

Background / Regulatory Requirements

In this Chapter:

- ▶ *How stormwater problems result from development*
- ▶ *Post-construction requirements for development projects*

2.1 Stormwater Problems in Developed Areas

Throughout the country, stormwater runoff is a leading source of pollutants for water bodies that fail to meet water quality standards¹. In the San Francisco Bay watershed, urban and agricultural runoff is generally considered to be the **largest source of pollutants** to aquatic systems². Although stormwater runoff is part of the natural hydrologic cycle, human activities can alter the natural drainage patterns, introduce pollutants and increase erosion, degrading the natural habitats.

2.1.1 Stormwater Runoff in a Natural Setting

The natural water cycle circulates the earth's water from sky, to land, to sea, to sky in a never-ending cycle. In a pristine setting, soil is covered with a complex matrix of mulch, roots and pores that absorb rainwater. As **rainwater infiltrates slowly into the soil**, natural biologic processes remove impurities. Because most rainstorms are not large enough to fully saturate the soil, only a small percentage of annual rainwater flows over the surface as runoff. Natural vegetation tends to slow the runoff in a meandering fashion, allowing suspended particles and sediments to settle. In the natural

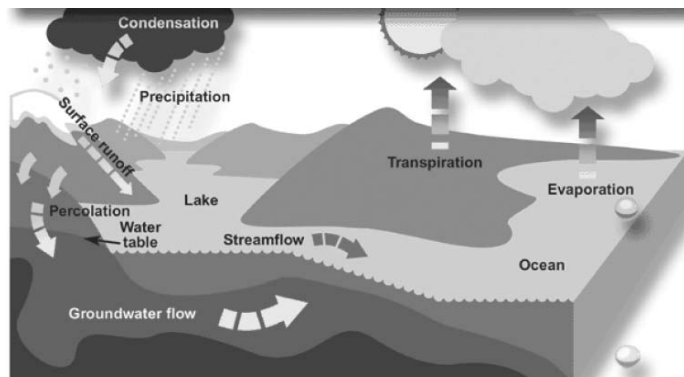


Figure 2-1: The Water Cycle (NGRDC/GDNR, 2005/06)

¹ USEPA, Stormwater Frequently Asked Questions, http://cfpub.epa.gov/npdes/faqs.cfm?program_id=6

² San Francisco Bay Regional Water Quality Control Board, Basin Plan, 2004, www.waterboards.ca.gov/sanfranciscobay/basinplan.htm

condition, the hydrologic cycle creates a stable supply of groundwater, and surface waters are naturally cleansed of impurities. Sediment is carried with the flow of stormwater runoff, but creeks typically find an equilibrium in which sediment is carried without impairing beneficial uses.

2.1.2 Stormwater Runoff in Urban or Urbanizing Areas

In developed areas, impervious surfaces – such as roads, parking lots and rooftops – prevent water from infiltrating into the soil. **Most of the rainfall runoff flows across the surface**, where it washes debris, dirt, vehicle fluids, chemicals, and other pollutants into the local storm drain systems. Once in the storm drain, polluted runoff flows directly into creeks and other natural bodies of water. Figure 2-2 contrasts the percentage of rainfall that becomes stormwater runoff in a natural and an urban setting.

