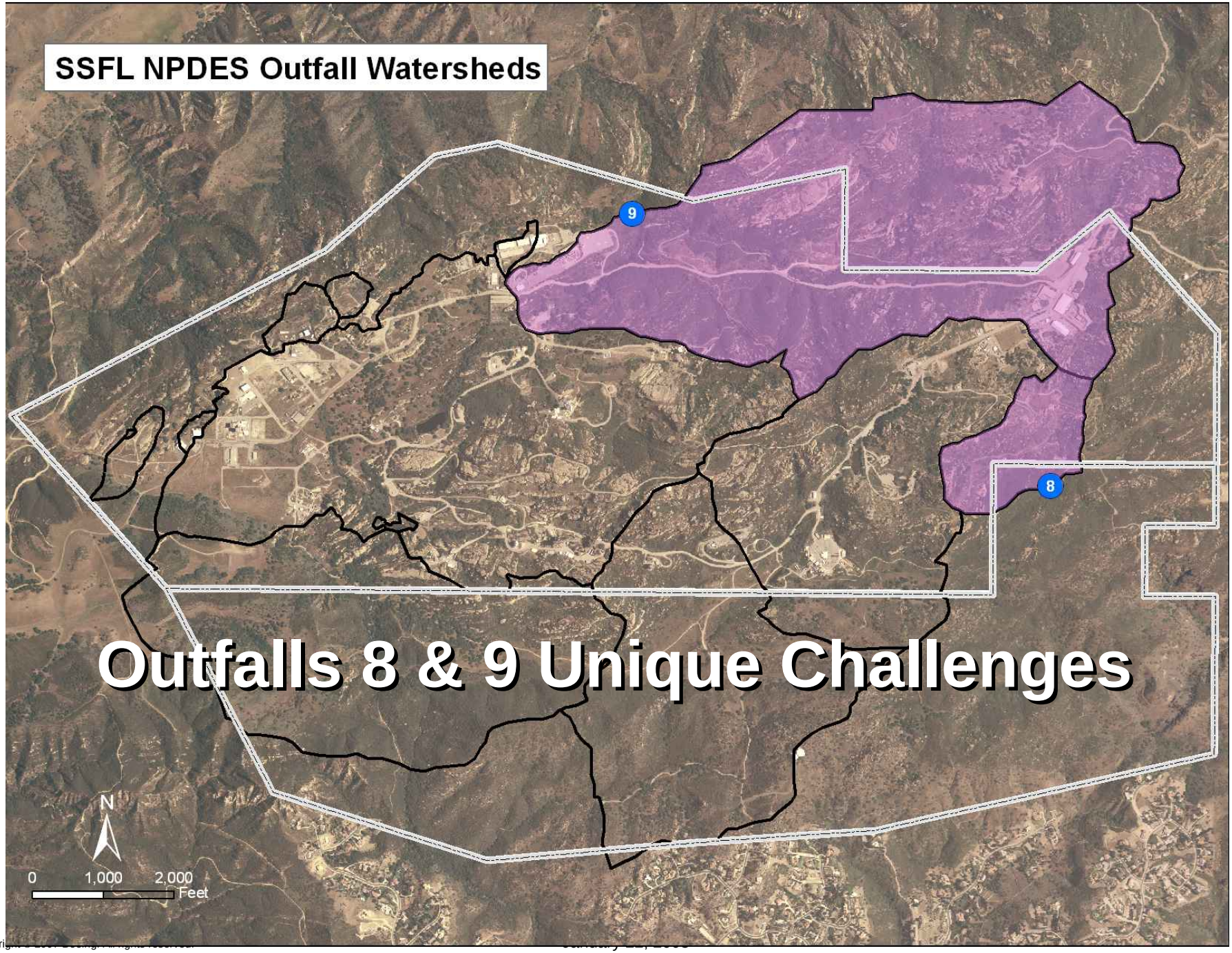
Overdrain – spreads flow evenly over filter

Zeolite – removes metals and ammonia

Activated Carbon – removes organics and mercury

Outfall 18 Stormwater Filtration System

Engineered Natural Treatment Systems (ENTS)



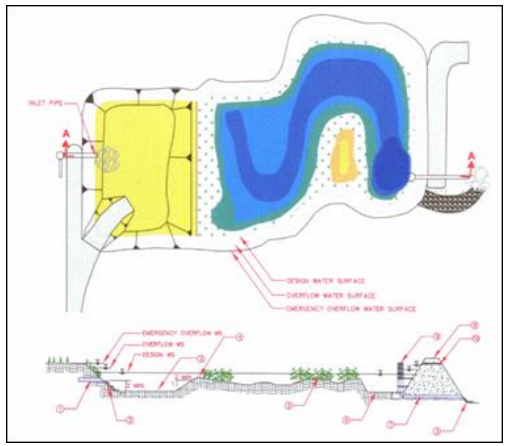
Outfalls 8 & 9 Unique Challenges

Proposed Approach - Engineered Natural Treatment Systems

Vegetated Dry Detention Basin

Goleta, Santa Barbara County

Conceptual Wetlands Design



Vegetated Swale

Turnpike Bio-Swale, Santa Barbara County

Engineered Natural Treatment Systems Achieve Optimum Performance

- Biofiltration, vegetated and wetland storm water treatment systems have some of the best reported effluent quality for most parameters measured
- Biofiltration and dry vegetated storm water treatment systems also show significant runoff volume reductions
- However, for a number of parameters the permit limits are sometimes below observed performance of Engineered Natural Treatment Systems

