

University of the Pacific

Stormwater Management Plan (SWMP)

Cover

This Plan was initially created by seniors in the School of Engineering and Computer Science for their Senior Project in EMGT 195: Engineering Management Synthesis by Dr. Abel Fernandez in April 2023. Students: Ryanne Molenaar, Sergio Campos, Blake Herrington, Emily Takasaki

Facilities and Sustainability staff reviewed and edited to create this version.

Intent

The Plan is intended to be updated and added to as needed.

Next Steps

1. Potentially update Appendix B – Drain Grate Types. Do Drain Grate Types need names? Or is this integrated into their name?
2. Include a full, to scale base map with quadrants, Drain Inlets (DI), DI names, water meters, sewer, irrigation, potable water. Ideally these are all layers on one Master Utilities map
3. Get this document stamped as the official University Storm Water Management Plan. About \$4,000 to stamp. Benefit is it will help with regulators.
4. Set Annual review and Revision Dates. These should correspond to annual inspection reporting dates or STARS data Gathering in July. Agenda: review the Plan. Review Recommendation report. Identify and prioritize any recommendations to implement.

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1. Introduction

1.1 Regulatory Background

In 1972, the Federal Water Pollution Control Act, later known as the Clean Water Act (CWA) was enacted. The CWA established the National Pollutant Discharge Elimination Program (NPDES) storm water program. In 1990, Phase I of the NPDES was in place to regulate municipalities, requiring operators of municipal separate storm sewer systems (MS4s) who serve populations of 100,000 or greater, to implement a stormwater management program to control polluted discharges from these MS4s. The polluted stormwater runoff collected from these MS4s are often discharged into local waterways (rivers, streams, lakes, and bays) without treatment. The EPA's MS4 storm water management program intends to improve waterways by reducing pollutants that end up in storm sewer systems during storm events. Many of these pollutants include the oil from roadways and parking lots, chemicals from pesticides, dirt and sediments generated from construction sites, and discarded trash/liter like wrappers, plastic bottles, or paper items. Since the water from MS4's is not treated before discharging into waterways, these pollutants are discharged as well. Pollutants in the local waterways can interfere with the habitat of fish and wildlife and can also deter the recreational use of the waterway.

NPDES Phase I regulations require operators of medium/large MS4s to develop a program in order to:

- Reduce the discharge of pollutants to the “maximum extent practicable” (MEP)
- Protect water quality;
- Satisfy the appropriate water quality requirements of the Clean Water Act and Central Valley Regional Water Quality Control Board (Regional Water Board)

As of February 1995, the City of Stockton and the County of San Joaquin became co-permittees of a NPDES municipal stormwater permit. Officially, University of the Pacific is located in the City of Stockton's boundary and is under the regulation of the City of Stockton and San Joaquin County.

1.2 Goals for STARS Program Rainwater Management

The Sustainability Tracking, Assessment & Rating System (STARS) is a self-reporting system that many colleges and universities use nationwide to measure their sustainability performance. STARS helps these institutions to envision long-term sustainability goals and acts as a first step towards sustainability for institutions. University of the Pacific aims to ultimately achieve a gold rating (current rating is silver). To take the steps to achieve this goal, University of the Pacific can first address the Rainwater Management section of STARS.

Currently under STARS, University of the Pacific holds a 0.5 rating for Rainwater Management:

“Institution uses green infrastructure to manage rainwater and employs LID practices on a case-by-case basis or for demonstration projects (i.e., in the absence of formal policies, plans or guidelines).”

The goal is to achieve at least a 1 rating for STARS' Rainwater Management:

“Institution has rainwater management policies, plans, or guidelines that incorporate green infrastructure, but are less comprehensive (e.g., do not cover the entire campus, cover buildings and not other types of projects, or require consideration of rather than mandate LID practices).”