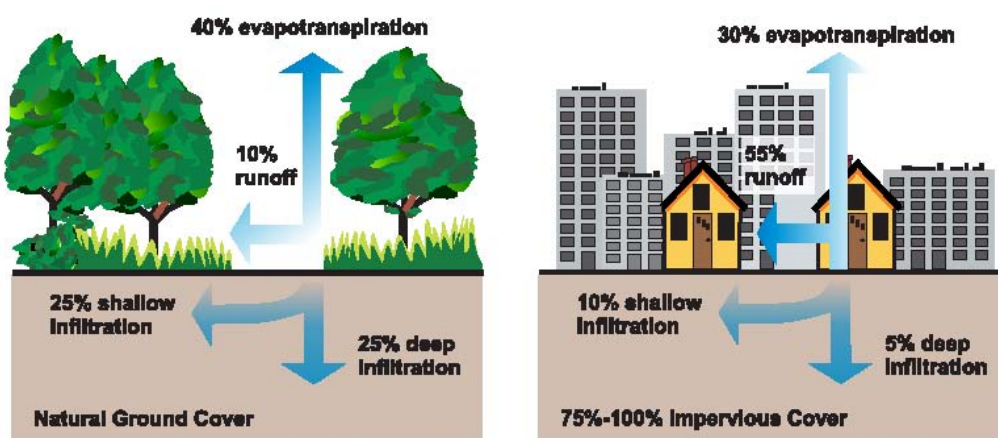


Figure 2-2: Change in volume of stormwater runoff after development. (USEPA, 2003)

Not only does urban stormwater runoff **wash pollutants into local waterways**, but it can also cause natural creek channels to erode. When impervious surfaces are built, rainwater runs off at **faster rates and in larger volumes** than in the natural condition. Natural creek channels must suddenly handle much greater volumes of water traveling at much faster rates, greatly increasing the duration of erosive forces on their bed and banks. In response to these changes, creek channels enlarge by downcutting and widening. This effect is called hydrograph modification or hydromodification. Figures 2-3 and 2-4 contrast creek channels in the natural condition and creek channels subject to hydromodification.

2.2 Low Impact Development Stormwater Controls

Key Point



Various permanent control measures have been developed in order to **reduce the long-term impacts** of development on stormwater quality and creek channels. These permanent control measures are often called post-construction stormwater controls/low impact development (LID) or post construction best management practices (BMPs) to distinguish them from the temporary construction BMPs that are used to control sedimentation and erosion while a project is being constructed. LID reduces water quality impacts by preserving and re-creating natural landscape features, minimizing imperviousness, and then infiltrating, storing, detaining, evapotranspiring (evaporating

stormwater into the air directly or through plant transpiration), and/or biotreating stormwater runoff close to its source, or onsite.



Figure 2-3: Creek with Natural Banks

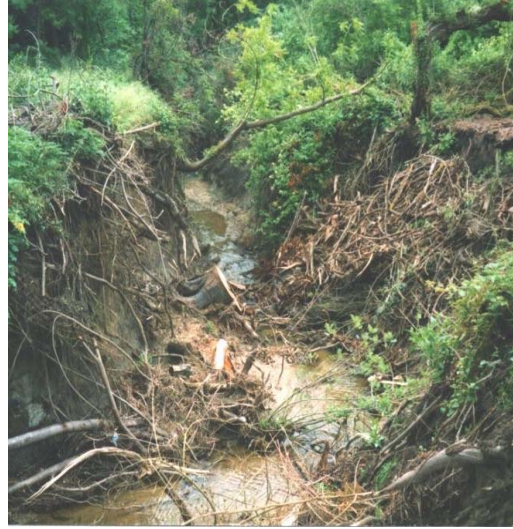


Figure 2-4: Creek Subject to Hydromodification

Post-construction stormwater control measures can be divided into four categories: site design measures, source control measures, stormwater treatment measures, and hydromodification management measures. Each of these categories is described below.

2.2.1 Site Design Measures

Site design measures are **site planning techniques** for pollution prevention and reduction in flow rates and durations, by protecting existing natural resources and reducing impervious surfaces of development projects. Some examples of site design measures include:

- Minimize land disturbance and preserve high-quality open space;
- Minimize impervious surfaces by using narrow streets, driveways and sidewalks;
- Minimize impervious surfaces that are directly connected to the storm drain system (unless the connection includes a stormwater treatment measure). One example of “disconnecting” impervious surfaces is to direct roof downspouts to splash blocks or “bubble-ups” in landscaped areas;
- Cluster structures and paved surfaces; and
- Use landscaping as a drainage feature.

2.2.2 Source Control Measures

Source control measures consist of either structural project features or operational “good housekeeping” practices that **prevent pollutant discharge and runoff** at the source, such as by keeping pollutants from coming into contact with stormwater. Examples of structural source controls include:

- Roofed trash enclosures,
- Berms that control run-on to or runoff from a potential pollutant source, and

- Indoor mat/equipment wash racks that are connected to the sanitary sewer. (Note that any sanitary sewer connections must be approved by the local permitting authority.)