Addressing Toxics and Other Contaminants

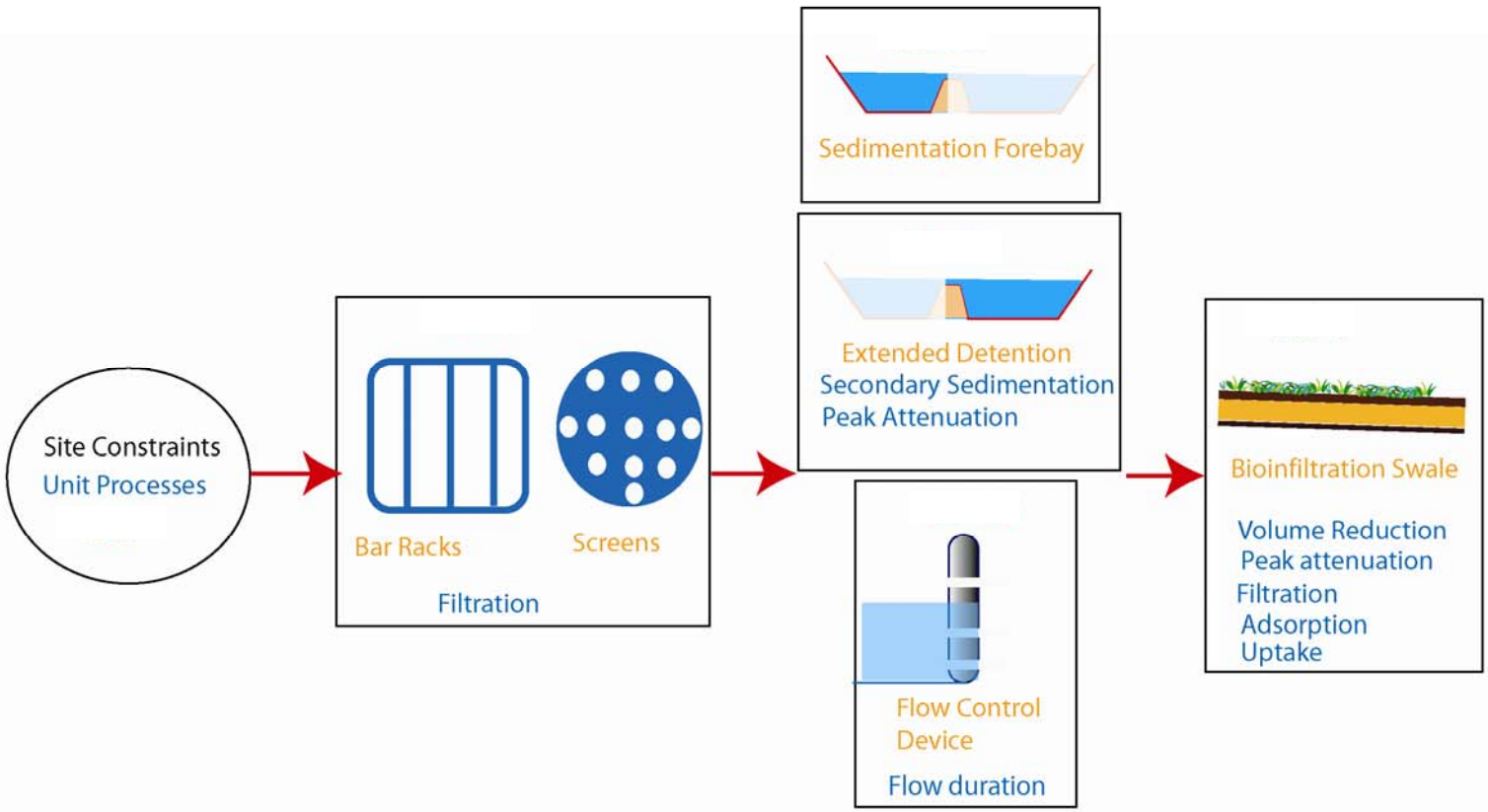
- **Hydrological Source Controls**
- **Pollutant Source Controls**
- **Hydrology/Hydraulic Controls**
- **Unit Processes:**
  - Physical
  - Biological
  - Chemical