1.3 Purpose of Stormwater Management Plan

A Stormwater Management Plan (SWMP) generally delineates the best management practices (BMPs), outlines measurable goals for the future as well as time schedules of implementation for each task. Major areas the SWMP will cover include:

- Identifying potential pollutant sources that impact the quality of stormwater discharges
- Define the minimum BMPs applicable to University of the Pacific based on conditions and practices of specific sites
- Establish the required minimum documentation and tracking requirements to complete annual program effectiveness
 - Including reporting on assessments and suggesting future improvements

The purpose of this document is to provide written documentation of the formal policies, plans and guidelines the University of the Pacific currently has in place and utilizes to address stormwater and storm events on campus.

2. Facilities

2.1 Facilities Description

University of the Pacific has drainage maps to detail the locations of pipes and drains around the campus. These drainage maps split the campus into seven sections called “zones.” These zones all contain different facilities from residence halls to classroom buildings, laboratories to athletic facilities. The campus’s inventory of these various buildings in the respective drainage zones is organized and listed in the following sections of this report starting from Zone 1 in the northeast side of campus and working down to Zone 7 on the southwest side of campus. Campus storm system maps are included in Appendix A.

2.1.1 Zone 1

Zone 1: Located on the northeast side of campus, Zone 1 encompasses the campus north of Brookside Road and east of Manchester Avenue. The facilities within this zone are listed:

- Alan and Olive Gardemeyer Field
- Public Safety
- Cowell Wellness Center
- Edward and Alice Long Memorial Hall
- Rotunda
- Health Science Library

- Monagan Hall
- Chan Family Hall
- Chan Family Health Sciences Learning Center and Clinics Building
- Thomas J. Long School of Pharmacy and Health Sciences
- Rite Aid Info Common
- Speech, Hearing and Language Center
- Health Sciences Learning Center
- Parking Lots: 9, 8, 10, 11, 12

2.1.2 Zone 2

Zone 2: Located on the northwest side of campus, Zone 2 encompasses the campus north of Calaveras River and west of the road of Wood Memorial Bridge road. The facilities within this zone are listed:

- Brookside Field
- Duplicating Services
- Support Services
- Physical Plant
- Calaveras Hall
- Theta Chi
- University Townhouses
- Mail Services
- Parking Lots: 14, 18, 29

2.1.3 Zone 3

Zone 3: Located on the east side of campus, Zone 3 encompasses the campus north of Chapel Lane, east of Baxter Way, and south of Calaveras River. The facilities within this zone are listed:

- Baun Fitness Center
- Don and Karen DeRosa University Center
- DeRosa University Center Bookstore
- Alpha Phi
- Beta Theta Phi
- Sigma Chi
- Delta Gamma
- Kappa Alpha Theta
- Delta Delta Delta
- Parking Lot 7
- Hand Hall
- Development
- External Relations
- Colliver Hall
- Office of Student Life
- Grace Covell Hall
- Sears Hall
- Morris Chapel
- Office of Marketing and Communications
- President's Residence

2.1.4 Zone 4

Zone 4: Located on the west side of campus, Zone 4 encompasses the campus north of Larry Heller Drive, west of the road of Wood Memorial Bridge and south of Calaveras River. The facilities within this zone are listed:

- Zuckerman Field
- Field Hockey Turf
- Bill Simoni Field
- Eiselen House
- Ritter House
- Wemyss Hall
- Raymond Great Hall
- Callison Hall
- Carter House

- Knoles Field
- Eve Zimmerman Tennis Center
- Bechtel International Center
- Chris Kjeldsen Pool
- Raymond Lodge
- Parking Lots: 2, 4, 6, 19
- Farley House
- School of International Studies
- Roy and Jean Sanders Tennis Clubhouse
- Elbert Covell Hall
- Casa Werner
- Douglass M Eberhardt Aquatics Center
- John Ballantyne Hall
- Jessie Ballantyne Hall
- Casa Jackson
- Price House
- George Wilson Hall
- Pacific Technology Customer Support Center