Examples of operational source controls include:

- Street sweeping and
- Regular inspection and cleaning of storm drain inlets.

2.2.3 Stormwater Treatment

Effective **December 1, 2011, (and revised on November 19, 2015)** the Municipal Regional Stormwater Permit (MRP) requires stormwater treatment requirements to be met by using evapotranspiration, infiltration, rainwater harvesting and reuse, or biotreatment. In some Special Projects, media filters and high flow rate tree well filters are allowed. See Section 2.3.1 for more information on stormwater treatment requirements and Appendix J for information on Special Projects.

Stormwater treatment measures must be sized to comply with one of the hydraulic design criteria listed in the municipal regional stormwater permit's Provision C.3.d, which are described in Section 5.1 of this guidance document. Chapter 6 provides technical guidance specific to the following, commonly used treatment measures:

- Bioretention areas,
- Flow-through planter boxes,
- Tree well filters (effective December 1, 2011, high flow rate tree well filters are allowed only in Special Projects - see Appendix J),
- Infiltration trenches,
- Extended detention basins,
- Green roofs,
- Pervious Paving, and grid pavements,
- Rainwater harvesting and use,
- Media filters (effective December 1, 2011, media filters are allowed only in Special Projects - see Appendix J), and
- Subsurface infiltration systems.

2.2.4 Hydromodification Management Measures

Hydromodification management (HM) measures include site design and source control measures that promote infiltration or otherwise **minimize the change in the rate and flow of runoff**, when compared to the pre-development condition. HM measures also include constructed facilities (such as basins, ponds, or vaults) that manage the flow rates of stormwater leaving a site, and under some conditions can also include re-engineering of at-risk channels downstream from the site. In some cases a single stormwater treatment measure may be used to meet both the treatment and HM objectives for a project. A dual-use measure of this type is sometimes called an "integrated management practice," or IMP.

2.3 Municipal Stormwater Permit Requirements

The development or redevelopment of property represents an opportunity to incorporate post-construction controls that can reduce water quality impacts over the life of the project. The Municipal Regional Stormwater Permit (MRP), adopted by the Water Board in November 2015, includes requirements for incorporating post-construction stormwater control/LID measures into new development and redevelopment projects. These requirements are known as Provision C.3 requirements. The text of Provision C.3 and the entire MRP (Order No. RB2-2015-0049) can be found at the following link: www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/R2-2015-0049.pdf.

Provision C.3.c establishes thresholds at which new development and redevelopment projects must comply with Provision C.3, although the municipal stormwater permit also requires agencies to encourage all projects subject to local development review to include adequate source control and site design measures that minimize stormwater pollutant discharges. Regardless of a project's need to comply with Provision C.3, municipalities apply standard **stormwater conditions of approval** for projects that receive development permits. These conditions of approval require appropriate site design, source control measures, and, in some cases, treatment measures.

Regardless of a project's need to comply with Provision C.3, municipalities apply standard **stormwater conditions of approval** to projects that receive

PROVISION C.3 THRESHOLDS



Thresholds for determining whether Provision C.3 applies to a project (in which case the project is a "C.3 Regulated Project") are based on the amount of impervious surface that is created and/or replaced by a project, as described below.

- Since 2006, private or public projects that create and/or replace **10,000 or more or impervious surface** have been C.3 Regulated Projects.
- Effective **December 1, 2011**, the threshold for requiring stormwater treatment is reduced from 10,000 to 5,000 square feet of impervious surface for the following project categories: uncovered parking areas (stand-alone or part of another use), restaurants, auto service facilities³¹ and retail gasoline outlets.

In addition to these thresholds, there are size thresholds for implementing the site design measures but not stormwater treatment or hydromodification management measures for the following project types:

- Small projects that create and/or replace between 2,500 square feet and 10,000 square feet of impervious surface; and
- Detached single-family home projects that create and/or replace 2,500 square feet or more of impervious surface.

