

University of California, Irvine

Storm Water Management Plan

March, 2003

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1.0 Introduction

1.01 Regulatory Background

This Storm Water Management Plan (SWMP) is required under Federal Environmental Protection Agency Phase II storm water regulations, promulgated under the Clean Water Act. These regulations require UC Irvine to apply for a National Pollution Discharge Elimination System (NPDES) permit by March 2003, and develop a SWMP.

Polluted storm water runoff is often transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local waterways (rivers, streams, lakes, and bays) without treatment. EPA's Storm Water Phase II Rule establishes an MS4 storm water management program that is intended to improve the nation's waterways by reducing the quantity of pollutants that storm water picks up and carries into storm sewer systems during storm events. Common pollutants include oil and grease from roadways and parking lots, pesticides from lawns, sediment from construction sites, and carelessly discarded trash, such as cigarette butts, paper wrappers and plastic bottles. These pollutants are deposited into nearby waterways, discouraging recreational use of the resource, and interfering with the habitat for fish, other aquatic organisms, and wildlife.

In 1990, EPA promulgated rules establishing Phase I of the NPDES storm water program. The Phase I program for MS4s requires operators of "medium" and "large" MS4s, that is, those that generally serve populations of 100,000 or greater, to implement a storm water management program as a means to control polluted discharges from these MS4s. The Storm Water Phase II Rule extends coverage of the NPDES storm water program to certain "small" MS4s but takes a slightly different approach to how the storm water management program is developed and implemented.

NPDES Phase II regulations require operators of small MS4s to develop a program to:

- Reduce the discharge of pollutants to the "maximum extent practicable" (MEP);
- Protect water quality; and
- Satisfy the appropriate water quality requirements of the Clean Water act and Regional Water Quality Control Board Basin Plan

1.02 Purpose of the SWMP

This document has been developed to comply with Environmental Protection Agency Phase II NPDES requirements promulgated under the Clean Water Act.

The purpose of the SWMP is: (1) to identify pollutant sources potentially affecting the quality and quantity of storm water discharges; (2) to provide Best Management Practices (BMPs) for municipal and small construction activities implemented by UC Irvine staff and contractors and; (3) provide measurable goals for the implementation of this SWMP to reduce the discharge of the identified pollutants into the storm drain system and associated water ways.

This SWMP covers the UC Irvine Campus, located in Irvine, California. The UCI Medical Center in Orange, CA is addressed in a separate plan.

1.03 Storm Water Advisory Council

The SWMP was developed with input from representatives from various campus departments with a potential to impact surface water quality. Participants ranged from departmental directors to operations personnel.

UC Irvine Departments

- Environmental Health & Safety
- Facilities Management – Central Plant, Trades, Grounds, Pest Management
- Campus and Environmental Planning – Physical and Environmental Planning
- Design and Construction -- Project Management, Inspection Services
- Parking & Transportation
- Housing Administrative Services
- Campus Asset Management – Real Estate, interaction with on-campus leasees

2.0 Site Information

2.01 Facility Description

The University of California (UC), Irvine is one of ten UC campuses governed by the Regents of the University of California and is an internationally recognized public teaching and research institution.

The UC Irvine campus is situated in Irvine, California, in central Orange County. The facility is generally bounded by Jamboree Road to the north, Campus Drive to the northeast, Culver Drive to the east, and State Route 73 to the west, and Bonita Canyon Road to the south.

This SWMP covers facilities on the campus. Specific facility information is attached in Appendix 1.

The current 2002-2003 population, which includes students, faculty, staff, visiting scholars, researchers, and visitors, is approximately 25,000. The draft projection for 2010 to 2011 is 27,500 and the draft projection for 2020-2021 is 29,000.*

*Source: Capital Planning Group, Draft Estimated Space Demand, January 2003

2.02 Facility Operation

UC Irvine employs operations, maintenance, custodial, and grounds staff for day-to-day operations. This includes building maintenance (cleaning, painting, repairs), daily cleaning of common buildings, grounds maintenance, small construction jobs, and various repair and maintenance activities. Facilities Management staff and outside contractors perform electrical, plumbing, roofing, asphalt, exterior building painting, sewer line cleaning, utility repairs, and janitorial duties.