2.1.5 Zone 5

Zone 5: Located on the west side of campus, Zone 5 encompasses the campus north of Dave Brubeck Way and east of the Baxter Way and south of Chapel Lane. The facilities within this zone are listed:

- Bannister Hall
- Owen Hall
- Main Gymnasium
- Wendell Phillips Center
- Humanities Wing
- College of the Pacific
- Gladys L. Benerd School of Education
- Finance Center
- Khoury Hall
- Hydraulics Laboratory
- Baun Hall
- McCaffery Center
- The Grove
- Career Resource Center
- Disability Services
- Janet Leigh Theatre
- William Knox Holt Memorial Library
- Recital Hall
- Rehearsal Hall
- Tower View Apartments
- Buck Memorial Hall
- Eberhardt School of Business
- Weber Hall
- West Memorial Hall
- Human Resources
- John T. Chambers Technology Center
- School of Engineering and Computer Science
- Kappa Psi
- McConchie Hall
- Parking lot 20
- Anderson Hall
- Regents Dining Room
- Office of the President
- Office of the Provost
- Southwest Hall
- Registrar
- Knoles Hall
- Graduate School
- Admission Office
- Burns Tower
- Conservatory of Music
- Faye Spanos Concert Hall
- Pacific House
- Phi Delta Chi
- Manor House
- Center for Community Involvement

2.1.6 Zone 6

Zone 6: Located on the west side of campus, Zone 6 encompasses the campus south of Dave Brubeck Way, west of Kensington Way and east of the Robb Family Garden. The facilities within this zone are listed:

- Geosciences Center
- Reynolds Art Gallery
- Bon Appétit Company Native Garden
- Robb Family Garden
- DeMarcus Brown Studio
- Theatre Arts
- Theatre Arts
- Biological Laboratories
- Olson Hall
- Classroom Building
- Biological Sciences Center
- Alumni House
- Long Theatre

2.1.7 Zone 7

Zone 7: Located on the west side of campus, Zone 7 encompasses the campus west of Robb Family Garden, north of Mendocino Avenue, and south of Larry Heller Drive. The facilities within this zone are listed:

- Raney Sand Volleyball Courts
- Covered Performance Center.
- Klein Family Field
- Alex G. Spanos Center
- Pacific Intercollegiate Athletics Center
- Janssen-Lagorio Gymnasium and Performance Center
- Dance Studio
- South Campus Gymnasium
- Engineering and Computer Science South Campus Labs
- Ceramics Studio
- Communication Department
- Psychology Department
- Jeannette Powell Art Center
- Parking Lot 1

2.2 Facilities Operation

This SWMP covers all facilities on campus owned and operated by PACIFIC.

PACIFIC relies on skilled Grounds, Custodial, Plumbing, and occasionally Structures department staff for day-to-day maintenance of the storm system. Grounds and Plumbing are typically responsible for keeping drain grates clear and maintaining the system, but more serious blockages of the storm lines, or upcoming storm events, will usually involve Plumbing and Structures as well to resolve the issue in a timely and effective manner.

These departments also collaborate with Sustainability and Athletics to meet program goals related to stormwater and irrigation or to fix problems related to a specific area of expertise.

Students and staff do not usually interface directly with storm system maintenance staff and instead report problems through Public Safety.

2.3 Campus Inventory

There are a variety of physical installations around the University of the Pacific campus that assist with stormwater management.

2.3.1 Bioswales

There are currently eight swales around campus intended to slow stormwater runoff, filter this water, and improve infiltration.

Rock basin swales are located at:

- Alex and Jeri Vereschagin Alumni House (two)

Grass/vegetated swales are located at:

- Don and Karen DeRosa University Center (one)
- Janssen-Lagorio Gym (one)
- Behind the Klein Family Field batting cages (one)
- Eve Zimmerman Tennis Center/Stagg Memorial Plaza (one)
- Calaveras (one)



2.3.2 Straw Wattles

The University utilizes straw wattles in certain areas around campus to prevent stormwater runoff and erosion. Wattles are replaced when needed. Mulch binding is a possible long-term alternative, but the costs must be balanced against the benefits of not having to replace wattles yearly.

