Best Management Practices

Storm Water Management

Compliance and Watershed Stewardship at Stanford
Water Planning & Stewardship (WP&S) Team

Manages Compliance for:

- Wastewater
- Drinking Water
- Stormwater
- Water Efficiency

Team Members:

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More info:

suwater.stanford.edu/construction-compliance-swppp
Outline

- Driver and Regulation Overview
- Construction General Permit
  - When is it required?
  - What is the process?
  - What does a typical project need?
  - SMARTS Online Access
- Pollution Prevention BMPs
- Design Considerations
  - Storm drain labels
  - Loading Docks
  - Trash Enclosures
Training Purpose

- Protect Bay, creeks, groundwater, and lake water from pollution
- Ensure compliance with stormwater regulations and protect Stanford from regulatory enforcement
- Develop Best Management Practices (BMPs) for common tasks
# Stormwater Regulations and Requirements

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Federal</strong></td>
<td>Clean Water Act, US EPA</td>
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<tr>
<td><strong>State of California</strong></td>
<td>Stormwater permits, NPDES</td>
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<tr>
<td><strong>Santa Clara County</strong></td>
<td>General Use Permit</td>
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<td><strong>City of Palo Alto</strong></td>
<td>Sewer Use Ordinance</td>
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<tr>
<td><strong>Stanford University</strong></td>
<td>Environmental Special Conditions (contractual agreement between all contractors and Stanford)</td>
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</tbody>
</table>

**Enforcement and Fines**
- Santa Clara County
- State of California
- Publicly available
Construction Site Stormwater Regulations

US EPA - Clean Water Act
NPDES Permit Program

State Water Resources Control Board

SF Bay Regional Water Quality Control Board

Construction General Permit
Municipal Regional Permit
Only Rain Down the Storm Drain
Construction General Permit

CONSTRUCTION SITE POLLUTION PREVENTION
Construction Site Regulations Timeline

- **1972**: Clean Water Act passed
- **1987**: Clean Water Act amended to address stormwater
- **1990**: EPA publishes regulations for construction sites and storm sewers
- **1999**: CA SWRCB creates Construction General Permit
- **2009**: SWRCB updates Construction General Permit, SWRCB Region 2 creates Municipal Regional Permit
When Is It Required?

The Construction General Permit applies to:

- Construction or demolition activity disturbing ≥1 acre

- Includes Linear Underground/Overhead Projects (LUPs) ≥1 acre
  - Such as water and electrical line installation

Sites <5 acres with low rainfall erosivity risk (i.e. minimal overlap with the rainy season) may qualify for a waiver. Visit lew.epa.gov to check.
## What Is The Process?

1. **Construction team emails project info to WP&S at least one month before construction**

2. **WP&S starts permit application (NOI) in the SMARTS system and links the construction site’s QSD**

3. **QSD completes data input, risk assessment, and SWPPP**

4. **WP&S reviews content and submits complete NOIs to the state**

5. **Stanford project manager pays permit fee**

6. **SWRCB issues Waste Discharger’s ID (WDID) and construction activities may begin**
Discharge Prohibitions

- Do not discharge trash, sediment, or debris
- Report and properly handle contaminated soil
- Stormwater discharges are only allowed if permit provisions are followed
- Non-stormwater discharges are only allowed if they are not feasible to eliminate and comply with the permit provisions
- Follow any other regulations, e.g. the Region 2 Basin Plan
What Does A Typical Project Need?

- Stormwater Pollution Prevention Plan (SWPPP)
- Pollution Control Best Management Practices (BMPs)
- Rain Event Action Plan (REAP)
- Inspections and Sampling
- Reporting
- Close-out
Risk Assessment

Determines level of protection required by the CGP

<table>
<thead>
<tr>
<th>Sediment Risk</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Level 1</td>
<td>Level 2</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Level 2</td>
<td>Level 3</td>
<td></td>
</tr>
</tbody>
</table>

Stanford campus is High due to sediment issues and sensitive species in local creeks.

Depends on soil type, slope, and construction dates.

