University of California, Santa Barbara Stormwater Management Program

Interim Low Impact Development Strategy

April 2011

INTRODUCTION

The University of California, Santa Barbara (University) is committed to incorporating low impact development (LID) strategies in the design and construction of campus projects. The University has partnered with the Central Coast Regional Water Quality Control Board and other municipalities in a two-year joint effort to develop long-term hydromodification control criteria. In the interim, the following describes the University's LID strategy to effectively incorporate LID principles in the design and construction of projects during the two-year period preceding the adoption of the University's Hydromodification Management Plan.

PURPOSE/GOAL

The interim LID strategy proposes to require all campus projects that engage in design and/or construction during the interim period to manage storm water with the ultimate goal of minimizing changes to the campus watershed. LID shall be used to control changes in surface water flow and water volume of development sites from pre to post development

PROJECT TYPES

In an effort to maintain the University as a leading research and teaching institution committed to public service through the creation and distribution of knowledge that adcances the well –being of our state, nation, and world, maintenance, improvement and development of the University is essential in providing the atmosphere required for development of growth of mind and matter. Construction projects that maintain and provide the infrastructure to accomplish the campus' mission range from small tenant improvements to multilevel research facilities. Table 1 groups types of construction projects as they pertain to LID. Table 2 lists current and future projects and provides project types for those not deemed complete to date. Table 3 identifies the projects that fall in the interim period and are governed by this document.

Table 1
UCSB Project Types

Type A	Projects that do not affect exterior surfaces and are considered maintenance projects. Examples include: • Utility/Infrastructure. • Tenant improvement projects. • Hardscape repairs, ADA ramps, broken sidewalks.
Type B	Site work projects. Examples include: • Pavement – New/rehabilitation/replacement. • Landscape improvements. • Sports/Rec fields.
Type C	Building projects that are constrained by existing structures/improvements.
Type D	Building projects that are unconstrained such as those on undeveloped land.

Table 2
UCSB Future Projects

UCSB Project	Phase			
	In Construction	Deemed Complete*	In Design Phase	Type
Aquatic Complex			X	C
Arts Building Seismic Corrections	X	X		N/A
Bioengineering Building		X		N/A
Campus Infrastructure Improvement Project Phase 1 and 2a	X	X		N/A
Davidson Library Addition		X		N/A
Faculty Club Expansion			X	C
Hot Water Loop			X	A
Lagoon Road and Ocean Road Stormdrain (Infrastructure 2b)			X	A
North Campus Faculty Housing	X	X		N/A
Ocean Science Education Building	X	X		N/A
Research Greenhouse		X		N/A
Rob Field Turf Expansion		X		N/A
San Joaquin Student Housing			X	C
Sierra Madre Housing		X		N/A

* = UC Regent/Chancellor Approval.

Table 3
Projects to Include LID during the Interim Period

Aquatic Complex	Type C
Faculty Club Expansion	Type C
Hot Water Loop	Type A
Lagoon and Ocean Road Storm Drain	Type A
Research Greenhouse	Type C
San Joaquin Student Housing	Type C

LID STRATEGY AND GOALS

The University characterizes projects into four types with all but type A incorporating storm water management practices in the design and construction that minimize changes to the campus' watershed. The design and construction teams shall incorporate LID strategies to manage the storm water caused by various rain events keeping in mind factors such as treatment, quantity leaving the site and flow inclusive of changes in direction and magnitude. Impervious surfaces such a buildings, pervious roads, walks and parking surfaces lead to changes in management of site stormwater which shall be considered during the design process. To the extent possible, avoid excessive grading and disturbance of vegetation and soil. Concentrate development on portions of the site with less permeable soils to preserve permeable soils areas to receive stormwater runoff. Conform to

the site topography utilizing natural landforms to replicate the sites drainage patterns

Project Types:

Type A Projects – LID practices are not applicable for this type of project.

Type B or C Projects

Proposed Volume of Stormwater to be Treated/Managed

Rain Event	Goal (%)*
1 Year	90 – 100
5 Year	80 – 100
10 Year	70 – 100
>10 Year	Determined on a case by case basis.

* = 100 is drainage pattern similar to existing.

Type D Projects

Proposed Volume of Stormwater to be Treated/Managed

Rain Event	Goal (%)*
1 Year	95 – 100
5 Year	90 – 100
10 Year	85 – 100
>10 Year	Determined on a case by case basis.

* = 100 is drainage pattern similar to existing.

VARIOUS LID STANDARDS FOR PROJECT TYPES B - D

Site Design

- Preserve natural areas and existing vegetation including buffers.
- Preserve existing onsite natural drainage routes.
- Limit disturbance and grading.
- Maintain most permeable site soils (i.e. development should occur on the least permeable site soils).
- Reduce impervious areas:

  - Cluster buildings.
  - Reduce building footprint, by using multi-storied structures
  - Use the minimum required width for streets and roads.
  - Provide appropriately sized and located pedestrian and bicycle circulation.
  - Utilize permeable pavement.
- Disconnect impervious areas:
  - Install infiltration areas (trenches, planters, basins, rain gardens) to receive the flows from impervious areas.
  - Redistribute concentrated flows from impervious areas into sheet flow.
- Direct flows to vegetated areas and other rough conveyance systems.
- Eliminate or minimize curb and gutter design features.
- Replant all cleared or graded areas.

Structural Features

- Permeable Pavement.
- Rainwater Collection.
- Disconnected Roof Drains.
- Green Roofs/Living Walls.
- Rain Gardens.
- Curb Inlets/Drain Inlets.
- Infiltration Trench/Basins.
- Retention/Irrigation.
- Vegetated Swale/Buffer Strips.
- Bioretention.
- Media Filter.
- Water Solid Separators

BUILDING PROCESS

The University shapes land use development through planning that in turn relies on contracts, standards, and other enforceable mechanisms applied to projects throughout the design, review, approval and construction. To effectively implement LID, the University will continue to develop and improve these enforceable mechanisms. The University's building process includes opportunities where LID shall be applied and identifies the codes and standards that affect LID.

- Project Initiation – The Project Initiation Form (PIF) starts the process and clarifies the type of project in regards to LID (Type A – D).
- Design and Construction – The Design Guidelines contain the Interim LID Strategy alongside stormwater pollution prevention requirements and best management practices.
- Design Agreement – The Design Agreement includes the scope of work regarding LID and goals as set out for all projects as well as the degree of documentation required by the design team to document strategies for LID.
- Design Review – UCSB project managers, knowledgeable in the campus LID Strategy and stormwater objectives, oversee the design process and document project principles and design strategies.
- Construction – UCSB project managers and inspectors ensure that design strategies incorporated into project construction meet proposed objectives and identify site conditions which may require adjustments to meet goals.
- Record of LID – Record drawings will be produced and LID strategies will be identified on GIS mapping.

Existing Codes and Standards that Could be Affected by LID Strategy

- Fire Requirements – Minimum 20 foot wide road able to withstand fire truck loading.
- Long Range Development Plan (LRDP) – The LRDP could have constraints on building development.
- Topography and Geology – LID objectives could be affected on projects that are located adjacent to existing buildings with basements.
- Bluff Erosion – Construction near bluffs could affect LID objectives.

Long term maintenance strategies include:

- Map BMPs via GIS and record the maintenance history using the GIS map.
- Monitor the effectiveness of BMPs by conducting annual inspections.
- Conduct monitoring during rain events both onsite and offsite.

The University also provides education and outreach on LID which includes guidance for LID design and for complying with hydromodification control criteria.