**Santa Susana Field Laboratory**

**BMP Factsheet**

**Year Constructed**
2014

**Target Constituents**
Lead, dioxins, and total suspended solids (TSS)

**Drainage Area**
18.2 acres

**Treatment Processes**
Detention, settling, filtration, and biofiltration

<table>
<thead>
<tr>
<th>PROCESS</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detention Bioswales</td>
<td>The Outfall 009 watershed covers 535 acres</td>
</tr>
</tbody>
</table>

- Runoff is conveyed to the detention bioswales by a speed bump and rock swale or drains directly to the bioswale
- Stormwater is ponded on the surface to promote settling of pollutants
- Plants prevent scour, reduce maintenance, and filter and collect particulate-bound pollutants in the soil
- Captured runoff is stored in chambers below to detain flows and increase water treated by the biofilter

**SNAPSHOT**

- The BMP (location starred) treats runoff before it reaches Outfall 009
- The treated drainage area (shaded) includes both paved and unpaved surfaces

**PERFORMANCE**

19 paired samples have been collected to date. The number of samples exceeding the OF009 Permit Limit decreases from influent to effluent, or is generally unchanged when concentrations are already low.

- **Dioxins**
  - Influent: 100%
  - Effluent: 32%

- **Lead**
  - Influent: 53%
  - Effluent: 0%

**Treated water is either diverted to the biofilter or flows to the Northern Drainage and ultimately to Outfall 009**
Santa Susana Field Laboratory
BMP Factsheet

**Year Constructed**
2017

**Target Constituents**
Lead, dioxins, and total suspended solids (TSS)

**Drainage Area**
5.1 acres

**Treatment Processes**
Settling, sorption, ion exchange, and filtration

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**PROCESS**

Runoff from adjacent parking lot, roadway, and hillside are conveyed by existing gutters and culverts

**LOCATION**

The Outfall 009 watershed covers 535 acres

Similar design compared to other SSFL media filters (e.g., B1, CM9, etc.)

**SNAPSHOT**

Pretreatment Forebay

- Large particles settle out to reduce clogging of media filter and extend its lifetime
- Water flows by gravity through the gravel berms into the media filter

Media Filter

- Optimized engineered media blend removes pollutants through sorption, ion exchange, and filtration

Treated water flows to the Northern Drainage and ultimately to Outfall 009

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**PERFORMANCE**

This is a new installation so only 2 paired samples have been collected to date. The number of samples exceeding the OF009 Permit Limit decreases from influent to effluent, or is generally unchanged when concentrations are already low.

- **Dioxins**
  - Influent: 100%
  - Effluent: 50%

- **Lead**
  - Influent: 0%
  - Effluent: 0%
**Santa Susana Field Laboratory**

**BMP Factsheet**

<table>
<thead>
<tr>
<th>Year Constructed</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target Constituents</strong></td>
<td>Lead, dioxins, and total suspended solids (TSS)</td>
</tr>
<tr>
<td><strong>Drainage Area</strong></td>
<td>30 acres</td>
</tr>
<tr>
<td><strong>Treatment Processes</strong></td>
<td>Settling, filtration, sorption, ion exchange, and biofiltration</td>
</tr>
</tbody>
</table>

### PROCESS

<table>
<thead>
<tr>
<th>Cistern</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Runoff is stored until pumped to sedimentation basin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sedimentation Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Large particles settle out in basin</td>
</tr>
<tr>
<td>- Water flows by gravity to biofilter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Biofilter</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Plants prevent scour, reduce maintenance, and filter and collect particulate-bound pollutants in the media</td>
</tr>
<tr>
<td>- Optimized engineered media blend removes pollutants through sorption, ion exchange, and filtration</td>
</tr>
<tr>
<td>- Flow is controlled through the media to increase treatment</td>
</tr>
<tr>
<td>- Evapotranspiration reduces frequency and volume of runoff</td>
</tr>
</tbody>
</table>

- Treated water flows to the Northern Drainage and ultimately to Outfall 009

### LOCATION

- The Outfall 009 watershed covers 535 acres

- NPDES Permit compliance Outfall 009
  - The BMP (location starred) treats runoff before it reaches Outfall 009
  - The treated drainage area (shaded) includes both paved and unpaved surfaces

### PERFORMANCE

24 paired samples have been collected to date. The number of samples exceeding the OF009 Permit Limit decreases from influent to effluent, or is generally unchanged when concentrations are already low.

- **Dioxins**
  - Influent: 92% Above Permit Limit
  - Effluent: 8% Below Permit Limit

- **Lead**
  - Influent: 13%
  - Effluent: 4%
Santa Susana Field Laboratory
BMP Factsheet

**Year Constructed**
2009 (upgraded 2017)

**Target Constituents**
Lead, dioxins, and total suspended solids (TSS)

**Drainage Area**
CM-1: 43 acres; CM-3: 17 acres

**Treatment Processes**
Settling, sorption, ion exchange, and filtration

### PROCESS

CMs were opportunistically installed to fit within existing topography, resulting in some partial treatment even in large drainage areas.

**Pretreatment Forebay**
- Runoff is conveyed to the CMs from adjacent roadways and hillsides

**Advanced media mound**
- Stormwater is ponded upstream of the weir boards to promote settling of pollutants
- Water flows by gravity through the media mounds
- Optimized engineered media blend removes pollutants through sorption, ion exchange, and filtration

**SNAPSHOT**

Runoff from roadways/impervious surfaces

Runoff from upstream hillside

Treated water flows to the Northern Drainage and ultimately to Outfall 009

### LOCATION

The Outfall 009 watershed covers 535 acres

NPDES Permit compliance Outfall 009

- The BMPs (locations starred) treat runoff before it reaches Outfall 009
- The treated drainage areas (shaded) include both paved and unpaved surfaces
- There are 10 other CMs that capture runoff from other areas of the site

### PERFORMANCE

26 paired samples have been collected to date for CM-1 (shown below). The number of samples exceeding the OF009 Permit Limit decreases from influent to effluent, or is generally unchanged when concentrations are already low. Generally, historical results at CM-3 show a similar decrease.

- **Above Permit Limit**
- **Below Permit Limit**

For Dioxins:
- Influent: 65%
- Effluent: 50%

For Lead:
- Influent: 42%
- Effluent: 23%
Improving Stormwater Quality

Boeing uses two methods for treating stormwater at Santa Susana: active and passive. This water management strategy is a hybrid approach that combines state-of-the-art and natural processes.

**ACTIVE TREATMENT**

Boeing designed and constructed advanced stormwater treatment systems at Outfalls 011 and 018. These systems employ water treatment processes and chemicals similar to those used by city and county municipalities to make drinking water. The stormwater treatment process flow is outlined here.

**PROCESS FLOW**

1. Pond water pumped to treatment system.
2. ACTIFLO removes solids, metals and organic matter.
3. Water treated with sand vessels and bag filters.
4. Activated carbon removes dissolved organic compounds from water.
5. Solids transported offsite.
7. Treated water sent to outfall.

**TREATMENT BY THE NUMBERS**

- **2.5 million gallons** can be treated during rain events
- **2.5 swimming pools** of water per hour can be treated by Outfall 018 system