3.0 Description of Potential Sources of Pollution

Potential Pollutant Activity or Sources List

In order to aid in the identification of pollutant sources, the committee that developed this SWMP utilized knowledge on the day-to-day operations to identify activities and sources of potential pollutants of concern.

Best Management Practices (BMP) to address the pollutant sources and activities described below will be developed as described in the Minimum Control Measures (Section 4.03).

Activity/Source	Pollutants of Concern
Building maintenance (washing, graffiti abatement)	Wash water, paint chips, cleaning products, dirt and sediment
Chemical spills	Various cleaning compounds, diesel, paint, hazardous materials, vehicle fluids
Construction activities	Concrete, drywall, paint, sediment
Erosion	Sediment, organic matter
Food service operations	Wash-water, food residue, oil and grease
Grounds maintenance	Green waste, fuel, oil, pesticides, herbicides, sediment
Impervious areas	Increased flows and pollutant loading
Irrigation runoff	Chloramines, fertilizers, pesticides
Litter and debris	Litter and debris
Loading/ unloading areas	Petroleum products, fertilizers, pesticides, herbicides, cleaning solutions, paint
Outdoor storage of raw materials	Sand, asphalt, soil, pesticides, herbicides, fertilizer, paint, solvents, fuel
Painting (indoor)	Paint or rinse water (oil and water based), paint thinner
Parking lot runoff	Oil/grease, litter, heavy metals
Roof runoff	Particulate matter and associated pollutants
Sewer line blockages	Raw sewage
Sewer line seepage	Raw sewage
Trash storage areas	Organic materials, hazardous materials
Vehicle and equipment washing (staff)	Cleaning products, oil/ grease, vehicle fluids

Utility line maintenance and repairs (water/ irrigation/ sewer)	Chloramines, chlorine, sediment, adhesive cements, primers
Pet feces	Coliform bacteria

4.0 Minimum Control Measures

4.01 What are Minimum Control Measures, MEP, and BMP

“Minimum Control Measures” is the term used by the EPA for the six MS4 program elements aimed at achieving improved water quality through NPDES Phase II requirements listed below:

- Public Education and Outreach
- Public Involvement / Participation
- Illicit Discharge Detection and Elimination
- Pollution Prevention / Good Housekeeping for Facilities Operation and Maintenance
- Construction Site Storm Water Runoff Control
- Post-construction Storm Water Management in New Development and Redevelopment

The goal of the SWMP is to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP), as defined by the EPA, and to identify activities or structural improvements that help improve the quality of the storm water runoff. Best Management Practices (BMPs) have been developed for the SWMP to reduce the discharge of pollutants to the storm drain system to the MEP. BMPs include treatment controls, operating procedures, and practices to control site runoff, spills and leaks, sludge or waste disposal, or drainage from raw material storage. BMPs will be updated as appropriate to comply with additions or changes to NPDES permit requirements.

4.02 How to use BMPs to Meet MEP Requirements

The BMPs described in this document in the measurable goals section are to be implemented by UC Irvine staff and outside contractors. Whenever UC Irvine staff or contractors perform work at UC Irvine, steps outlined in each relevant BMP, or other proven technique that reaches the same goal, may be used to comply with storm water discharge regulations.

UC Irvine is initiating many of the BMPs listed in the Minimum Control Measures in this SWMP. In some cases the measure has not been formalized into a written plan or program. The SWMP will formalize and document these Minimum Control measures and associated BMPs. Full

development and implementation of BMPs will be completed through the five-year implementation plan as presented in the measurable goals for each Minimum Control Measure in the following sections.

