

Background / Regulatory Requirements

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- ▶ *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 systems.² 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

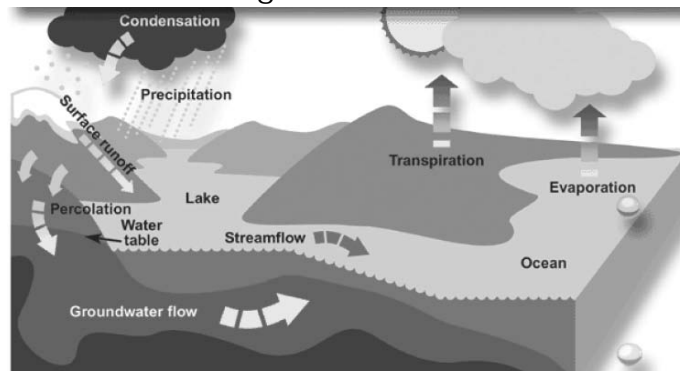


Figure 2-1: The Water Cycle (NGRDC/GDNR, 2005/06)

enough to fully saturate the soil, only a small percentage of annual rainwater flows over the surface as runoff. The natural vegetation tends to slow the runoff in a meandering fashion,

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, <http://www.waterboards.ca.gov/sanfranciscobay/basinplan.htm>

allowing suspended particles and sediments to settle. In the natural 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 in a natural setting, creeks typically find an equilibrium in which they transport sediment 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.

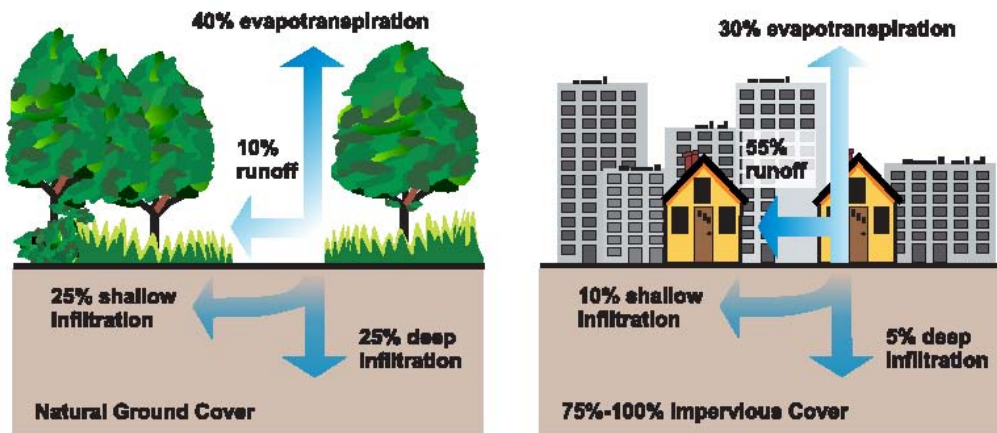


Figure 2-2: Change in volume of stormwater runoff after development. (USEPA, 2003)

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 Post-Construction Stormwater Controls



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 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.



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 washracks 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 Measures

Stormwater treatment measures are engineered systems that are designed to **remove pollutants from stormwater** using natural processes such as filtration, infiltration, flotation and sedimentation. Stormwater treatment measures must be sized to comply with one of the hydraulic design criteria listed in the municipal stormwater permit's Provision C.3.d, which are described in Section 5.1 of this guidance document. Stormwater treatment measures can be categorized according to whether they are landscape-based or non-landscape-based. Because landscape-based treatment measures have generally been found to be more effective than non-landscape based, the use of landscape-based treatment measures is encouraged. Although other types of stormwater treatment measures may be used, Chapter 6 provides technical guidance specific to the following, commonly used treatment measures:

- Vegetated swales,
- Vegetated buffer strips,
- Tree well filters,
- Flow-through planter boxes,
- Media filters,
- Infiltration trenches,
- Bioretention areas
- Extended detention basins, and
- Combining pervious pavement with stormwater treatment.

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. Since the first countywide municipal stormwater permit was adopted in 1993, the

Countywide Program’s member municipalities have required new development and redevelopment projects to incorporate post-construction stormwater site design, source control, and treatment measures in their projects to the maximum extent practicable (MEP). To meet the MEP standard, municipalities must employ stormwater control measures that are technically feasible (that is, are likely to be effective) and are not cost prohibitive.

In 2003 the countywide municipal stormwater permit was amended to include more prescriptive requirements for incorporating post-construction stormwater control measures into new development and redevelopment projects, similar to other Bay Area municipal stormwater permits. The full text of the municipal stormwater permit is available at the following link: www.waterboards.ca.gov/sanfranciscobay/Agenda/02-19-03/02-19-03-14finalto.doc, and Provision C.3 of the permit is described below.

2.3.1 Do the C.3 Requirements Affect My Project?

Provision C.3.c establishes thresholds for which new development and redevelopment projects must comply with Provision C.3, although it also states that “all projects regardless of size should consider incorporating appropriate source control and site design measures that minimize stormwater pollutant discharges to the maximum extent practicable [MEP]....”. Regardless of a project’s need to comply with Provision C.3, municipalities apply the MEP standard, including 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.

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PROVISION C.3 THRESHOLDS



The thresholds for determining whether Provision C.3 applies to a project are based on the amount of impervious surface that is created and/or replaced by a project, as described below.