¹ Auto service facilities include the specific Standard Industrial Classification Codes, as follows:
 5013: Wholesale distribution of motor vehicle supplies, accessories, tools, equipment, and parts.
 5014: Wholesale distribution of tires and tubes for passenger and commercial vehicles.
 7532: Repair of automotive tops, bodies, and interiors, or automotive painting and refinishing.
 7533: Installation, repair, or sale and installation of automotive exhaust systems.
 7534: Repairing and retreading automotive tires.
 7536: Installation, repair, or sales and installation of automotive glass.
 7537: Installation, repair, or sales and installation of automotive transmissions.

CALCULATING IMPERVIOUS SURFACE

An “impervious surface” is any material that prevents or substantially **reduces infiltration of water into the soil**. This includes building roofs, driveways, patios, parking lots, impervious decking, streets, sidewalks, and any other continuous watertight pavement or covering. Impervious surface is calculated in terms of square feet or acres. When calculating the area of building roofs, be sure to include not only the footprint of the main building or structure, but also any garages, carports, sheds, or other miscellaneous structures.

Pervious paving is not considered an impervious surface, as long as it is underlain with a pervious storage material that holds at least the Provision C.3.d amount of rainfall runoff.

Pervious paving is not considered an impervious surface, as long as it is underlain with a pervious storage material (such as gravel) that holds at least the Provision C.3.d volume of rainfall runoff. Open, uncovered retention/detention facilities are not considered impervious surfaces for purposes of determining whether a project is a Regulated Project, but they are considered impervious surfaces for purposes of runoff modeling and meeting the Hydromodification standard. The municipalities use a “C.3 Regulated Projects Checklist” to help applicants with these calculations. **Contact your local jurisdiction** for its checklist.



EXCLUSIONS FOR PENDING PROJECTS

All projects that meet the descriptions of Regulated Projects in Provision C.3.b are required to implement LID source control, site design, and stormwater treatment requirements as described in Provisions C.3.c and C.3.d of the MRP. However, Provision C.3.b provides for grandfathering of projects that were approved under a previous municipal stormwater permit, have not yet been constructed, and meet specific criteria described as follows:

- Any Regulated Project that has been approved with stormwater treatment measures in compliance with Provision C.3.d (numeric sizing criteria) under a previous municipal stormwater permit is exempt from the requirements of Provision C.3.c (LID requirements) in the current MRP and may proceed with the approved treatment measures.
- Any Regulated Project that was approved with no Provision C.3 stormwater treatment measures under a previous municipal stormwater permit and has not begun construction by the January 1, 2016, is required to fully comply with the requirements of Provisions C.3.c and C.3.d. Permittees may grant exemptions from this requirement if:
 1. The project was previously approved with a vesting tentative map that confers a vested right to proceed with development in substantial compliance with the ordinance, policies, and standards in effect at the time the vesting tentative map was approved or conditionally approved, as allowed by State law; or
 2. The local agency has no legal authority to require changes to previously granted approvals for the project, e.g., the project has been granted a building permit.

This exemption from the LID requirements of Provision C.3.c. may be granted to any Regulated Project as long as stormwater treatment with media filters is provided that comply with the hydraulic sizing requirements of Provision C.3.d.

EXCLUSIONS FOR SPECIFIC TYPES OF PROJECTS

Provision C.3.c of the MRP excludes specific types of projects from the C.3 requirements for stormwater treatment, source controls and site design measures, even if the thresholds described above are met or exceeded. The list of excluded project types is shown in Table 2-1, below.