4.03 Minimum Control Measures

4.03.1 Public Education and Outreach

The goal of this minimum control measure is to develop and distribute educational materials and perform outreach to inform students, faculty, and staff about the impact of polluted storm water runoff discharges, and that their actions can make a positive impact on water quality.

MEP Standards

- Implement a public education program to distribute educational materials to the community, or conduct equivalent outreach activities about the impacts of storm water discharges on local water bodies and the steps that can be taken to reduce storm water pollution;
- Assess the appropriate BMPs and measurable goals for this minimum control measure. Some program implementation approaches BMPs (i.e., the program actions/activities).

Measurable Goals to Meet MEP Requirements

Year	Public Education and Outreach Goals
1	<ul style="list-style-type: none"> ● Develop storm water pollution prevention educational material for faculty and staff. ● Develop and purchase storm drain markers. ● Develop storm water pollution prevention information for EH&S website.
2	<ul style="list-style-type: none"> ● Distribute educational material to faculty and staff. ● Begin stenciling campus storm drains. ● Post storm water pollution prevention information on EH&S website. ● Begin storm water pollution prevention outreach to on-campus community such as University Hills. ● Develop educational material for students.
3	<ul style="list-style-type: none"> ● Continue marking campus storm drains. ● Distribute educational material to students. ● Sponsor and/or participate in storm water pollution prevention events such as marsh/creek/campus clean-ups.
4	<ul style="list-style-type: none"> ● Continue marking campus storm drains as needed. ● Continue sponsoring and/or participating in storm water pollution prevention events such as marsh/creek/campus clean-ups. ● Outreach to faculty/academic programs for possible guest lectures.

5	<ul style="list-style-type: none">● Participate in article on storm water program for campus publications and EH&S newsletter.● Include educational information in new student orientation packets.● Give guest lecture on storm water runoff impacts/pollution prevention.
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4.03.2 Public Involvement / Participation

The goal of this minimum control measure is to provide opportunities for students, faculty, and staff to participate in program development and implementation on a storm water management working-group.

MEP Standards

- Comply with applicable State, and local public notice requirements;
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year	Public Involvement / Participation Goals
1	<ul style="list-style-type: none">● Establish on-going storm water working group and conduit for public comment.● Make copies of the SWMP available at EH&S office and campus libraries.● Place e-mail link on EH&S website to report storm water pollution.
2	<ul style="list-style-type: none">● Contact campus community environmental event organizers.● Convene campus storm water working group.● Use media and publications promoting program and participation.
3	<ul style="list-style-type: none">● Participate in campus storm water pollution prevention event(s).● Continue to convene campus storm water working group.
4	<ul style="list-style-type: none">● Organize and sponsor campus/marsh/creek volunteer clean-up event.● Continue to convene campus storm water working group.
5	<ul style="list-style-type: none">● Organize and sponsor another campus/marsh/creek volunteer clean-up event.● Participate in campus storm water pollution prevention event(s).● Continue to convene campus storm water working group.

4.03.3 Illicit Discharge Detection and Elimination

The goal of this minimum control measure is to develop and implement a plan to detect and eliminate non-storm water discharges (illicit discharges) such as process water, wash water, chemical spills, and other non-rain water discharges to the storm drain system. Only clean rainwater should be discharged to the storm drain system.

MEP Standards

- Prepare a storm sewer system map, showing outfall locations and the names and location of all waters of the United States that receive discharges from those outfalls;
- Through internal policies and procedures, a prohibition (to the extent allowable under State, or local law) on non-storm water discharges into the MS4, and appropriate enforcement procedures and actions;
- Prepare a plan to detect and address non-storm water discharges, including illegal dumping, into the MS4;
- The education of public employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste;
- The assessment of appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year	Illicit Discharge Detection and Elimination Goals
1	<ul style="list-style-type: none"> ● Review and evaluate campus facilities storm drain maps. ● Review and update campus notification system for sewage spills and other non-storm water discharges. ● Develop storm drain outfall monitoring program to visually identify dry weather flows into the storm drain system. ● Develop an interior drain assessment program to identify and re-route illicit connections. ● Creation of a campus wide SPCC Plan.
2	<ul style="list-style-type: none"> ● Update campus storm drain maps as necessary. ● Implement updated campus notification system for sewage spills and other non-storm water discharges. ● Begin implementation of drain assessment program (building as-built review and interviews with campus plumbers). ● Implement storm drain outfall monitoring program. ● Inform staff of hazards associated with illicit discharges/disposal.
3	<ul style="list-style-type: none"> ● Develop a campus policy that includes prohibiting non-storm water