*Construction dates that avoid the rainy season may allow small sites (<5 acres) to obtain an erosivity waiver. Go to [lew.epa.gov](http://lew.epa.gov) to check if you qualify*
Stormwater Pollution Prevention Plan (SWPPP)

SWPPP must include:

▪ Inventory of pollutants, including sediment and non-visible pollutants
▪ ID and management of non-stormwater discharges
▪ BMPs for stormwater and non-stormwater discharges that achieve BCT / BAT standard, run-on control, and final stabilization

SWPPP must be created by QSD (Qualified SWPPP Developer)

▪ QSPs (Qualified SWPPP Practitioners) help to implement but cannot be preparers of SWPPPs
Minimum Best Management Practices (BMPs)

BMP categories:
1. Erosion control
2. Sediment control
3. Good housekeeping
4. Non-stormwater management
5. Run-on / runoff control
6. Active treatment systems (if needed)
Ongoing Visual Inspections

- Quarterly non-stormwater discharge
- Weekly BMP inspections
- Monthly wet season inspections by WP&S
- *Corrective actions must begin 72 hrs after identifying deficiencies*
Non-Visible Pollutant Monitoring

Required if there is evidence of contact between runoff and pollutants

Examples of non-visible pollutants:

- Basic materials: Concrete, cement, gypsum, wash waters
- Toxins: herbicides (glyphosate), pesticides (diazinon, chlorpyrifos)
- Combustion byproducts: flyash
- Fertilizer
- Lubricant: molybdenum
- Fecal contamination: portable toilets
Rain Events

Visual Inspections
- Daily during storms, plus pre- and post-storm inspections

Sampling
- 3 samples / day during storms. If numeric action levels (NALs) below are exceeded, trigger corrective actions
  - pH: 6.5 – 8.5
  - Turbidity: <250 NTU
- Also record rain gauge readings

Rain Event Action Plan (REAP)
- Develop within 48 hrs before likely precipitation events
- Ensure BMPs and emergency procedures are in place
- Must include contact information for site stormwater manager, sampling agent, and BMP provider
Reporting

Annual report

- Filled out by construction team on SMARTS by Sep 1st each year for the period of July 1st to June 30th, or prior to the NOT
- Includes documentation of inspections, sampling results, and corrective actions
- Keep records of inspections for 3 years
- WP&S review prior to submittal

NAL exceedances

- Sites must submit storm event sampling results for NAL exceedances
- To WP&S ASAP; due to be submitted in SMARTS within 10 days
Close-out

- Construction team files a notice of termination (NOT) through SMARTS
- Remove all hazardous items from site
- Site must achieve "final stabilization" and that sediment risk is no greater than pre-construction state
- Prove site is complete using photos, RUSLE or RUSLE2 methods, or analysis results. Options:
  - 70% cover method
  - RUSLE / RUSLE 2 method
  - Custom method to demonstrate final stabilization
- Deliver SWPPP binder to WP&S team
- WP&S will review and submit NOT
- Inspections and sampling are required to continue until the NOT is approved!
SMARTS Online Access

https://smarts.waterboards.ca.gov
Receiving Water Sampling

- Receiving water sampling during storms
  - For Risk Level 3 / LUP Type 3 only, if monitoring trigger (pH = 6.0-9.0, turbidity = 500 NTU) or NELs are exceeded
  - 5-year, 24 hr storm exemption
- Bioassessment required for Risk Level 3 / LUP Type 3 sites larger than 30 acres
Best Management Practices (BMPs)

CONSTRUCTION SITE POLLUTION PREVENTION
Best Management Practices (BMPs)

**Goal:** Prevent pollutants from being blown or washed off site
- Sediment
- Concrete washout
- Paint
- Oil and grease
- Litter
- Waste
- Construction materials

**BMP categories:**
1. Erosion control (first line of defense)
2. Sediment control (second line of defense)
3. Good housekeeping
4. Non-stormwater management
5. Run-on / runoff control
6. Active treatment systems (if needed)
BMPs:  
1. Erosion Control

First line of defense – keeping soil in place
- Preserve existing vegetation
- Fit development to land contours
- Apply soil binders / stabilizers, mulch
- Hydroseed
- Fiber rolls and blankets – fit closely to ground and staked in

