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Applicability

Site Design Measures are required for all projects that **create and/or replace** (including projects with no net increase in impervious footprint) **between 2,500 square feet and 5,000 feet of impervious surface**.

Low Impact Development (LID) Design Standards are required for all development projects that **create and/or replace 5,000 square feet or more of impervious surface** (Regulated Projects).

Requirements

- 1) **Projects that create and/or replace between 2,500 square feet and 5,000 feet of impervious surface** shall implement one or more of the following **site design measures** to reduce project site runoff:
 - a) Stream Setbacks and Buffers – a vegetated area including trees, shrubs, and herbaceous vegetation that exists or is established to protect a stream system;
 - b) Soil Quality Improvement and Maintenance – improvement and maintenance of soil through soil amendments and creation of microbial community;
 - c) Tree planting and preservation – planting and preservation of health, established trees that include both evergreens and deciduous, as applicable;
 - d) Rooftop and Impervious Area Disconnection – rerouting of rooftop drainage pipes to drain rainwater to rain barrels, cisterns, or permeable areas instead of the storm sewer;
 - e) Porous Pavement – pavement that allows runoff to pass through it, thereby reducing the runoff from a site and surrounding areas and filtering pollutants;
 - f) Green Roofs – a vegetative layer grown on a roof (rooftop garden);
 - g) Vegetated Swales – a vegetated, open-channel management practice designed specifically to treat and attenuate stormwater runoff;
 - h) Rain Barrels and Cisterns – system that collects and stores stormwater runoff from a roof or other impervious surface
- 2) Project proponents shall use the **State Water Board SMARTS Post-Construction Calculator or equivalent to quantify the runoff reduction** resulting from implementation of **site design measures**.¹
- 3) **Site Design Measures** shall be based on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile rainfall event, to the extent feasible, to meet **6) Numeric Sizing Criteria for Stormwater Retention and Treatment**. Site design measures shall be used to reduce the amount of runoff, to the extent technically feasible, for which retention and runoff is required. Any remaining runoff from impervious drainage management areas (DMAs) may

¹ The State Water Board SMARTS Post-Construction Calculator referenced in the Phase II Small MS4 permit can be found at http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/draft_construction/app4_1_postcon.xls

The State Water Board Post-Construction Calculator for Small Projects (2,500-5,000 square feet) can be found at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/phase_ii_municipal/120214_post_const_calc.xls

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then be directed to one or more bioretention facilities as specified in **7) Stormwater Treatment Measures and Baseline Hydromodification Management Measures.**

- 4) **Projects that create and/or replace 5,000 square feet or more of impervious surface (Regulated Projects)** shall implement measures for **site design, runoff reduction, stormwater treatment, and baseline hydromodification management.**
 - a) Where a redevelopment project results in an increase of more than 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible.
 - b) Where a redevelopment project results in an increase of less than 50 percent of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be included.

- 5) **Source Control Measures** – Regulated Projects with pollutant-generating activities and sources are required to implement standard permanent and/or operational source control measures as applicable. Measures for the following pollutant-generating activities and sources shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment or equivalent manual, and include:
 - a) Accidental spills or leaks
 - b) Interior floor drains
 - c) Parking/Storage area maintenance
 - d) Indoor and structural pest control
 - e) Landscape/outdoor pesticide use
 - f) Pools, spas, ponds, decorative fountains, and other water features
 - g) Restaurants, grocery stores, and other food service operations
 - h) Storage and handling of solid waste
 - i) Outdoor storage of equipment or materials
 - j) Vehicle and equipment cleaning
 - k) Vehicle and equipment repair and maintenance
 - l) Fuel dispensing areas
 - m) Loading docks
 - n) Fire sprinkler test water
 - o) Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
 - p) Unauthorized non-storm water discharges
 - q) Building and grounds maintenance

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- 6) **Numeric Sizing Criteria for Stormwater Retention and Treatment** – Facilities designed to evapotranspire, infiltrate, harvest/use, and biotreat stormwater must meet at least one of the following **hydraulic sizing design criteria**:
- a) **Volumetric Criteria**
 - i) The maximized capture stormwater volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or
 - ii) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of CASQA’s Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.
 - b) **Flow-based Criteria**
 - i) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or
 - ii) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records
- 7) **Stormwater Treatment Measures and Baseline Hydromodification Management Measures** – After implementation of Site Design Measures, runoff from remaining impervious DMAs must be directed to one or more facilities designed to infiltrate, evapotranspire, and/or biotreat the amount of runoff specified in **6) Numeric Sizing Criteria for Stormwater Retention and Treatment**. The facilities must be demonstrated to be at least as effective as a bioretention system with the following design parameters:
- 1) Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.
 - 2) Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
 - 3) Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
 - 4) Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
 - 5) Underdrain with discharge elevation at top of gravel layer.
 - 6) No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
 - 7) No liners or other barriers interfering with infiltration.
 - 8) Appropriate plant palette for the specified soil mix and maximum available water use.

- a) **Alternative Designs for Bioretention Facilities** — Facilities, or a combination of facilities, of a different design than **Stormwater Treatment Measures and Baseline Hydromodification Management Measures** may be permitted if the following measures of equivalent effectiveness are demonstrated:
 - 1) Equal or greater amount of runoff infiltrated or evapotranspired.
 - 2) Equal or lower pollutant concentrations in runoff that is discharged after bioretention.
 - 3) Equal or greater protection against shock loadings and spills.
 - 4) Equal or greater accessibility and ease of inspection and maintenance.

- b) **Allowed Adjustments for Bioretention Facilities for Special Site Conditions** – The bioretention design parameters as specified in **Stormwater Treatment Measures and Baseline Hydromodification Management Measures** may be adjusted for the following special site conditions:
 - 1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
 - 2) Facilities in areas with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).
 - 3) Facilities located in areas of highly infiltrative soils or high groundwater, or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.

- c) **Exceptions to Requirements for Bioretention Facilities** – Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters) may be used for the following:
 - 1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
 - 2) Facilities receiving runoff solely from existing (pre-project) impervious areas;
 - 3) Historic sites, structures, or landscapes that cannot alter their original configuration in order to maintain their historic integrity.