	<p>discharges.</p> <ul style="list-style-type: none"> • Continue to update campus storm drain map. • Continue to implement the drain assessment program (test, mark drains, and document findings) • Continue to implement storm drain outfall monitoring program. • Develop inspection program for illicit discharges/ disposal.
4	<ul style="list-style-type: none"> • Continue to update campus storm drain map. • Continue to implement the drain assessment program (complete drain identification and marking and prioritize the re-routing of illicit connections). • Implement inspection program for illicit discharge/ disposal. • Prioritize the re-routing of illicit connections and develop and action plan.
5	<ul style="list-style-type: none"> • Continue to implement storm drain outfall monitoring. • Continue to update campus storm drain map. • Continue to implement inspection program for illicit discharge/ disposal. • Implement procedural and physical BMPs to reduce risk of illicit discharges from cross-connection until permanent re-routing takes place. • Continue to implement the drain assessment program (begin physically re-routing illicit connection). • Develop long-term sanitary sewer maintenance/upgrade program.

4.03.4 Pollution Prevention / Good Housekeeping for Facilities Operation and Maintenance

The goal of this minimum control measure is to develop and implement a program to prevent or reduce pollutant runoff from facilities operation and maintenance activities. The program will include training of relevant staff in pollution prevention measures and techniques (e.g., regular street sweeping, reduction in the use of pesticides, or frequent catch-basin cleaning).

MEP standards

- Develop and implement a program with the ultimate goal of preventing or reducing pollutant runoff from facilities and maintenance operations into the storm sewer system;
- Include employee training on how to incorporate pollution prevention/good housekeeping techniques into facilities operation and maintenance such as park and open space maintenance, fleet and building maintenance, and storm water system maintenance. To minimize duplication of effort and conserve resources, the MS4 operator can use training materials that are available from EPA, their State, or relevant organizations;
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year	Pollution Prevention / Good Housekeeping for Facilities Operation and Maintenance Goals
1	<ul style="list-style-type: none"> ● Review and evaluate BMPs for major campus physical operations (grounds, facilities maintenance, fleet services, custodial services, housing, and dining services). ● Creation of a campus wide SPCC Plan.
2	<ul style="list-style-type: none"> ● Select appropriate BMPs for major campus physical operations. ● Develop training program for campus operations staff on sources of storm water pollution and how to implement selected BMPs.
3	<ul style="list-style-type: none"> ● Implement training program for campus operations staff. ● Develop inspection program for compliance with BMPs.
4	<ul style="list-style-type: none"> ● Begin implementation of selected operational BMPs. ● Continue developing inspection program for compliance with BMPs.
5	<ul style="list-style-type: none"> ● Continue implementation of selected operational BMPs. ● Continue training program for campus operations staff. ● Implement BMP compliance inspection program.

4.03.5 Construction Site Storm Water Runoff Control

The goal of this minimum control measure is to develop, implement, and enforce an erosion and sediment control program for construction activities.