Applying mulch over exposed soil
BMPs:
2. Sediment Control

Second line of defense: trapping sediment that has eroded

**Perimeter control**

<table>
<thead>
<tr>
<th>Fiber rolls</th>
<th>Compost / mulch socks</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Staked into soil" /></td>
<td><img src="image2.jpg" alt="Not in contact with pavement" /></td>
</tr>
<tr>
<td><img src="image3.jpg" alt="Not in contact with pavement" /></td>
<td><img src="image4.jpg" alt="Heavy, does not need weights to ensure contact with pavement" /></td>
</tr>
</tbody>
</table>

- **Fiber rolls**
  - Staked into soil
  - Not in contact with pavement
  - Weigh down with gravel bags when using on pavement

- **Compost / mulch socks**
  - Heavy, does not need weights to ensure contact with pavement

Credit: 2020-02-05 SCVURPPP Presentation
BMPs:
2. Sediment Control

Second line of defense: trapping sediment that has eroded

**Inlet protection**

- ✔️ Gravel bags
- ✔️ Protect or plug inlets within site
- ❌ Gravel bags broken
- ✔️ Check dams

Credit: 2020-02-05
SCVURPPP Presentation
BMPs:
2. Sediment Control

Second line of defense: trapping and settling sediment that has eroded

Entrance stabilization

✅ Rumble plates and rock keep sediment on site

⚠️ Sweep streets if sediment is tracked out
BMPs: 3. Good Housekeeping

Preventing contact between pollutants and wind / rain

**Portable toilet**
- ✔️ In secondary containment
- ❌ But placed next to storm drain

**Stockpiles**
- ✔️ Covered and protected by berm when not actively used
BMPs:
3. Good Housekeeping

Preventing contact between pollutants and wind / rain

Materials missing covers, no secondary containment

Sign and location to dispose cigarettes

Concrete washout is contained
BMPs:
4. Non-stormwater Controls

- Activities that could result in non-stormwater discharges:
  - Dewatering
  - Irrigation
  - Vehicle / equipment use, fueling, and cleaning
  - Concrete curing and finishing
  - Paving and grinding operations

Water from dewatering is pumped to lake water. Backup discharge to storm drain.
BMPs:
5. Run-on / Runoff Control

- Run-on
  - Prevent runoff from entering site from elsewhere
  - May bring pollutants or overwhelm your BMPs

- Runoff
  - Ensure that runoff does not cause erosion or flooding downstream
BMPs:
6. Active Treatment Systems

- Specialized system for settling / filtering out sediment
  - Addition of chemicals for coagulation / flocculation
- Used for specific circumstances
- Has stringent requirements
  - Sampling, monitoring
  - Numeric effluent limits for turbidity
  - Spill prevention plan
  - Operator training
Your Work and Best Management Practices Development

How can we help you?

Agree on Goals:
• Allow you to get your work done
• Prevent spills and properly respond when they occur
• Protect Creeks/Streams/Groundwater
• Protect Stanford and you from regulatory enforcement or lawsuits
FDG

DOCUMENTS AND OTHER FREQUENT DESIGN CONSIDERATIONS
I. PURPOSE OF THESE SPECIAL CONDITIONS
   A. The purpose of these Special Conditions and the requirements herein is to prevent the pollution of Stanford’s storm drainage, sanitary sewer systems, and the environment from construction projects and operations & maintenance activities. Following these requirements will facilitate compliance with environmental regulations to reduce discharges of materials and wastes including metal debris, detergents, pesticides, grease, lubricants, and other contaminants, and reducing erosion and sedimentation. Storm drainage systems discharge surface water runoff directly to creeks and the San Francisco Bay without treatment. Wastewater treatment plants are sensitive to hazardous chemicals, heavy metals loading, and grease. The Contractor shall be liable for any noncompliance or fines related to disregarding applicable laws and the requirements in these Special Conditions.

   B. These requirements are based on the following permits and ordinances applicable to Stanford University from our local and regional permitting agencies (Santa Clara County, City of Palo Alto):
      4. The City of Palo Alto Municipal Code – Sewer Use Ordinance (Stanford discharges wastewater to the City of Palo Alto Regional Water Quality Control Plant and maintains a permit to discharge wastewater). http://www.cityofpaloalto.org/gov/depts/clk/municode.asp (Title 16, Section 09)

II. GENERAL REQUIREMENTS
   A. Non-hazardous Material / Waste Management
      1. Designated Area
         Propose designated areas of the project site, for approval by Stanford’s Project Manager, suitable for material delivery, storage, and waste collection that, to the maximum extent practicable, are near project entrances and away from catch basins, gutters, drainage courses, and creeks.
# Stanford University

## Procedure for Planned Discharges of Rainwater or Wastewater

### Procedure Details

- **Name of Requester/Discharger:**
- **Phone Number for Requester/Discharger:**
- **Project Name/Number or Utility System:**
- **Date Discharge Request Submitted:**
- **Date(s) of Expected Discharge:**

### Step 1: Identify Discharge Type (Page 2)

Identify your discharge type from the list on page 2. Some discharges may have multiple discharge options based on presence or absence of contaminants in the water.