The Calaveras River levee slope is not owned by the University, but the University is responsible for some maintenance. The north facing slope of the levee on the south side of the is maintained

to not be vegetated per previous university administration. It is treated with herbicides, necessitating other methods of surface erosion control for the slope, including straw wattles.

Wattle locations include:

- Along the levees: Calaveras Hall. Lot 6, Lot 7

Parking Lot 1, Eve Zimmerman Tennis Center

- Field Hockey Turf
- Klein Family Field



2.3.3 Retention Basins

Knoles Field serves as a retention basin for parts of the Quads, Zuckerman Field, the Field Hockey Turf, and the nearby utility street during heavy storm events when the City of Stockton's storm lines are at capacity. There is a pump with a check valve for the city's flow that manages this, which is inspected and maintained quarterly, semi-annually, and annually.

2.3.4 Permeable Pavers & Turf Cells

To distribute weight of emergency vehicles, several lawn/grass areas around campus have permeable paver/turf cells installed. Locations include the De Rosa Center and J.L. Gym. These reduce flooding and retain runoff during storm events. The biological area near Calaveras Hall

and the fire lane utilize cellular-confined decomposed granite for filtration, attenuation, and retention.



2.3.4 Drains/Grates

Campus contains hundreds of drain inlets (DIs) feeding into the storm system across over 175 acres of land, with a variety of sizes and styles located in different areas. Example photos of types are included in Appendix B.

2.3.5 Magnation

In early 2023 the university installed several magnation devices. In addition to reducing energy use for pumps, they may result in less water having to be used for irrigation overall by contributing to better infiltration and less run off.

2.4 University of the Pacific Water Usage

The Grounds Department oversees the University of the Pacific's exterior water usage and Plumbing/Facilities Admin oversees potable water use inside buildings. The exterior water usage varies slightly annually as it depends on the year and season. Data of the university's exterior water usage is recorded and monitored by the Grounds Department.

3. Stormwater Management Plan

3.1 Stormwater Management Plan Goals

The goal of this document is to provide written documentation of the formal policies, plans and guidelines the University of the Pacific currently utilizes to address stormwater and storm events on campus. Additional goals for University of the Pacific to strive for in the future include:

- Increasing outreach to student and faculty about the impacts of polluted storm water discharges on local water sources and distribute educational materials that informs them on possible actions that positively impact water quality
- Continued development and implementation of erosion and sediment control on campus

As University of the Pacific participates in STARS, achieving a gold rating in the program would allow the university to obtain international recognition and involve the local community to engage in sustainability and generate new innovative ideas. Improving rainwater management in STARS will allow the university to achieve better sustainability and documentation to build upon.

3.2 Stormwater Management Principles

University of the Pacific's Stormwater Management principles are informed by the City of Stockton's SWMP and NPDES Phase 1 permit. Abiding by the City's regulations on maintenance and reporting standards influences the university's standards and processes. With University of the Pacific being a private institution, the university will notify the City of Stockton if leaks or potential contamination occurs that could negatively impact stormwater runoff and water quality. The university will also reduce the discharge of pollutants on campus to the MEP. MEP standards for the University of the Pacific include:

- Comply with applicable State and City of Stockton public notice requirements
- Determine the appropriate BMPs and measurable goals for this minimum control measure
- Provide employee training on incorporating pollution prevention/good housekeeping techniques into operations and maintenance activities

PACIFIC's SWM efforts are also driven by a desire to promote sustainability and safe, ethical development of buildings and other campus infrastructure. In particular, the clean and safe reuse of stormwater for infiltration and groundwater recharge is central.