	Excluded Projects
Commercial, industrial, residential, or other development	Detached single-family home projects that are not part of a larger plan of development ⁴ .
Road projects	<ul style="list-style-type: none"> ▪ Roadway reconstruction that does not add one or more new lanes of travel or a new roadway; ▪ Widening of roadways that does not add one or more new lanes of travel; ▪ Impervious trails with a width of 10 feet or less and located more than 50 feet from top of creek banks. ▪ Sidewalk projects in the public right of way that are not built as part of new streets or roads; ▪ Bicycle lane projects in the public right of way that are not built as part of new streets or roads.⁵ ▪ Sidewalks built as part of new streets or roads that are constructed to drain to adjacent vegetated areas; ▪ Bicycle lanes built as part of new streets or roads that are not hydraulically connected to the new streets or roads, and that are constructed to direct stormwater runoff to adjacent vegetated areas; ▪ Impervious trails built to direct stormwater runoff to adjacent vegetated areas or other non-erodible pervious areas, preferably away from creeks or toward the outboard side of levees; ▪ Sidewalks, bicycle lanes or trails built with permeable surfaces; ▪ Caltrans highway projects and associated facilities.
Redevelopment projects (including pavement resurfacing)	<p>Interior remodels and routine maintenance or repair, including:</p> <ul style="list-style-type: none"> ▪ Roof replacement. This exclusion applies to all roof replacement projects, including those that remove the entire roof. ▪ Exterior wall surface replacement; ▪ Pavement resurfacing within the existing footprint. This exclusion applies to any routine maintenance of paved surfaces within the

⁴ Effective December 1, 2012, detached single-family home projects that are not part of a larger plan of development and that create and/or replace 2,500 square feet or more of impervious surface are required to implement site design measures specified in Provision C.3.i.

⁵ If an existing road is widened to add a traffic lane in addition to a new bicycle lane, and the bike lane is not hydraulically separated from the road, treatment of runoff from the bike lane would be required.

Table 2-1 Projects Excluded from Provision C.3 Numerically Sized Treatment Requirements	
	Excluded Projects
	existing footprint, including the repaving that occurs after conducting utility work under the pavement, and the routine reconstruction of pavement, which may include removal and replacement of the subbase. If a repaving project results in changes to the footprint, grade, layout or configuration of the paved surfaces, it would trigger the requirements of Provision C.3. The pavement resurfacing exclusion also applies to the reconstruction of existing roads and trails.

ROAD PROJECTS

If your roadway project (including sidewalks and bicycle lanes built as part of new streets or roads) creates 10,000 square feet or more of **newly constructed, contiguous impervious surface**, the project is subject to the requirements of Provision C.3. Impervious trails 10 feet wide or more that are constructed within 50 feet of the top of a creek bank are also considered roadway projects. If the roadway project widens existing roads with additional traffic lanes, the **“50 Percent Rule”** for stormwater treatment applies (see the C.3 requirements for redevelopment projects, below). Road projects excluded from Provision C.3 are listed in Table 2-1.

2.3.1 What is Required by Provision C.3?



Projects that are subject to Provision C.3 (C.3 Regulated Projects) must implement:

- Site design measures,
- Source control measures, and
- Low impact development (LID) treatment measures.

What Are C.3 Regulated Projects? Except for the excluded projects listed in Table 2-1, projects that create and/or replace 10,000 square feet or more of impervious surface are C.3 Regulated Projects. Effective **December 1, 2011**, projects that consist of restaurants, auto service facilities, retail gasoline outlets, and surface parking areas (stand-alone or part of another use) that create and/or replace 5,000 square feet or more of impervious surface are also C.3 Regulated Projects.

What Are LID Treatment Measures? LID treatment consists of evapotranspiration, infiltration, rainwater harvesting and use, and/or biotreatment of the amount of stormwater runoff specified in MRP Provision C.3.d. Effective **December 1, 2011**, C.3 Regulated Projects must provide treatment using LID measures. In some limited cases, LID treatment reduction is allowed for certain smart growth, high density or transit-oriented development Special Projects, described below. All treatment measures must be hydraulically sized as specified in MRP Provision C.3.d.

What Are Special Projects? LID treatment requirements are reduced for certain smart growth, high density, or transit-oriented development Special Projects. If a project meets the Special Projects criteria provided in Appendix J, specific non-LID treatment measures

may be used to treat a percentage of the total C.3.d amount of stormwater runoff that requires treatment. Two types of non-LID treatment measures are allowed in Special Projects: high flow rate tree well filters and high flow rate media filters. See Appendix J for criteria and procedures for identifying Special Projects and calculating the LID treatment reduction.