### Step 2: Identify Discharge Options

Review discharge option from list on page 2. Check the box of the preferred discharge option. Identify specific location or manhole number. Fill in discharge details.

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape Location</td>
<td>Sanitary Sewer Manhole #</td>
<td>Storm Drain Manhole #</td>
</tr>
</tbody>
</table>

### Discharge Details

- Type of liquid to be discharged:
- Current location of liquid to be discharged:
- Purpose of discharge:
- Approximate volume:
- Expected duration of discharge:
- Maximum flow rate:

### Step 3: Comply with Discharge Requirements

Follow all discharge requirements associated with your discharge type from the list on the next page. Return this form to the Stanford Water Department or Environmental Quality Group for discharge approval.

### Step 4: Receive Approval for Discharge

Once form has been approved, you may discharge per the requirements specified above.

**Approved Location:**

### For Internal Use Only

- Date discharge approved:
- Name of approver:
- Date of field inspection (if necessary)
- MSDS reviewed?
- Meets sewer discharge requirements?

File copy of discharge procedure at: S:\Groups\Utilities\DischargeProcedures

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**Planned Discharge Form**
Storm Drain Labels
Trash Enclosures

- Provide trap primer with air gap (Zurn Z1022-XL or equal), min 12" above flood level, connect to water source and SS drain line.
- Provide secondary pedestrian access where feasible.
- Post beam and fence frame, see detail MA-17-52.
- Concrete cube inside of posts, see detail MA-17-02.
- Drain with hard pipe to sanitary sewer. Connection to grease control device may be required. See note.
- Minimum 4" thick concrete pad with #4 rebar @ 18" O.C. both ways.
- Swing gate set back from drive aisle in vehicular areas.
- Vehicular concrete apron size TBD by service provider based on conditions. Use dark gray integral color concrete (Davis "Graphite", CAC) where adjacent to asphalt.

**Front Elevation**
- Gate infill panels: 12 gauge perforated steel, 3/8" diameter holes, 9/10" on center.
- Gate doors: 3/4" tube steel frame, heavy duty butt hinges, pull loops, hasp, and cane bolt. Bottom of doors to be 2" min. clear of pavement.

**Notes:**
- Corrugated metal roofing.
- Steel tube post and beam.
- Fence frame with 1" chain link fabric infill.

**Side Elevation**
- See detail MA-17-02.
Loading Docks
WP&S and EH&S

- Report spills over 1 quart to EH&S – 650-725-9999
- EH&S is available to respond to spills
- EH&S and WP&S report as required to regulators
- WP&S coordinates inspections and response from regulators
  - This training
  - Storm drain and bioretention inspections
  - Corrective action coordination and reporting
Resources and Links

- Official Construction General Permit
  - waterboards.ca.gov/water_issues/programs/stormwater/construction.html
- WP&S Construction Compliance Website:
  - suwater.stanford.edu/construction-compliance-swppp
- SCVURPPP Construction Site Inspector Workshop
  - scvurppp.org/2020/02/05/construction-site-stormwater-inspector-workshop-february-5-and-13/
- CASQA Construction BMP Handbook (subscription required):
  - casqa.org/resources/bmp-handbooks
- Caltrans Construction BMP Fact Sheets:
  - dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/construction-site-bmp-fact-sheets
- US EPA Concrete Washout BMP Fact Sheet:
  - epa.gov/npdes/pubs/concretewashout.pdf

Image credits: SCVURPPP’s construction site inspector workshop or as labeled. Unlabeled images are by WP&S staff.
Incident Reporting & Response

911 (or 9-911 from an office desk phone)
  650-725-9999*
  650-723-2281*

*EH&S and WP&S report to agencies if needed