3.3 Best Management Practices Implementation

3.3.1 General Housekeeping Guidelines

University of the Pacific utilizes many best management practices (BMPs) around the campus to minimize pollutants entering the stormwater systems through runoff. General housekeeping BMPs are in place around the campus, much of which is preventive maintenance. In the event of reported spills or release of chemicals/pollutants into stormwater, University of the Pacific will respond as soon as is practicable.

Some of these general pollution prevention housekeeping guidelines include:

- Keep work sites clean and organized
- Remove debris effectively and efficiently
- Sweep in and around affected areas
- Dispose of wash water, sweepings, and sediments, properly
- In appropriate locations post waste disposal charts
 - Lists different types of wastes and their hazardous characteristics: poisonous, corrosive, flammable
 - Lists prohibitions on disposal: dumpster, drain, sewer
 - Lists the recommended method of disposal: recycle, sewer, burn, storage, landfill
- Maintain required SERS report
- Have, and review regularly, a contingency plan for spills, leaks, and extreme weather (floods, droughts, etc.)
- Time permitting, clear drains prior to large rain events.

3.3.2 Stormwater Drain Inspections

Through the Grounds and Plumbing Departments, inspections are conducted before predicted storm events, usually occurring before the start of the rainy season in October. These inspections include clearing roofs and gutters of debris such as leaves and dirt and inspecting the storm drains and verifying that debris is not in the drainage. In case a drain is clogged, various methods are utilized by the Grounds Department to clear the drain:

- Sweeping
- Shoveling
- Blower
- Snake and hydrosnake
- Etc.

When the drain cannot be cleared using these methods, the Grounds Department will contact Plumbing. Following this a truck suction machine will vacuum and clean the clogged drain. Additionally, University of the Pacific utilizes sandbags to keep pollutants (organic matter, sediment, etc.) out of drains that are at risk of getting clogged. The sandbags are placed before predicted storm events. Pumps are also utilized on campus to extract and send stormwater to waterbodies. The most prevalent example of this is at Knoles field. Being 12 feet below sea level, Knoles Field naturally collects stormwater runoff and the drainage pipes around the field also send campus stormwater there. This water is then pumped southward to American Legion Park which is then sent to the San Joaquin River through a canal. In the event of water entering a building a dehumidifier and air circulator are utilized. Additionally, a vacuum typhoon machine extracts water from the floors.

Stormwater drains and conveyance systems have the following pollution prevention guidelines:

- Cover storm drains during field work

- Minimize and prevent non-stormwater discharges to the storm drain system
- Inspect for signs of illegal/waste discharges to the storm drains
- Identify any repairs, maintenance, or operational issues of storm drains
 - Schedule follow-up inspection in a timely manner if a problem occurs
- Train the appropriate staff to identify stormwater pollution prevention issues
- Train the appropriate staff to perform required inspections, repairs, operation and maintenance of storm drain system facilities and structures

3.3.3 Chemical and Hazardous Storage and Use

All materials with the potential to pollute stormwater runoff such as cleaning/maintenance products used outdoors, fertilizers, and pesticides, for example, will be utilized in accordance with the printed label directions. These materials shall be stored in covered areas or in covered/sealed containers to prevent harmful pollutants from entering stormwater drains. All containers holding chemicals or hazardous materials will be stacked according to the manufacturers' instructions and any additional federal, state, and local regulations that apply to prevent leaks or damage to the containers. Pallets will be placed under containers as a preventative measure to avoid the containers from corroding due to contact with moisture on the ground.