Engineered Natural Treatment Systems – Developing the Treatment Train

1. **Minimize flow rates and/or volume of runoff from impervious areas (hydrological control and LID).**
2. **Remove bulk solids (pretreatment: > 5mm)**
3. **Remove settleable solids and liquid floatables (coarse primary treatment: >75 µm; fine primary treatment: >10 µm)**
4. **Remove suspended and colloidal solids (secondary treatment: > 0.1-25 µm)**
5. **Remove colloidal, dissolved and volatile constituents (tertiary treatment)**
6. **Control discharges (hydraulic controls)**

Example Desired Outcomes: Flow Management, Total Suspended Solids, Debris and Dissolved Copper

Treatment Train Example



Engineered Natural Treatment Systems – Advantages and Disadvantages

Vegetated Dry Detention Basin

Goleta, Santa Barbara

Advantages:

- More sustainable
- Less habitat impacts
- Potential for habitat creation
- Lower energy requirements
- Less green house gas emissions

Disadvantage:

- Potentially variable performance due to natural processes

Project Team

SSFL ENTS Design Team

Geosyntec Consultants
Principal in Charge
Eric Strecker, P.E.

Senior Technical Advisor
Susan Paulsen, P.E., FSI

The Boeing Company
Site Activities Coordination
Paul Costa
David Dassler

Regulatory Agencies
LARWQCB Staff
DTSC Staff

Geosyntec Consultants
Project Manager
Brandon Steets, P.E.

Design Storm and BMP EXPERT PANEL

Expert Panel Coordinator/Facilitator
Mark Schultheis, P.E.
Expert Panel Technical Advisor
Eric Strecker, P.E.

Public Outreach

ENTS Design
Jim Howell, P.E.
Nathan Jacobsen, P.E.

Hydrology
Chris Potter
Alex Sandu, P.E.

Geotechnical
Ron Johnson, P.E.
Greg Corcoran, P.E.

Remediation
Mark Schultheis, P.E.

Construction Oversight
David Oliver
Ryan Smith

Performance Monitoring/ Adaptive Management
Jim Howell, P.E., Donna Bodine, P.E.

Other Contractors

NEPA/CEQA/Permitting
Impact Sciences
Glenn Jaffe, MWH

Groundwater Hydrology
Rich Andrachek, MWH

Biological Surveys
Padre

Landscape Architect
[TBD]

Arborist
Pacific

Hydraulics/Pumping
Richard Haimann, MWH

Construction/Implementation
MP Environmental

WHO IS THE "PROJECT TEAM"?

Independent Expert Panel

Independent Expert Panel

- **RWQCB desired independent expert panel comprising technical experts in stormwater management and natural treatment systems**
- **Panel will recommend the design of low impact engineered natural treatment systems**
- **Key Aspects**
  - **Members selected based on their expertise.**
  - **RWQCB staff input into panel selection process.**
  - **Design and performance monitoring information compiled so that it may be shared with others on a regional and state basis.**
  - **Sharing of expert panel recommendations with the public.**

Independent Expert Panel Public Involvement

- **Public Participation Meetings**
- **Periodic reports to RWQCB on project status**
- **Periodic progress reports posted on the Internet**

Panel Selection Process

- 19 potential experts identified and contacted with interest letter
- Individuals, interest groups along with RWQCB staff were consulted regarding list members and selection of experts
- Experts were selected based upon their expertise areas (Water Quality, Natural Treatment Systems Experience, BMP performance and requirements/Stormwater Management, Habitat)

Panel Members

- Dr. Robert Gearheart
- Dr. Richard Horner
- Jonathan Jones, P.E.
- Dr. Michael Josselyn
- Dr. Robert Pitt
- Dr. Michael Stenstrom

Panel Members

- Dr. Robert Gearheart
  - Professor Emeritus, Humboldt State University
  - Water Quality Management
  - Water Treatment through Constructed Wetlands

Panel Members

- Dr. Richard Horner
  - Former Professor, University of Washington
  - ENTS Design/Performance
  - Aquatic Ecology

Panel Members

- Jonathan Jones, P.E.
  - CEO, Wright Water Engineers
  - Stormwater Quality and Quantity
  - Surface Water Hydrology
  - Watershed Modeling

Panel Members

- Dr. Michael Josselyn
  - President, Wetlands Research Associates
  - Wetlands Restoration/Mitigation
  - Wetlands Ecology

Panel Members

- Dr. Robert Pitt
  - Professor of Civil Engineering, University of Alabama
  - Urban Runoff Control
  - Stormwater and Erosion Control Practices
  - National Urban Runoff Program

Panel Members

- Dr. Michael Stenstrom
  - Professor of Civil Engineering, UCLA
  - Stormwater and Wastewater Treatment Systems
  - Modeling and Optimization

Public Input

We would like to hear your input!!

Project/Panel Timeline

- February: Panel reviews site data
- March: Public meeting: March 17
- April: Panel issues white paper regarding proposed conceptual designs
- May – September: Design/implementation status
- Public review of proposed ENTS
- June 2009: Initial performance monitoring results