- Since February 15, 2005, private or public projects that create and/or replace **one acre or more of impervious surface** have had to comply with Provision C.3, unless an applicable development permit application was “deemed complete” by February 15, 2005, or another exclusion applies. (“Impervious surface,” “deemed complete,” and projects excluded from Provision C.3 are discussed below.)
- Beginning August 15, 2006, private or public projects that create and/or replace **10,000 square feet or more** of impervious surface must comply with Provision C.3, unless an applicable development permit application is “deemed complete” by August 15, 2006.

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 area where material is placed on the ground and prevents or substantially reduces the infiltration of water into the soil. Impervious surface is calculated in terms of square feet or, for larger sites, in acres. When calculating the area of building roofs, be sure to include not only the footprint of the main

building or structure, but also their eave overhangs and any garages, carports, sheds, or other miscellaneous structures. If your project includes artificial turf or areas of “pervious paving,” such as pervious asphalt, pervious concrete, or unit pavers, these areas must be included when calculating the total amount of impervious area on the site. Areas of turf block are not included in the calculation of impervious surface. The municipalities use an “Impervious Surface Form” to help project applicants with these calculations. **Contact your local jurisdiction** to obtain its impervious surface form.



DEEMED COMPLETE

The California Permit Streamlining Act requires development permit applications to be “deemed complete” if they have been accepted by the municipal Planning Department and the applicant has not received a letter within 30 days stating that the application is incomplete. If the applicant has received a letter within 30 days stating that the application is incomplete, the application will be considered complete if the applicant submits the additional requested information to the satisfaction of the Planning Department.



If your project creates and/or replaces at least 10,000 square feet but less than one acre of impervious surface, does not require a planning permit, and you submitted a building permit application prior to August 15, 2006, contact the local jurisdiction regarding the applicability of the Provision C.3 requirements.

EXCLUSIONS FROM PROVISION C.3

Provision C.3.c of the municipal stormwater permit excludes specific types of projects from Provision C.3 requirements, even if they meet the threshold requirements described above. The list of excluded project types is shown in Table 2-1.

	Excluded Projects
Commercial, industrial or residential development	Construction of one single-family home that is not part of a larger common plan of development, with the incorporation of appropriate pollutant source control and design measures, and using landscaping to appropriately treat runoff from roof and house-associated impervious surfaces (e.g., runoff from roofs, patios, driveways, sidewalks, and similar surfaces).
Street, road, highway, and freeway projects that are under the Dischargers’ jurisdiction	Sidewalks, bicycle lanes, trails, bridge accessories, guardrails, and landscape features that are part of a street, road, highway or freeway project. Note: these are <u>not</u> exempt when part of commercial, industrial or residential developments.
Significant Redevelopment projects	Interior remodels and routine maintenance or repair, such as roof or exterior surface replacement, pavement resurfacing, repaving and road pavement structural section rehabilitation within the existing footprint, and any other reconstruction work within a public street or road right-of-way where both sides of that right-of-way are developed.
Source: San Francisco Bay Regional Water Quality Control Board, February 2003	

Key Point



2.3.2 What is Required by Provision C.3?

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 must incorporate the following stormwater controls.

- Site design measures,
- Source control measures, and
- Stormwater treatment measures that are hydraulically sized as specified by the countywide municipal stormwater permit.

After key provisions from the Countywide Program's Hydromodification Management Plan (HMP) are approved by the Water Board, projects that are not on the excluded list (Table 2-1) and create or replace **one acre or more** of impervious surface will need to incorporate hydromodification management measures, if the project is located in an area susceptible to hydromodification.

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:

- Redevelopment projects that replace 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 more than 50 percent of the existing impervious surface are required to treat runoff from the entire site.
- Redevelopment projects are subject to hydromodification management requirements only if they increase the amount of impervious surface compared to the pre-redevelopment project conditions, or the redeveloped project increases the efficiency of drainage collections and runoff, and they are located in susceptible areas.

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. It also includes simple instructions for small sites in Section 3.4.

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

2.4 Alternative Compliance

Provision C.3.g of the municipal stormwater permit allows municipalities to develop procedures for granting "alternative compliance" to development or redevelopment projects. Alternative compliance would allow a project to meet the requirement to treat stormwater through an approved **equivalent offsite treatment** or water quality benefit projects. In some very limited cases, exemptions from the requirement to treat stormwater runoff may be granted. The NPDES permit allows the Countywide Program to prepare a model

alternative compliance program, which would need to be approved by the Water Board before implementation by the municipalities. In the absence of such a model program, individual municipalities may opt to grant **interim alternative compliance**. To be eligible for interim alternative compliance both of the following conditions must be present:

- The project applicant demonstrates that treatment measures are **impracticable** on-site due to space limitations and lack of below-grade treatment options.
- The project applicant presents sufficient assurance of providing appropriate **off-site treatment** within the drainage basin.



The Countywide Program has not prepared an alternative compliance model program, and anticipates that the Water Board will refine the requirements for alternative compliance when it issues the municipal regional permit -- which will replace the countywide municipal stormwater NPDES permit and is scheduled to be adopted in 2007. If you think your project may meet the eligibility criteria described above, **contact the local jurisdiction** to learn whether interim alternative compliance may be an option for your project.

2.5 Regulatory Authority



The Countywide Program's municipalities derive their authority to regulate stormwater quality and hydrograph modification impacts from their stormwater ordinances. Each municipal stormwater ordinance may have unique elements, but they provide the municipalities the authority to implement the countywide NPDES municipal 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.