Guidelines for chemical and hazardous storage and use at University of the Pacific are listed below:

- No hazardous material or chemical may be disposed of or rinsed into the campus storm drain system
- Use appropriate amounts of fertilizers, herbicides, and pesticides to avoid over-applying
- Follow manufacturer instructions. "Label is the Law"
 - Applications
 - Required protective equipment
 - Ventilation
 - Flammability
 - Allowable mixing of chemicals
- Hazardous materials and wastes shall be stored, managed, and disposed of in accordance with applicable federal, state, and local laws and regulations
- Hazardous materials will be stored off the ground using pallets
- Hazardous materials stored outside shall be placed in an area with overhead coverage or be covered with a tarp or lid
- Store hazardous materials away from heat and direct sunlight
- Ensure caps and lids are securely tightened on containers
- Inspect storage containers for cracks and leaks
- Train campus staff in the proper material use of materials on campus
- Train field staff to recognize any potential hazardous waste storage issues

3.3.4 Solid Waste

Another source of pollutants that can enter the stormwater conveyance systems comes from the improper storage and handling of solid waste. These include but are not limited to trash, oil, grease, nutrients, and suspended solids. Containers holding solid waste shall be kept closed when not in use and be inspected and cleaned regularly. Any leaking containers shall be repaired or replaced approximately and timely.

Guidelines for solid waste on campus include:

- Containers such as dumpsters will be stored in covered areas where possible
- Containers must be maintained in good condition
- Containers must be securely closed when not in use
- Leaking containers will be replaced as quickly as possible
- Materials/equipment necessary for the cleanup of trash shall be maintained and kept readily accessible
- Solid waste shall be stored, managed, and disposed in accordance with applicable federal, state, and local laws and regulations
- Place/install trash receptacles in key locations around campus to maximize use and prevent litter
- Reduce waste generation and disposal through recycling.
- Prevent runoff from solid waste storage areas
- Periodically inspect containers, dumpsters and other receptacles or disposal areas
- Train staff to follow through with appropriate procedural protocols.

3.3.5 Landscape and Grounds Maintenance

Landscape and grounds maintenance activities can impact stormwater conveyance systems with the release of pollutants that enter into stormwater runoff. Chemicals such as herbicides, insecticides, and fertilizer can contribute as potential pollutants. Therefore, University of the Pacific will follow good landscape management practices such as preventing and cleaning up spills immediately and keep debris from entering the storm drains. These practices will aid in reducing the number of pollutants entering stormwater conveyance systems on campus. Additionally, preventing the disposal of landscape waste such as litter, debris, organic matter into the storm drains by collecting and properly disposing of clippings and cuttings will further help reduce pollutants.

The following are the pollution prevention guidelines and practices for landscape and grounds maintenance activities:

- Grounds and landscaped areas will be periodically inspected
- Paved surfaces such as sidewalks shall be cleaned regularly using dry methods (e.g., sweeping, vacuuming, leaf blowing).
 - Non-dry methods such as hosing, power washing, and other wet cleaning methods are permissible only if precautions to prevent the discharge of wash water to the stormwater conveyance systems have been done
- Materials from paved surfaces are to be collected and disposed of properly

- Recycle grass clippings and use fertilizer as appropriate
- Cleanup spills immediately
- Have spill cleanup materials readily available
- Select low water using plantings, trees, shrubs, and groundcover.
- Inspect ground facilities for any signs of spills, leaked vehicular fluids, illegal dumping
- Conduct periodic inspections of maintenance activities (i.e. properly timed fertilizing, weeding, pest control) to help preserve the landscape’s target water efficiency.
- Inspect irrigation system operation and performance to maximize efficiency.
- Train staff on the appropriate use of chemicals on-site (pesticides, herbicides)
- Train staff on proper techniques for spill cleanup
- Train staff on an annual basis in protecting storm drain conveyance systems from pollutants associated with landscaping and ground maintenance activities.

3.4 Potential Pollutants

There are many pollutants on the University of the Pacific campus that can enter stormwater drains or runoff contributing to poorer water quality and stormwater pollution. Table 1 lists some of the sources of stormwater pollution on campus and general pollutants that can come from the associated source.