HYDROMODIFICATION MANAGEMENT REQUIREMENTS

Projects that create and/or replace **one acre or more** of impervious surface must incorporate hydromodification management measures, if the project is located in an area susceptible to hydromodification (shown in a map in Appendix H), and if the amount of impervious surface area is increased above pre-project conditions. See Chapter 7 for more information.

REDEVELOPMENT PROJECTS

If your project is located on a previously developed site and will result in the **replacement of impervious surface**, then it is considered a redevelopment project and the following special provisions apply to it:

- **“50 Percent Rule:”** Redevelopment projects that replace or alter 50 percent or less of existing impervious surface need to treat stormwater runoff only from the portion of the site that is redeveloped. Redevelopment projects that replace or alter more than 50 percent of the existing impervious surface are required to treat runoff from the entire site.
- A project that does not increase impervious surface over the pre-project condition is not an HM project.

ALTERNATIVE COMPLIANCE

The municipal stormwater permit allows projects to use “alternative compliance,” to meet stormwater treatment requirements offsite. See Chapter 9 for more information.

How Do Projects Meet the C.3 Requirements?

The project’s development permit application submittals must include detailed information showing how the Provision C.3 stormwater requirements will be met.

Chapter 3 provides **step-by-step instructions** for incorporating C.3 stormwater submittals into your permit applications.

See Chapter 3
for **step-by-
step
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on
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2.3.2 Site Design Requirements for Small Projects

Effective December 1, 2012, specific sizes of small projects must meet site design requirements in Provision C.3.i of the Municipal Regional Stormwater Permit (MRP). This applies to:

- Projects that create and/or replace at least 2,500 but less than 10,000 square feet of impervious surface; and
- Individual single family home projects that create and/or replace 2,500 square feet or more of impervious surface.

Applicable projects must implement at least one of the following site design measures:

- Direct roof runoff into cisterns or rain barrels for use.
- Direct roof runoff onto vegetated areas.
- Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
- Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
- Construct sidewalks, walkways, and/or patios with permeable surfaces.
- Construct bike lanes, driveways, and/or uncovered parking lots with permeable surfaces.

The requirements apply to your project if it meets the size thresholds described above, and it received **final discretionary approval on or after December 1, 2012**. If your project does not require discretionary approval, such as tract map approval, conditional use permit, or design review, then the requirements apply if the building permit is issued on or after December 1, 2012.

Projects in the following four **“Special Land Use Categories”** that create and/or replace 5,000 square feet or more of impervious surface are considered Regulated Projects and are required to implement low impact development (LID) stormwater treatment, source control measures, AND site design measures:

- Restaurants;
- Retail gasoline outlets;
- Auto service facilities; and
- Surface parking (stand-alone or part of another use).

The LID site design and treatment measures implemented for Special Land Use Category projects will satisfy the C.3.i requirements.

Appendix L provides guidance to assist in selecting and implementing appropriate site design measures for small projects. Included in Appendix L are four fact sheets that provide detailed information for implementing the six site design measures.

2.4 Regulatory Authority

The Countywide Program’s municipalities derive their authority to regulate stormwater quality and hydrograph modification impacts primarily from their stormwater ordinances. However, related municipal code sections, planning documents, resolutions, policies and standard procedures can also be important regulatory sources. Each municipal stormwater ordinance may have unique elements, but they provide the municipalities the authority to implement the municipal regional stormwater permit, including the requirements of Provision C.3 as described above. **Violations of a municipal stormwater ordinance** may be subject to civil actions such as:

- Temporary and/or permanent injunction;
- Assessing costs of any investigation or inspection to establish the violation and bring legal action;



- Costs incurred in removing, correcting, or terminating adverse effects of the violation;
- Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life;
- Order to cease and desist a violation;
- Notice to remove waste or other material that may result in an increase in pollutants entering the stormwater drainage system; and
- Arrest or citation of persons violating the stormwater ordinance.