MEP Standards

- Prepare a contractual enforcement mechanism for contractors requiring the implementation of proper erosion and sediment controls, and controls for other wastes, on applicable construction sites;
- Have procedures for site plan review of construction plans that consider potential water quality impacts;
- Have procedures for site inspection and enforcement of control measures;
- Establish procedures for the receipt and consideration of information submitted by the public;
- Assess the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year	Construction Site Storm Water Runoff Control Goals
1	<ul style="list-style-type: none">● Review and evaluate construction contract sediment and erosion control BMP specifications and site pollution control requirements.● Determine how an ordinance could be established to ensure compliance.● Review and evaluate how construction contract sanctions/penalties could be enforced.● Review and evaluate construction site inspection procedures for BMPs.● Develop construction site inspection procedures.
2	<ul style="list-style-type: none">● Formalize the submission of plans to various interested parties.● Develop formal plan review procedures and checklists to document site plan comments.● Modify or include construction sanctions/penalties if needed.● Include revised storm water specifications in construction projects with the potential to impact water quality.● Train project managers and inspectors on the contents and implications of the revised storm water specifications for contractors.● Train contractors and sub-contractors at pre-construction meetings regarding storm water issues.● Develop training for construction inspectors.
3	<ul style="list-style-type: none">● Incorporate pollutant source assessment into pre-construction campus site plan and BMP review process.

	<ul style="list-style-type: none"> • Formalize campus BMP enforcement procedures and responsibilities. • Implement construction site inspection procedures.
4	<ul style="list-style-type: none"> • Include storm water specifications in smaller projects (less than \$50,000) including Facilities Management and other departments' minor construction activities. • Continue implementation of construction site inspection procedures. • Conduct pollutant source assessment during site plan and BMP review.
5	<ul style="list-style-type: none"> • Develop standard procedures to receive and respond to public and/or campus complaints regarding storm water runoff impacts from construction sites. • Continue implementation of construction site inspection procedures. • Continue to conduct water quality assessment during site plan and BMP review.

4.03.6 Post-Construction Storm Water Management in New Development and Redevelopment

The goal for this minimum control measure is to develop, implement, and monitor a program to address discharges of post-construction storm water runoff from new development and redevelopment areas.

Post-construction storm water management controls includes permanent structural and non-structural best management practices (BMPs) (e.g. conservation of natural and permeable areas, permeable pavers, rooftop runoff infiltration galleries, and mechanical storm drain filters) that remain in place after the project is completed and continue to prevent pollution from the new development.

Projects subject to the new standards are new development that are > 1 acre in size and redevelopment projects that replace > 1 acre in size (such as redevelopment on a surface parking lot). Projects that have construction funding committed and construction scheduled by December 31, 2004 are not subject to the revised standards. If the site does not accommodate treatment controls, or the University determines that they are too costly, the equivalent volume of water may be treated at an alternative site.

MEP standards

- Develop and implement strategies which include a combination of structural and/or non-structural BMPs;
- Have internal policies and procedures requiring the implementation of post-construction runoff controls to the extent allowable under State, or local law;
- Ensure adequate long-term operation and maintenance of controls;
- Determine the appropriate BMPs and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year	Post-construction Storm Water Management in New Development and Redevelopment Goal
1	<ul style="list-style-type: none">● Review and evaluate structural and non-structural BMPs.
2	<ul style="list-style-type: none">● Develop standard specifications for selected structural BMPs.● Develop standard specifications for selected non-structural BMPs.● Provide training for CP, C&EP and D&CS staff on long-term BMP site planning, design, and implementation/construction.
3	<ul style="list-style-type: none">● Incorporate post-construction structural and non-structural BMP requirements into site planning and review process.● Include construction BMPs in new construction site plans as required (> 1 in size).

4	<ul style="list-style-type: none">• Develop inspection and operations & maintenance programs for long-term site.• Include long-term BMPs in new construction site plans as required (> 1 acre in size).BMPs.
5	<ul style="list-style-type: none">• Implement inspection and operations & maintenance programs for long-term site BMPs.

5.0 Record Keeping

5.01 SWMP Updating

The SWMP will be reviewed annually and UC Irvine will update the SWMP whenever a change in activities or operations occurs which may significantly affect the discharge of storm water pollutants.