Table 1: Potential Pollutant Sources at University of the Pacific

Source	Potential Pollutants
Building maintenance	Wash water, cleaning products, dirt, sediment
Chemical storage facilities	Cleaning compounds, hazardous materials
Construction activities	Concrete, drywall, paint, sediment, gasoline, diesel
Equipment Storage	Cleaning compounds, diesel, hazardous materials
Natural Erosion	Sediment, organic matter
Food service operations	Food residue, oil, wash water
Grounds maintenance (landscaping & maintenance)	Fuel, fertilizers, pesticides, herbicides, nutrients, sediment, organic pollutants, trash, debris, hazardous materials
Painting	Paint, rinse water, paint thinner
Parking lot runoff	Oil/grease, litter, heavy metals
Public buildings	Trash, debris, litter, organic materials
Sewer line	Raw sewage spills, leaks
Solid waste containers	Litter, debris, solid waste
Trash storage areas	Organic materials, hazardous materials, litter, debris
Swimming Pool	Pool chemicals/cleaners

3.5 Irrigation

The Grounds Department uses non-potable water to irrigate landscaped areas throughout University of the Pacific. Non-potable water comes directly from the Calaveras River and approximately 98% of the campus is irrigated with this water. The Greenhouse has a water recycling system which saves over 100,000 gallons a year. **All non-potable sprinklers are identified with their purple color.** The Grounds Department utilizes an Irrigation Monitoring Management System (IMMS) to control irrigation on campus. With IMMS, the Grounds Department is able to conserve more water used during irrigation as the system centrally manages 64+ sprinkler clocks/systems to allow for immediate adjustments to irrigation through smartphones or desktops. The university utilizes different types of sprinklers such as drip, pop up sprays, gear, and hybrid sprinklers in their irrigation systems. Irrigation on campus has the following guidelines to manage pollution and non-stormwater runoff into stormwater conveyance systems.

Pollution Prevention Guidelines:

- Sprinklers, nozzles, and other irrigation equipment shall be maintained in good working condition.
- Isolate/shutoff the water source(s) of broken pipelines, sprinklers, or valves as quickly as possible to prevent excess non-stormwater flows into stormwater drains. Repair broken pipelines, sprinklers, or valves as soon as possible.
- Adjust watering schedules to optimize the amount of water used while minimizing runoff. Determining the appropriate application of water use can consider factors such as soil structure, time of year, and the type of plant material present.
- Use low-volume watering methods (e.g., drip-, sub-, cycle soak, and pulse irrigation) to minimize excess runoff where available.

Design Guidelines:

- Design timing methods of the usage of irrigation water on campus to minimize the runoff of excess irrigation water into the stormwater systems/drains.
- Erosion control materials and straw wattles will be used to reduce the potential for erosion.
- Shutoff devices to prevent irrigation after precipitation through IMMS.
- Design irrigation systems to each landscape area's specific water requirements. Areas are defined as high-use, medium-use, and low/no-use as well as sacrifice lawns in cases of drought.

Inspection Guidelines:

- Routinely inspect irrigated areas within the PACIFIC campus limits for excess watering. At a minimum, inspect the irrigation system on a weekly/monthly basis depending upon the season, scheduling and usage.

- Inspect the curbs, gutters and storm drains around campus for signs of excessive irrigation/runoff.
- Inspect irrigation lines and nozzles for any potential leaks and proper operation.

3.6 Monitoring

The University of the Pacific's SWMP includes crucial elements for monitoring and assessment. An efficient monitoring and assessment program is a prerequisite for adaptive management since the data gathered informs many of the program management choices. The campus is broken down into 7 zones in which staffing of Grounds are assigned to work, keeping the area clean before the rainy season. Stormwater monitoring is done by the Grounds Department of University of the Pacific located on-campus in Physical Plant. Monitoring and reports are kept and sent to the City of Stockton to maintain the NPDES Phase 1 Permit requirements to protect the quality of stormwater runoff.