5.02 SWMP Public Access

This SWMP is meant for use by UC Irvine and UC Irvine staff and is a public document. Any request for a copy of the SWMP by the Santa Ana Regional Water Quality Control Board (SARWQCB), other governmental agency, or citizen is to be forwarded to the UC Irvine, Environmental Health & Safety Department, 4600 Bison Avenue, Irvine, CA 92697-2725.

5.03 SWMP Annual Reports

EH&S will complete and submit annual reports regarding the implementation of the SWMP and measurable goals to the SARWQCB.

6.0 Appendices

Appendix 1 Off-Site Facility Information

Appendix 1

UC Irvine Information

Central Campus

Location Description

The UC Irvine Campus is situated in Irvine, California, in central Orange County. The facility is generally bounded by State Route 73, Jamboree Rd, Campus Dr, Culver Rd, and Bonita Canyon Road.

Facility Operations

UC Irvine employs licensed operators, skilled trades, grounds, and custodial staff for day-to-day operations. Typical duties include plant operation, building maintenance, plumbing and electrical repairs and grounds maintenance. A few of the buildings use pumps to remain dewatered.

Climate and Rainfall

Meteorological conditions at UC Irvine are influenced by its proximity to the Pacific Ocean. Average annual daily temperatures for Irvine range from 67 degrees Fahrenheit (°F) in the winter, to 86 °F in the summer. Average total precipitation is 13 inches annually, with approximately 84% of the annual rainfall occurring during November through March.

Facility Drainage

UCI receives water from neighboring areas and roads, specifically from Turtle Rock on the eastern edge of campus, and from the residential areas along University Drive.

There are 2 point sources that discharge from UC Irvine into San Diego Creek, along University Drive, and an area source from the Facilities yard and other activities from the “North Campus” area located at the intersection of Jamboree Road and Campus Drive that flows into the marsh and eventually enters San Diego Creek. Runoff from local developments and roads co-mingles with UCI water in along University Drive. These sources drain areas such as streets, parking lots, loading docks, roofs, and other surfaces that receive rain water. When San Diego Creek leaves campus it flows into Newport Bay, which opens into the Pacific Ocean.

General Watershed Description

The San Diego Creek watershed, includes lands owned by the University of California, lands owned by the City of Irvine, and land owned by private landowners (residences). All of these sources influence the water quality of San Diego Creek.

Local Geology

The San Joaquin Hills area of the region is part of a section of uplifted marine terrace (Tertiary) sediments included in the Peninsular Ranges province of Southern California. Rocks exposed within the area include middle Miocene age marine sedimentary rocks, and intrusive and extrusive igneous rocks. These rocks have been assigned to two members of Topanga formation: the Los Trancos member and the Paularino member. The Los Trancos member can be found in the central and southern portions of the campus, and the Paularino member in the highlands at the southern boundary of the property, extending to the Campus Drive on the north.

Land Use

The developed area in the lower San Diego Creek watershed is dominated by institutional activities. The UC Irvine central campus and residential housing account for most of this area. Buildings, parking lots, small lawn and open areas, as well as roadways and walkways are included in this category. Recreational land uses consist of the Arboretum and Estuary.

On the western portion of the campus, near the facilities yard in "North Campus" there is a former landfill. The landfill was deeded to the University of California as part of the land given when UCI was first created. UCI never operated the landfill, but has maintained the closed site. The County of Orange was the operator of record. There is an existing NPDES General Permit covering this area.

Existing Sampling Data

Limited storm water quality sampling was conducted under an earlier NPDES permit, originally obtained to discharge water from the cooling towers on the UC Irvine campus. The discharge was discontinued several years ago, and this NPDES permit is no longer in existence. Water was sampled for Total Dissolved Solids (TDS), flow, suspended solids, oil and grease, pH, toxicity sampling, copper, and chromium. San Diego Creek is listed on the Clean Water Act Section 303(d) list of impaired water bodies

and the SARWQCB is establishing Total Maximum Daily Loads (TMDLs) for coliform, metals, pesticides.