3.7 Monitoring plans for University of the Pacific Campus

Monitoring on the University of the Pacific campus is done internally with Physical Plant. Before the rainy season during the month of October, the Grounds Plumbing and Structures departments will have a meeting to discuss cleaning and maintenance plans. The tasks that these cleaning and maintenance plans consist of include:

- Drain cleaning
- Tree/brush trimming
- Root removal
- Debris removal from gutters

During the rainy season, the Grounds department remains on call in case emergency cleaning is needed around the campus.

3.7.1 Monitoring Irrigation

University of the Pacific utilizes IMS to control and manage irrigation on campus. With IMS, the Grounds Department is able to closely monitor irrigation water usage. The university can manage campus irrigation system immediately from any device and is especially useful during the summer to effectively and efficiently irrigate lawns.

3.7.2 Monitoring Water Usage

The Grounds department of University of the Pacific documents the campus's monthly exterior water usage to monitor the usage on campus to analyze and determine ways to reduce overall usage.

3.7.3 Monitoring Grounds Maintenance

The university also monitors known problem areas around the campus. These areas include flooding, clogged drains, high sediment deposits, etc. Methods to alleviate the known problems in the areas of the campus, Physical Plant utilizes and is not limited to:

- Items for flooding
 - Sandbags
 - Pumps
- Items to address **interior** water damage (**Custodial**)
 - Air scrubber (cleans the mold)then dehumidifier if applicable
 - Dessicant machine
 - Extractor machines to extract water from floors
- Items to clean storm drains
 - Sweep
 - Shovel
 - Blower
 - Hydro jetting
 - Cabling
 - Rodding
 - Etc.

The Grounds department will assign available employees to an area on a daily basis to perform maintenance and cleaning.

3.7.4 Monitoring Mosquitoes

Additionally, the San Joaquin County monitors water sources with mosquitoes. The City of Stockton will address and treat these areas with known problems of mosquitoes with mosquito abatement in the form of adding mosquito pills into the drain or water source.

4. SWMP Review and Revision

This Plan and [Recommendation Report](#) will be reviewed at least on a yearly basis to ensure it is up to date with new construction and policies on campus, the implementation of recommendations from the associated recommendations report, as well as any new local, state, or federal regulations regarding stormwater. The Plan should reflect major problems, new BMPs, or other noteworthy events as quickly as possible and before the annual review if feasible.

If significant changes are made to this Plan, the Revision Summary form (see Appendix C) will be updated accordingly and attached at the beginning of the revised Plan. Prior versions of the

Plan should be recorded and filed along with other SWM documents such as quarterly and annual inspection reports.

5. Conclusion

This Stormwater Management Plan addresses both the minimum regulatory requirements that University of the Pacific is required to meet for managing stormwater, as well as a broader set of ideal goals and principles that should be always kept in mind, whether for routine maintenance or development and implementation of new BMPs. As a small university with a strong sense of community, it is both viable and advantageous for SWM operations to promote sustainable practices and innovation, as such efforts will resonate with the students, faculty, and other departments on campus. A single, centralized source of information on inventory, procedures, guidelines, and goals will help all concerned parties see the big picture more easily and allows for analysis and foresight that is not possible when data and practices are scattered. The SWMP aims to help University of the Pacific keep pace with the unique challenges and demands associated with water in California.

Appendix A – Storm System Maps

Maps are in Facilities Sharepoint: [Pacific Base Map SD Storm Water](#) Base map is divided into 6 sections. There is one pdf that has all sections, and detailed pdf of each individual section.

Appendix B – Drain Grate Types



Appendix C – Revision Summary Form

University of the Pacific

Stormwater Management Plan: Revision Summary Form



Whenever the university's SWMP or one of its associated documents is significantly updated or revised, the following form should be attached or filed with the new revision to summarize the changes made and provide a distinction between versions kept on record. The changes noted in each form will also provide a microcosm of the university's steps towards improving how it manages stormwater over time.

Date:

Document under revision:

Revision number:

Responsible party:

Overview of changes:

Justification for changes:

References (new regulations, industry standards, etc.) if applicable: