

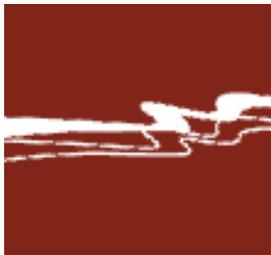
STORM WATER RUNOFF FROM NEW DEVELOPMENT: AN EVALUATION OF COUNTY PERMIT REVIEW PROCEDURES

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1 INTRODUCTION

In the County of Santa Barbara, storm water discharges from the municipal storm drain system are regulated under the National Pollutant Discharge Elimination System General Permit Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (General Permit). In order to comply with the General Permit, the County developed a Storm Water Management Program which was approved by the Regional Water Board on July 7, 2006. One of the County-initiated measurable goals identified in Chapter 5.0 "Post-Construction Runoff Control" of the *County of Santa Barbara Storm Water Management Program* is to evaluate existing policies, procedures and standard conditions for consistency with the General Permit including Attachment 4 (State Water Resources Control Board Water Quality Order No. 2004 – 0005 – DWQ). Attachment 4 includes requirements to address storm water quality for selected types of development. These requirements include site, source, and treatment control Best Management Practices (BMPs). The following report summarizes an evaluation conducted to meet this goal.

One of the more promising site control BMPs is the use of low impact development (LID) concepts. LID is a stormwater management approach used extensively on the East coast and more recently in the western states that preserves a site's predevelopment hydrology through the use of distributed lot-level controls such as infiltration, filtering, storage, evaporation and detention. An LID approach reduces stormwater runoff, pollution and erosion typically associated with new development and redevelopment projects. LID has seen increased usage and success in recent years and is anticipated to become a standard approach for all municipal programs during the upcoming permit term.

As part of this evaluation effort, this project sought answers to the following questions:

- Does the County's development review program meet the requirements established by the General Permit?
- Are the guiding policies understood early in the process of permit review?
- Are the recommended design standards known, reasonable and appropriate?
- Can improvements be made based upon more established development review programs from other communities, especially applying LID as a stormwater management approach?

To accomplish the evaluation, the following multi-pronged approach was taken:

1. Review the County's current regulatory requirements.
2. Review and compare other representative municipalities' stormwater management policy, procedures, guidance manuals and regulations to identify opportunities for improvement.
3. Analyze the ability of existing county land use policies, design standards, California Environmental Quality Act (CEQA) review/impact mitigation's, ordinances and standard conditions to achieve minimum compliance with the permit conditions.
4. Evaluate additional opportunities for improvement and identify inconsistencies within existing county land use policies, design standards, CEQA review/impact mitigation, ordinances and standard conditions.
5. Assess the development review and approval process for the incorporation of LID concepts.

6. Review the county's ability to assure post construction long-term operation and maintenance of structural BMPs and address potential procedural hindrances towards compliance.
7. Provide near term and long term recommendations to assure County compliance with General Permit conditions, including Attachment 4, and improve the County's overall development review program.

2 REGULATORY REQUIREMENTS

The General Permit requires the County (Permittee) to develop and implement a Storm Water Management Program that describes BMPs, measurable goals, and timetables for implementation in the following six program areas:

1. Public Education

The Permittee must educate the public in its permitted jurisdiction about the importance of the storm water program and the public's role in the program.

2. Public Participation

The Permittee must comply with all State and local notice requirements when implementing a public involvement/participation program.

3. Illicit Discharge Detection and Elimination

The Permittee must adopt and enforce ordinances or take equivalent measures that prohibit illicit discharges. The Permittee must also implement a program to detect illicit discharges.

4. Construction Site Storm Water Runoff Control

The Permittee must develop a program to control the discharge of pollutants from construction sites greater than or equal to one acre in size within its permitted jurisdiction. The program must include inspections of construction sites and enforcement actions against violators.

5. Post Construction Storm Water Management

The Permittee must require long-term post-construction BMPs that protect water quality and control runoff flow, to be incorporated into development and significant redevelopment projects. Post-construction programs are most efficient when they stress (i) low impact design; (ii) source controls; and (iii) treatment controls.

6. Pollution Prevention/Good Housekeeping for Municipal Operations

The Permittee must examine its own activities and develop a program to prevent the discharge of pollutants from these activities. At a minimum, the program must educate staff on pollution prevention, and minimize pollutant sources.

Additionally, the General Permit stipulates in Attachment 4 that the County must implement a post construction program that includes design standards for the following types of discretionary development and redevelopment projects¹:

- Single-Family Hillside Residences
- 100,000 Square Foot Commercial Developments
- Automotive Repair Shops
- Retail Gasoline Outlets
- Restaurants
- Home Subdivisions with 10 or more housing units
- Parking lots 5,000 square feet or more or with 25 or more parking spaces and potentially exposed to storm water runoff

¹ For a full disclosure of the General Permit Attachment 4 requirements, see Appendix A.

Santa Barbara County must meet specific design standards described in Attachment 4 of the General Permit as part of their post-construction program. These include but are not limited to:

a. Peak Storm Water Runoff Discharge Rates

Post-development peak storm water runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak storm water discharge rate will result in increased potential for downstream erosion.

b. Conserve Natural Areas

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- 1) Concentrate or cluster Development on portions of a site while leaving the remaining land in a natural undisturbed condition.
- 2) Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- 3) Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- 4) Promote natural vegetation by using parking lot islands and other landscaped areas.
- 5) Preserve riparian areas and wetlands.

c. Minimize Storm Water Pollutants of Concern

The development must be designed so as to minimize, to the maximum extent practicable, the introduction of pollutants of concern that may result in significant impacts, generated from site runoff of directly connected impervious areas (DCIA), to the storm water conveyance system as approved by the building official.

d. Protect Slopes and Channels

Project plans must include BMPs consistent with local codes, ordinances, or other regulatory mechanism and the Design Standards to decrease the potential of slopes and/or channels from eroding and impacting storm water runoff:

e. Provide Storm Drain System Stenciling and Signage

f. Properly Design Outdoor Material Storage Areas

g. Properly Design Trash Storage Areas

h. Provide Proof of Ongoing BMP Maintenance

i. Design Standards for Structural or Treatment Control BMPs

The Permittees shall require that post-construction treatment control BMPs incorporate, at a minimum, either a volumetric or flow based treatment control design standard, or both, as identified below to mitigate (infiltrate, filter or treat) storm water runoff:

- 1) Volumetric Treatment Control BMP
- 2) Flow Based Treatment Control BMP

3 OTHER MUNICIPAL STORMWATER PROGRAMS

The following section reviews several other NPDES municipal stormwater programs with similar responsibilities for land development. Municipal stormwater programs have been implemented across the United States for over 15 years to varying degrees of success. The review of other programs provides an opportunity to identify strengths that may be appropriate for the Santa Barbara County program and weaknesses or pitfalls to avoid. Other programs of similar size (i.e. Phase 2 communities) were considered for review. However, most Phase 2 communities in California have not fully implemented Attachment 4 requirements. More importantly, the established programs from Phase 1 communities provide broader experience and insights into effective programs from which the text of Attachment 4 was drawn.

The review includes the following entities (all Phase 1 communities):

- Ventura County
- San Diego County
- Contra Costa County
- City of Portland, Oregon

These entities were selected because of 1) their innovative and successful approaches, 2) long-standing program implementation, and 3) in the case of Ventura, San Diego, and Contra Costa counties, are subject to the same requirements of Attachment 4 as Santa Barbara County. It is important to recognize that although rainfall and runoff conditions vary across these entities from dry southern California to the wet northwest, the principals and approaches used by municipalities to regulate development are typical and provide comparable examples for success. LID principles in particular are relatively universal regardless of site specific rainfall conditions.

Several key aspects are identified and discussed in detail. A matrix that includes additional detail for each program is included in Appendix B.

3.1 MECHANISMS FOR IMPLEMENTATION

Each program reviewed has a stormwater ordinance that both codifies non-stormwater discharge prohibition and provides direct or indirect regulatory authority for the post-construction requirements. The ordinances included enforcement articles, which outline administrative and civil remedies for non-compliance.

Ventura County has developed a Stormwater Quality Urban Impact Mitigation Plan (SQUIMP) to comply with NPDES permit requirements for new development and significant redevelopment, and a Technical Guidance Manual for Stormwater Quality Control Measures (Tech Manual). Although these documents are not specifically referenced in the ordinance there are sections in the ordinance to address construction, development, best management practices, and illicit connections. An enforcement article outlines administrative and civil remedies for non-compliance. A permit article outlines the permitting process and requirements. The ordinance places requirements on construction and development to submit stormwater control plans. Additionally, the ordinance empowers the director (Director of Public Works of the County or designee) to adopt requirements identifying appropriate BMPs for any activity, operation, or facility which may cause or contribute to pollution or contamination of the storm drain. The adoption of the Tech Manual

by individual jurisdictions would be an example of the adoption of requirements identifying appropriate BMPs. To implement the SQUIMP, Ventura County has revised planning and development policies to incorporate aspects of the post-construction requirements to varying degrees of success.

The San Diego County ordinance includes an appendix titled "Stormwater Standards Manual (SSM)". Adoption of the SSM as part of the ordinance provides regulatory authority to require permit applicants to implement minimum stormwater management requirements and controls. Those requirements and controls must be detailed in a Stormwater Management Plan (SWMP) submitted with the development permit application for applicable projects. Information contained in the SWMP regarding structural BMPs is used to formulate conditions of approval. The conditions of approval typically specify that the requirements of the SWMP shall be implemented. The conditions are structured to assure that grading or other actions that could threaten water quality or contribute to contaminated stormwater run-off are not allowed until all required BMPs and other actions are implemented to the satisfaction of the County.

The Contra Costa County ordinance requires permit applications be accompanied by a Stormwater Control Plan (SCP) that meets the criteria in the most recent version of the Program's Stormwater C.3 Guidebook (C.3 Guidebook). Provision C.3 was added to Contra Costa's stormwater NPDES permit in February 2003 and municipalities have been phasing in the requirements from 2004 through 2006. The C.3 provision is similar in many aspects to the General Permit Attachment 4 requirements. The C.3 Guidebook is referenced throughout the ordinance and provides programmatic guidance and BMP design standards. The SCP must be developed and submitted in connection with an application for a permit for land development activity or significant redevelopment. The SCP must demonstrate the project will incorporate site design characteristics, landscape features, and BMPs that will minimize imperviousness, retain or detain stormwater, slow runoff rates, and reduce pollutants in post-development runoff to the maximum extent practicable. Projects cannot receive a permit or approval for land development activity or significant redevelopment activity unless the project meets or will meet the requirements of the ordinance and the C.3 Guidebook. Information from the SCP is used by Planning staff or the Planning Commission (or in some cases, a City Council or the County Board of Supervisors depending on the municipality in the county) to determine whether to approve or deny the project application. If the application is approved, staff, the commission, or the Council or Board will attach conditions of approval, including a requirement to implement the SCP.

The City of Portland, Oregon adopted two stormwater ordinances. One ordinance codified the NPDES permit non-stormwater discharge prohibition and outlines violations, enforcement, and penalties. The other requires development permit applications to include design information that meet the standards or guidelines established by the Director of the Bureau of Environmental Services and as specified in the City of Portland Stormwater Management Manual (SWMM). The SWMM is referenced throughout the ordinance and provides the administrative rules for meeting code requirements as well as identifies techniques to preserve or mimic the natural hydrologic cycle and achieve water quality goals. These two ordinances serve the same purpose as the ordinances in place in Ventura, San Diego, and Contra Costa counties.

The primary method of enforcement of each of these programs' construction and re-development requirements is through placing conditions on projects. However, the ordinances also allow for administrative and/or civil remedies if projects fail to comply with program requirements.

3.2 DEVELOPMENT PERMIT REVIEW PROCESS

Each of the counties reviewed generally have a similar process in place for review of the permit applications for development. The general process has the Planning and Development department receiving the permit application and then passing a copy of the application to Public Works which makes a determination if additional consideration needs to be given to compliance with stormwater requirements. In the case of Ventura County if the project falls in one of the categories identified in the Technical Manual it is passed on to personnel within a specific Stormwater Program for review. In the case of San Diego and Contra Costa counties review of the project, regardless of category, remains the responsibility of the general Public Works review staff.

3.3 APPROACHES TO POST CONSTRUCTION BMPS

3.3.1 Standard Categories

All discretionary development and redevelopment projects in Ventura and San Diego Counties fall into the same standard categories contained in Attachment 4 of the General Permit. These are:

- Single-Family Hillside Residences
- 100,000 Square Foot Commercial Developments
- Automotive Repair Shops
- Retail Gasoline Outlets
- Restaurants
- Home Subdivisions with 10 or more housing units
- Parking lots 5,000 square feet or more or with 25 or more parking spaces and potentially exposed to storm water runoff

Both the Ventura and San Diego County programs provide specific requirements for implementing control measures for all categories. These programs have tables included in their technical guidance manuals that indicate the required control measures for each category. The manuals also provide detailed criteria for the development and maintenance of each control measure. In the case of Ventura County, design forms for each control measure are included and developers must fill out the forms for submittal along with the permit application. This allows the reviewer to determine if the measure was designed appropriately for the size and type of development.

The Contra Costa County permit is slightly different in that it does not set requirements based on the aforementioned categories. Rather, a project must meet the requirements outlined in the C.3 Guidance if the project results in the development of a certain amount of impervious surface. The program was implemented in two phases. Between February 15, 2005 and August 15, 2006 projects were subject to C.3 Guidance if the total amount of impervious surface created was 1 acre or greater. After August 15, 2006 projects are now subject to C.3 Guidance if the amount of impervious surface created is 10,000 square feet or greater.

The City of Portland requirements apply to all projects within the city, whether public or private. Projects of any size are required to comply with stormwater destination/disposal requirements as identified in the SWMM. The City's specific destination/disposal requirements present a very prescriptive approach to addressing stormwater issues relevant to a major urban area with flooding issues. However, the destination/disposal requirements are similar in nature to pre and post development hydrology considerations in place in California permits. All projects developing or redeveloping over 500 square feet

of impervious surface, or existing properties proposing new stormwater discharges off-site, are required to comply with pollution reduction and flow control requirements. Specific facility designs that meet these requirements are presented. Projects constructing destination/disposal, pollution reduction, or flow control facilities are also required to comply with operations and maintenance requirements. Projects classified as high risk because of certain site characteristics or activities must comply with source control requirements.

3.3.2 BMP Considerations

The following BMP requirements were considered when reviewing the various programs:

1. Attainment of peak storm water runoff discharge rate requirements
2. Site design BMPs
3. Source control BMPs
4. Treatment Control BMPs
5. Long term Maintenance arrangements

3.3.2.1 Peak Storm Water Discharge Requirements

Both Phase I and Phase II NPDES storm water permits contain requirements that post-development peak storm water runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak stormwater discharge rate will result in increased potential for downstream erosion. (See Attachment 4(2(a)) of the General Permit).

Ventura County has requirements for implementing control measures to address peak storm water runoff discharge rates for categories of project discussed previously. Guidance is given to reduce stormwater runoff peak flows and volumes through appropriate site design, including minimizing imperviousness. However, no specific guidance is provided on how to implement control measures such that pre-development runoff discharge rates are maintained.

The San Diego County stormwater ordinance states that "Projects shall maintain or reduce peak velocities from the project area to the maximum extent practicable." The extent practicable is not defined. The Site Design BMPs section of the technical guidance manual provides generalized guidance on minimizing imperviousness and directly connected impervious areas to maintain pre-development runoff characteristics. However, no specific guidance is provided on how to implement control measures such that pre-development runoff discharge rates are maintained.

Contra Costa County has developed a Hydrograph Modification Management Plan (HMMP) as part of the C.3 Guidebook. The HMMP will be included as an appendix to the 3rd edition (expected in Fall 2006) of the C.3 Guidebook. The HMMP outlines four methods for determining compliance with pre-development runoff discharge requirements. The C.3 Guidebook presents design considerations and guidelines to minimize imperviousness and increase infiltration as the means to implement control measures that will result in maintaining pre-development runoff discharge rates. The Contra Costa County program is the only program reviewed that specifies how to implement control measures such that pre-development runoff discharge rates are maintained. If the developer implements the specified control measures as outlined in the C.3 Guidebook then they are assumed to be in compliance.

The Portland stormwater ordinance states that "The quantity of stormwater leaving the site after development shall be equal to or less than the quantity of stormwater leaving the site before development, as much as is practicable...."Per the ordinance, practicability can be defined in either the ordinance or in the SWMM. The SWMM offers three approaches for selecting and designing pollution reduction and flow

control facilities: simplified approach, presumptive approach, and the performance approach. The simplified approach is considered a relatively easy process for selecting and designing pollution reduction and flow control facilities, intended to save the project developer and the City time and expense. The presumptive approach requires the use of facilities presumed to be in compliance with the City's pollution reduction, flow control, and/or disposal requirements if the presented sizing and design requirements are followed. The performance approach requires the applicant to provide detailed engineering design and calculations, as well as documented evidence of the proposed design's performance. With the exception of facilities sized using the simplified approach, applicants must use a software program based on the Santa Barbara Urban Hydrograph (SBUH) to check design calculations for flow control facilities or NRCS TR-55, HEC-1, or SWMM to demonstrate compliance with flow control standards.

3.3.2.2 Site Development BMPs – Low Impact Development

Low impact development (LID) is an effective means to control urban runoff pollution because runoff is infiltrated onsite. The principal objective of LID is to reduce stormwater runoff peak flows and volumes through appropriate site design resulting in the following benefits:

- Reduced size of downstream treatment controls and conveyance systems
- Reduced pollutant loading to structural treatment controls
- Reduced hydraulic impact on receiving streams

The Ventura Technical Manual does provide a general discussion of measures to reduce runoff through minimizing imperviousness and there are two measures presented for minimizing effective imperviousness. Projects that employ either of the two measures to minimize effective imperviousness are allowed to reduce the value of the effective impervious ratio used to size treatment controls. Although LID is not currently expressly required, Ventura County is expecting some level of LID requirements in their next NPDES permit.

The San Diego program does provide a brief description of LID principles. Additionally, generalized guidance on minimizing imperviousness and directly connected impervious areas to maintain pre-development runoff characteristics. However, LID is not expressly required.

The Contra Costa program presents two general approaches to managing site runoff, one of which is LID. The other is the conventional BMP approach which emphasizes the design of fewer, larger facilities. The two approaches are not considered exclusive; however, the Contra Costa program recommends the LID approach and presents a procedure to simplify (and make consistent) selection, sizing, and documentation of strategies for stormwater treatment and hydrograph modification management. While LID is not mandated it is strongly encouraged and promoted indirectly with incentives (which are discussed in a subsequent section).

The San Francisco Regional Water Quality Control Board is in the process of developing a regional municipal storm water permit that would include Contra Costa County. In their draft Regional Permit, LID measures are required in all regulated development and include minimum LID requirements for single family residential. These minimum requirements are: divert roof runoff to vegetated areas before discharge to storm drain, direct paved surface runoff to vegetated areas before discharge to storm drain, and/or install patios, driveways, and walkways with impervious materials such as pervious concrete or pavers.

Lastly, the City of Portland's SWMM does not specifically identify site development BMPs or LID. However, the SWMM provides design guidance on several types of facilities that could be considered LID. Ecoroofs

and roof gardens, contained planter boxes, tree credits, pervious pavements and impervious area reduction are mitigation techniques that the SWMM encourages during the site planning and design stage to reduce the overall square-footage of impervious area that requires stormwater management.

Requirements and guidance for conservation of natural areas and protection slopes and channels have also been used as site development BMPs. Both the Ventura and San Diego technical manuals identify methods for conserving natural areas and protecting slopes and channels. Portland suggests the preservation of natural areas and provides credits for preservation of existing canopy. The Contra Costa C.3 Guidance does not expressly address these components. However, the general approach taken by Contra Costa supports the use of LID which can lead to the conservation of natural areas and protection slopes and channels.

3.3.2.3 *Source Control BMPs*

Each of the programs reviewed contains source control BMP requirements to varying degrees. The Ventura County Tech Manual addresses site-specific, structural source control measures, i.e., storm drain message and signage, outdoor material storage area design, outdoor trash storage and waste handling area design, outdoor loading/unloading dock area design, outdoor repair/maintenance bay design, outdoor vehicle/equipment/ accessory washing area design, fueling area design, parking lot design. Non-structural source control measures (i.e., good housekeeping and employee training) are not included; rather the California Industrial Best Management Practice Manual is referenced. Discretion for requiring additional source control measures not included in the Tech Manual for specific pollutants, activities or land uses is left to the governing stormwater agency.

The San Diego County manual addresses source control measures for storm drain signage, outdoor material storage area design, and outdoor trash storage area design. Additional source control measures included use of efficient irrigation systems and landscape design and the incorporation of requirements applicable to individual priority project categories.

The Contra Costa County C.3 Guidebook contains a stormwater pollutant sources control checklist that identifies which source control measures should be included based on the sources that will be on the project site. Source control BMPs described in the checklist address stenciling, outdoor storage areas and trash storage areas.

Portland's SWMM identifies source control BMPs that apply to all projects with the defined uses or characteristics including: new development, redevelopment, tenant improvements or those existing sites proposing new off-site discharges. Detailed descriptions of site uses and characteristics are provided along with the corresponding BMPs for fuel dispensing facilities and surrounding traffic areas, above-ground storage of liquid materials, solid waste storage areas, containers, and trash compactors, exterior storage of bulk materials, material transfer areas/loading docks, equipment and/or vehicle washing facilities, stormwater and groundwater management for development on land with suspected or known contamination, covered vehicle parking areas.

3.3.2.4 *Treatment Control BMPs Design Requirements*

As noted in Section 3.3, the General Permit requires treatment control BMPs for certain categories of development. Furthermore the General Permit specifies the design criteria² for sizing treatment control

² The criteria may be from any one of the following references:

1) Volumetric Treatment Control BMP

BMPs. Treatment control BMPs may be sized by using either a volumetric or flow based treatment control design standard depending on the treatment function of the BMP. Vegetated swales and buffer strips (and certain proprietary units) are sized using the flow standard while all other treatment control BMPs (e.g. detention basins, wetlands, etc.) are based on volume.

The Ventura County Tech Manual specifies the sizing criteria to treat the Stormwater Quality Design Flow (SQDF) or Stormwater Quality Design Volume (SQDV) of the storm water runoff depending on the type of BMP. The sizing criteria are based on the California BMP Handbooks unit volume capture curves which are based on capturing 80% of the annual runoff for treatment. Calculation procedures to determine the SQDF and SQDV are provided in the Tech Manual. Furthermore, the Tech Manual provides fact sheets on each of the approved treatment control BMPs and includes a description, advantages, disadvantages, and step by step design procedures, and detail design criteria (e.g. depth of sand filter, infiltration rates, media size, etc.).

The San Diego guidance manual provides a footnote that states

Design storms can be found at <http://www.wrcc.dri.edu/pcpnfreq.html>. The project proponent or County staff may calculate the storm events using local rain data. In addition, isopluvial maps contained in the County of San Diego Hydrology Manual may be used to extrapolate rainfall data to areas where insufficient data exists. If isopluvial maps are selected, the project proponent or County staff shall describe their method for using isopluvial maps ...

The Contra Costa C.3 Guidebook identifies sizing design criteria for stormwater treatment as "Approximately eighty percent of total annual runoff is produced by storms this size and smaller." Volume-based criteria are used for those BMPs relying on infiltration and detention and flow based criteria are used for those BMPs relying on filtration. The C.3 Guidance allows for the use of either of the two alternative methods for calculating water quality volume. The first method is stated in the book Urban Runoff Quality Management (Water Environment Federation Manual of Practice No. 23; ASCE Manual and Report on Engineering Practice No. 87, 1998) and is referred to as the WEF Method. The second method is in Appendix D of the California Storm Water Best Management Practice Handbook (Municipal) (SWQTF, 1993) and is referred to as the California BMP Method.

The Portland SWMM identifies sizing design criteria for stormwater treatment for three types of facilities intended to address pollution reduction: flow-rate based, flow volume-based, and combination rate/volume based. Combination based systems are those systems that incorporate both rate-based (e.g., grass swales) and volume-based (e.g., detention basins) treatment processes. With the exception of facilities sized using the simplified approach, the Rational Method is used to verify flow rates used to size flow-rate

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- a) The 85th percentile 24-hour runoff event determined as the maximized capture storm water volume for the area, from the formula recommended in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998); or
 - b) The volume of annual runoff based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment by the method recommended in California Stormwater Best Management Practices Handbook – Industrial/Commercial, (2003); or
 - c) The volume of runoff produced from a historical-record based reference 24-hour rainfall criterion for "treatment" that achieves approximately the same reduction in pollutant loads achieved by the 85th percentile 24-hour runoff event.
- 2) Flow Based Treatment Control BMP
- a) The flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the area.

based pollution reduction facilities. The City has verified, through a continuous simulation model utilizing Portland rainfall data, to treat 90% of the average annual runoff volume. Flow volume-based pollution reduction facilities are required to use the predetermined volume of 0.83 inches over 24 hours with a Vb/Vr (volume of basin/volume of runoff) ratio of 2 to be in presumptive compliance. The City determined this volume, through a continuous simulation model utilizing Portland rainfall data, to provide adequate detention time to treat 90% of the average annual runoff volume. Lastly, with the exception of facilities sized using the simplified approach, the City uses a software program based on the SBUH method, or a continuous simulation model, to verify the sizing of combination facility provides treatment of 90% of the average annual runoff volume.

3.3.2.5 *Long term Maintenance arrangements*

Long term BMP maintenance arrangements are required by each of the programs reviewed and are required as a standard condition of approval. The Ventura program includes an example long term maintenance agreement as an appendix to the Tech Manual. The type of agreement that has to be in place for approval is not expressly stated; rather it is left up to the discretion of the permitting agency. In general the agreement identifies the County/City, developer, special service district or Home Owners Association as the responsible party for providing long term maintenance.

In the case of San Diego County, if a project proponent is required to include interim BMPs (to be implemented during construction) or permanent structural BMPs (to be implemented and maintained post-construction) in project plans, and if the project's Stormwater Management Plan (SWMP) (which is a required part of the project's building permit application) does not provide a mechanism for BMP maintenance, the County requires the applicant to provide verification of maintenance requirements through such means as may be appropriate, at the discretion of the County, including, but not limited to covenants, legal agreements, maintenance agreements, and/or conditional use permits. The project proponent is required to provide a signed statement acknowledging responsibility for structural BMP maintenance, repair and replacement until the County accepts an alternative mechanism to ensure such maintenance, repair and replacement. Potentially acceptable mechanisms for ensuring BMP maintenance includes County maintenance, maintenance by another public entity, maintenance by a subsequent owner, County service area or assessment district, lease provisions, conditional use permits, or other mechanisms.

The Contra Costa C.3 Guidebook dedicates a chapter on long term maintenance and identifies six stages for establishing a long term maintenance process. Example operation and maintenance plans are provided. Each individual Co-Permittee has the flexibility to develop long term maintenance arrangement requirements. The County is currently developing a community services facility district which will include various tiers of service to ensure long term management of facilities. The following tiers are elevated levels of service and cost to the responsible entity.

- Tier 1) An assessment to fund a regular (perhaps annual) county verification inspection.
- Tier 2) An assessment to fund appropriate maintenance on the facility if it is not maintained appropriately by the responsibility party.
- Tier 3) An assessment to fund a replacement treatment device.

The Portland SWMM presents operations and maintenance (O&M) requirements that apply to all stormwater management facilities and related facility components identified in the SWMM except for developments treating less than 1,000 square-feet of impervious surface with new or existing tree canopy. Facility-specific O&M plans are provided which identify O&M requirements for each type of facility included in the SWMM. If a stormwater facility that is not included in the SWMM is used (such as a manufactured

stormwater treatment technology) an O&M plan is still required. The City code requires that all facilities constructed to comply with the SWMM must be properly operated and maintained for the life of the facility.

3.3.3 Waivers and Incentives

Each of the California NPDES permits reviewed provides the Permittees guidance on waiver requirements. Generally, waivers are only allowed when all other structural or treatment control BMPs have been considered and rejected as infeasible. There are three recognized situations of infeasibility identified in permit language:

- (i) extreme limitations of space for treatment on a redevelopment project
- (ii) unfavorable or unstable soil conditions at a site to attempt infiltration
- (iii) risk of ground water contamination because a known unconfined aquifer lies beneath the land surface or an existing or potential underground source of drinking water is less than 10 feet from the soil surface.

Ventura County does not have an incentive program in place (except as noted previously regarding the reduction of effective imperviousness and corresponding down sizing of the treatment control BMP). The San Diego County program has not implemented an incentive program. However, the model program does allow any Co-Permittee in San Diego County (which includes various cities within the county) to implement a Site Design Stormwater Treatment Credit program. The incentive program would need to specify the conditions under which project proponents could be credited for the use of site design features and LID techniques that can reduce the volume of storm water runoff, preserve natural areas, and minimize the pollutant loads generated and potentially discharged from the site. The credit granted would be a reduction in the volume or flow of storm water that must be captured or treated on a project. There is discussion of incorporating incentives in next version of the county manual. Ideas for incentives include a waiver of the maintenance agreement if LID meets runoff and treatment goals.

The City of Portland's permit does not provide guidance on waivers. No exceptions are provided in the City's SWMM, each applicable project must include some manner of stormwater management practice. As mentioned previously, the City of Portland has incentives based on maintaining existing trees or planting new trees. Additionally, the City takes into account a reduction in effective imperviousness of a project when determining the sizing requirements of the project's stormwater management facilities. A reduction of in effective imperviousness can be attained through implementation of LID techniques. It is interesting to note the City is currently in the process of implementing a program where ratepayers can reduce their stormwater management charges (charges property owners pay to the City for the stormwater program). A discount of up to 35% can be earned if a property owner manages stormwater on their property. Property owners can manage stormwater on their property by reducing or diverting runoff from roofs, driveways, and paved areas to areas of their property using various techniques, including LID.

No incentives are expressed in Contra Costa's C.3 Guidebook or other documentation. However, the incentive for using LID exists because the measures are pre-standardized and clear guidance is given through a sizing tool. As such, the use of the C.3 Guidebook will result in compliance.

3.3.4 Outreach and Education

Outreach and education is an important part of a successful program. Each program has developed a website to provide available information to interested parties and program staff. The Ventura County SMP contains a section discussing outreach to developers, engineers, planners, architects, builders, and others,

when relevant, and will emphasize relevant requirements. Appropriate materials are to be made available to educate the land use planning and development community.

It is not clear how San Diego County has encouraged/educated the development community to participate or comply with requirements. The City of San Diego conducts outreach through an established mailing list. Updates are sent to previous and existing applicants and industry associations. Additionally, the County maintains a website for all of the Co-Permittees, there are two public meetings a year with the development community.

Contra Costa County conducts several workshops a year geared toward land development professionals and municipal planners, engineers, and land development review staff. Additionally, updates and memoranda explaining requirements are mailed and e-mail to developers and other interested party when changes to requirements occur.

Portland has a variety of programs to reach citizens, businesses, students, property owners and organizations to increase public awareness of stormwater issues and promote private stormwater management efforts. The City's programs include: Clean Rivers Education Programs, Downspout Disconnection Program, Naturescaping for Clean Rivers, Community Watershed Stewardship Grants Program, Watershed Revegetation Program, Sustainable Stormwater Management Program, Watershed Management Programs, and Industrial Stormwater Program. Additionally, the City has a volunteer citizen advisory group (Stormwater Advisory Committee) that meets regularly to provide technical and expert advice to the City through stormwater-related policy recommendations.

3.4 OTHER MUNICIPAL STRENGTHS AND WEAKNESSES

The following section details key strengths and weaknesses of the programs reviewed. Key strengths identified in the programs reviewed include the following:

- A technical guidance manual that provides clear guidance on 1) the type of control measures required based on the project type and 2) how to design, build, and maintain each control measures. Additionally, the manual can be formatted similarly to previous technical manuals developers are familiar with such as grading manuals.
- A technical guidance manual that has regulatory authority, not necessarily through direct inclusion in an ordinance, rather through reference in a stormwater or building ordinance that a project proponent will use the latest version of a manual. This provides the manual with regulatory authority but does not require an agency to continually go back to a council or board to revise the technical aspects of the manual. Additionally, this approach may remove the requirement for review and approval from other agencies.
- Requirement for a predevelopment meeting for which the project proponent has already completed a standardized work sheet to determine the project's requirements under the predevelopment program. If the guidance is not incorporated in the predevelopment meeting the permit application is rejected as incomplete. This helps to minimize project conditioning later in the process when site design approaches are considerably more difficult to incorporate.
- The ability of a program to work constructively and communicate effectively with the development community.

Key weakness of the programs include the following:

- Municipal staff that are required to review permit applications do not necessarily accept the mandate to review additional design aspects related to stormwater management resulting in an inconsistent review based on interest level of staff.
- Maintaining pre-development peak flow run-off is not adequately addressed. Typically general guidance is given, but no hard requirement or guidance is in place to provide a realistic opportunity to enforce or achieve this requirement.
- Regular training is not provided to keep developers and/or municipal staff up to speed on evaluation procedures.
- Websites that do not clearly post the process an applicant must navigate and the documents the applicant either may use or are mandated to use.

3.5 PUGET SOUND LID PROGRAM

A low impact development local regulation assistance project was conducted by the Puget Sound Action Team in western Washington in 2005. The project encompassed 11 Puget Sound local governments. The objective was to develop new and/or revised regulatory language related to stormwater management and land development to increase the use of LID practices. The final product of the project was a binder providing government staff and managers recommendations for specific ordinance language changes, new ordinances, engineering drawings, and maintenance considerations.

Subsequently, several of the participating entities have adopted or revised stormwater ordinances to remove regulatory hurdles that prevent or impede the use of LID. The design information contained in the binder is similar in nature to the information contained in the technical manuals for the City of Portland and Ventura, Contra Costa, and San Diego Counties. However, the design information focuses entirely on LID and contains additional information. The additional information includes maintenance requirements and sample agreements; LID cost comparisons and incentive strategies; roadway, permeable pavement, and parking lot comparisons; as well as case studies taken from various communities in the region.

The information generated by the Puget Sound Action Team provides a wealth of information that could be drawn upon to incorporate LID approaches.

3.6 MUNICIPAL PROGRAMS SUMMARY

The review contained in this section provided a general overview of the approach each program takes to meet post-construction permit requirements. A matrix that includes additional considerations for each program is included in Appendix B. It is apparent that different approaches are used by the programs to varying degrees of success. Recommendations for Santa Barbara County are provided in Section 5 based on the various approaches, strengths, and weaknesses presented in this section and Section 4.

4 SANTA BARBARA COUNTY STORMWATER PROGRAM

This section presents a review of the existing County's efforts for complying with the requirements of Attachment 4(B) of the General Permit. First, a review of the legal mechanism for implementing these requirements is provided. Next an evaluation of the process used to implement County policies and standards is provided. And finally a review of the County policies and standards for consistency with Attachment 4 is provided.

4.1 SANTA BARBARA COUNTY MECHANISMS FOR IMPLEMENTATION

At a minimum, under the General Permit the County must:

- Develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the municipal separate storm sewer system by ensuring that controls are in place that would prevent or minimize water quality impacts;
- Develop and implement strategies that include a combination of structural and/or non-structural BMPs;
- Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment to the extent allowable under local law; and
- Ensure adequate long-term operation and maintenance of BMPs, and
- Comply with Attachment 4(B) of the General Permit.

Santa Barbara County uses a combination of ordinances and planning and development policies to incorporate these General Permit requirements.

In 2001, the County pro-actively reviewed and revised the existing new development policies and guidelines. The review process included recommendations identified through a series of workshops. At the time this review was conducted, the General Permit had not been issued by the State Water Resources Control Board. However, the federal implementing regulations were promulgated in 1999, with enough direction on the upcoming Phase II permits for staff to review and recommend revisions to the County's post-construction program.

The staff recommendations were presented to the Planning Commission in May, 2004, and were formally adopted through approval by the County Board of Supervisors on September 24, 2002. Key revisions included:

- Interpretive and implementation guidelines for key Comprehensive Plan policies addressing water quality (see Section 5.2.1 below);
- Revisions to the CEQA initial study checklist to bring attention to storm water pollution as an issue area on new development and redevelopment;

- Revisions to the Environmental Thresholds and Guidelines Manual to assess surface and storm water quality impacts, to determine whether impacts are significant and to provide a mitigation hierarchy; and
- New conditions of approval and mitigation measures to ensure that projects are consistent with key policies, address identified CEQA impacts.

The County, through the adoption of the County's Storm Water Management Program by the Regional Water Quality Board in July of 2006, set a goal of further refining the post-construction program during Year 1. This commitment to further refine the program, and a detailed description of the revisions made in September 2004 are both detailed in the County's Storm Water Management Program. This report is a part of the current effort to further refine the post-construction program.

4.2 SANTA BARBARA COUNTY DEVELOPMENT PERMIT REVIEW PROCESS

In Santa Barbara County, if a development or redevelopment project falls in one of the categories identified in Attachment 4 of the General Permit, a discretionary permit is required. The County's existing Discretionary Permit Process Flowchart is shown as Figure 1 on the following page and is posted on the County's Planning and Development web site. The following section provides details on the County's existing discretionary permit process. Potential opportunities to improve the process are included in Section 5.

4.2.1 Pre-Application Consultation

A pre-application assessment (pre-app) provides for initial review of a project for the purpose of exchanging information, discussing planning issues and identifying potential permitting problems prior to an application submittal. A pre-app is a voluntary independent process that consists of a meeting with County staff to discuss the applicant's project. No approvals are granted as a result of a pre-app.

4.2.2 Project Application Submittal

The County provides an eight page "Land Use Permit/Coastal Development Permit/Building Permit/Zoning Clearance" application packet which lists all of the items necessary to provide to County Planning Staff before the application is considered complete. The application package requires the applicant to identify current and proposed storm water drainage, proximity to creeks, proposed impermeable area, and proposed measures to reduce impacts to water quality.

4.2.3 Preliminary Review by Staff

Once the application has been accepted, it is reviewed by Planning & Development and by other department representatives having regulating authority over the application. The pertinent County departments and applicant discuss the application at the Subdivision/Development Review Committee (SDRC) meeting. Comments in the form of technical advice and conditions to be applied are identified here. Planning and Development synthesizes this information in a staff report intended to aid appointed and elected officials in their decision making.

4.2.4 Application Complete Milestone

The application is deemed "complete" when all information necessary to review the application submittal has been received. This includes the application form submittals and any special studies identified (for

example, an archaeological study needed if preliminary review indicates probable archaeological resources).

4.2.5 Initial Study

Next the Planning and Development Staff determines the level of environmental review required for the project. There are three primary levels of environmental review and documentation allowed under CEQA: Exemption, Negative Declaration and EIR.

4.2.6 Staff Report

The Planner analyzes the project's consistency with the Comprehensive Plan, local Zoning Ordinance requirements, and any other State and local planning regulations that apply and synthesizes the specific project information in a report. The report provides the recommended conditions of approval, final plans & maps and "findings" which the decision-maker is required by law to make. Copies of condition letters required by other departments are included in the staff report.

4.2.7 Decision Maker Hearings

The County's zoning ordinance and subdivision regulations specify the decision maker for each application type. Decision making bodies include the P&D Director, Zoning Administrator, Planning Commission, and Board of Supervisors. It is at this time that conditions of approval are finalized.

4.2.8 Compliance with Conditions of Approval

Final action on a discretionary permit is "conceptual" approval. During this step, the applicant submits final design plans and County staff performs plan checks to verify that the submitted plans are in full compliance with the final decision of the conditions of approvals established by the appropriate decision making body.

4.2.9 Land Use and Building Permit Issuance

Once a Building or Grading Permit has been issued, construction can begin. Construction practices must comply with conditions of approval, designs must be consistent with final approved plans, must meet all codes and standards, and comply with any conditions of use or final design conditions such as landscaping. Planning and Development Staff, along with Staff from other departments, such as the Fire Department, inspect the project regularly to ensure compliance with conditions of approval.

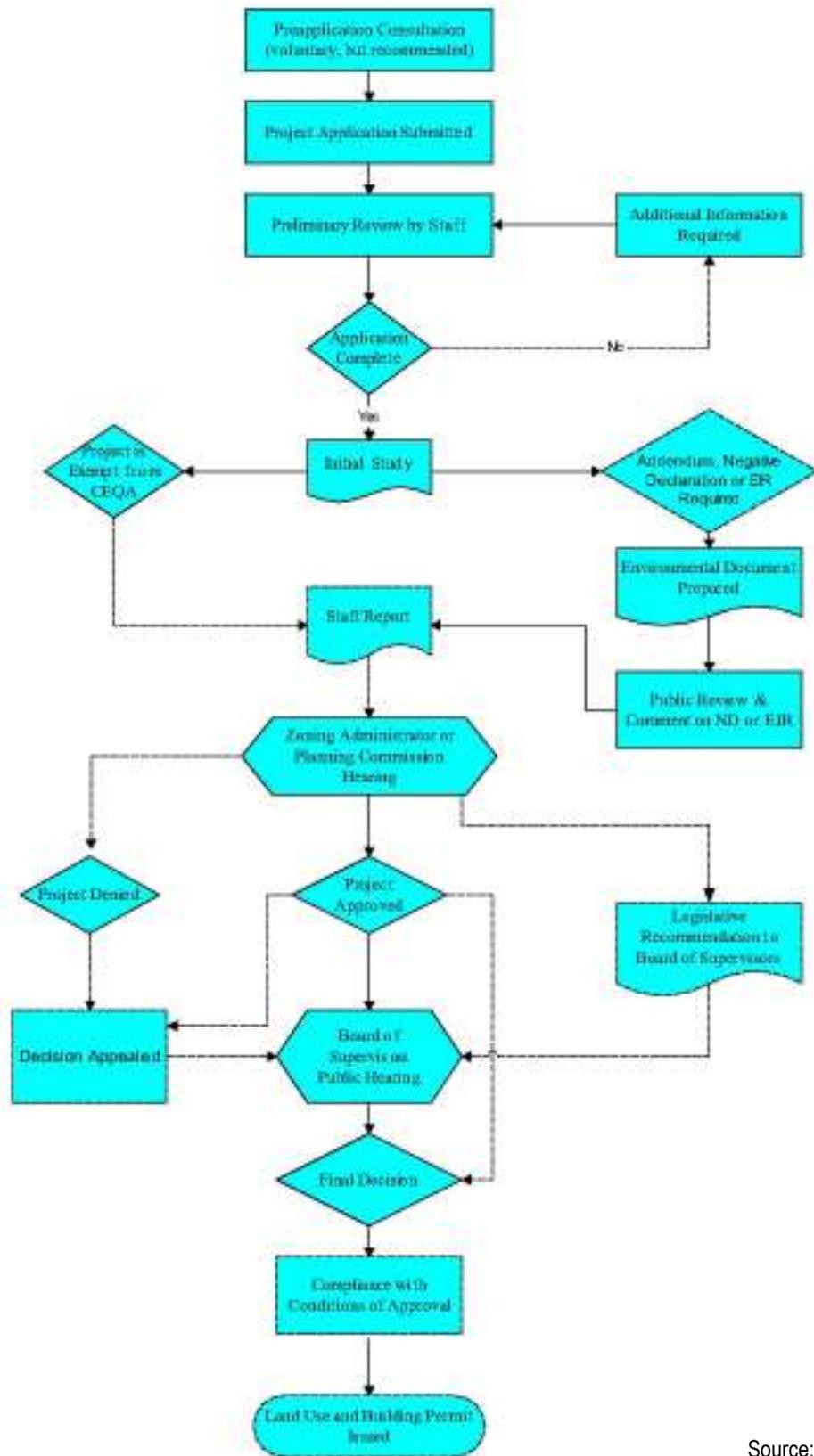


Figure 1 – Discretionary Permit Flowchart

Source: P&D 2006

4.3 SANTA BARBARA COUNTY APPROACH TO POST CONSTRUCTION BMPS

The County has a number of policies and standards that address the General Permit, Attachment 4(B) requirements. These include:

- Public Works
 - Water Resource Division, Project Clean Water
 - Flood Control
 - Roads Division *Engineering Design Standards*
 - Traffic Safety
- Public Health Department - Environmental Health Services Divisions
 - Liquid Waste Program
 - Food Handler Certification
- Planning & Development as described Storm Water Management Program
 - Land Use Development Code 35.30.180 Storm Water Runoff Requirements
 - Land Use Element Hillside and Watershed Protection Policies 3, 4, 5 and 7 (Coastal Plan Policies 3-15, 3-16, 3-17 3-19.)
 - CEQA Section on Water Quality
 - Santa Barbara County Thresholds and Guidelines Manual
 - Planner's Guide to Conditions of Approval and Mitigation Measures

A detail review of the County's ability to meet Attachment 4(B) General Permit requirements is provided in Appendix A. An overall assessment of the county's program is provided in the following paragraphs.

4.3.1 Standard Categories

Santa Barbara County, through a series of building and planning policies, public works conditions, and general conditions for project approval, has addressed each of the discretionary development and redevelopment projects categories identified in Attachment 4(B) and as provided earlier in section 3.3.1 of this report.

4.3.2 BMP Considerations

The following additional requirements were considered when reviewing Santa Barbara's program:

1. Attainment of peak storm water runoff discharge rate requirements
2. Site design BMPs
3. Source control BMPs
4. Treatment Control BMPs
5. Long term Maintenance arrangements

4.3.2.1 Peak Storm Water Discharge Requirements

Attachment 4(B)(2(a)) General Permit requires that post-development peak stormwater runoff discharge rates "shall not exceed estimated pre-development rate" for developments where the increased peak storm water discharge rate will result in increased potential for downstream erosion. Santa Barbara County Flood Control District's Standard Conditions place requirements for detention on post-development runoff

for 25-yr storms or smaller. For development in certain areas of the County, for example east of 101 and other parts of Orcutt, and for certain types of development, for example large greenhouse development in Carpinteria, attenuation up to the 100-year storm even is typically required to maintain pre-existing hydrologic function and protect downstream conditions. In most cases, the discharge rate from detention basin facilities is restricted to 0.07 cubic feet per second per acre of developed land.

4.3.2.2 *Site Design BMPs – Low Impact Development*

Site Design BMPs reduce or eliminate post-project runoff (peak rate and volume) and help to control sources and movement of pollutants. Basic design strategies include integrating BMPs into common site features, through disconnecting impervious areas, minimizing overall imperviousness, and providing opportunity for infiltration, evapotranspiration, and absorption of runoff and associated pollutants. Planning & Development policy requires conservation of natural areas and the protection slopes and channels which help to reduce impervious areas. These goals are accomplished by a Low Impact Development approach.

In general, most development in Santa Barbara County seeks rapid water removal from developed areas through closed, water tight conduits, and curb and gutters, instead of addressing on-site infiltration and disconnection techniques. Perceived safety and/or maintenance concerns may discourage the use of parks, open space and public road right-of-way areas for use to reduce downstream water quantity impacts.

4.3.2.3 *Source Control BMPs*

Each of the other stormwater programs reviewed contained source control BMP requirements to varying degrees. Santa Barbara County has addressed requirements for storm drain stenciling, outdoor material storage areas, and trash storage areas (source control BMPs) through standard conditions of permit approval. In some cases, the Santa Barbara County standard conditions fall short of the specificity provided in the other programs. For example, the municipal programs reviewed in this report specifically require covered material storage areas in all cases. Whereas in Santa Barbara, such a mitigation measure would only be included if a planner identified such a condition based upon a project-specific review. In other words, it is not a standardized mitigation measure (see recommendation 6.3.1).

4.3.2.4 *Treatment Control BMPs Design Requirements*

Treatment control BMPs are specified in the Standard Conditions for Project Plan Approval – Water Quality BMPs. The conditions identify those project categories that require treatment control and provide flexibility to require treatment control BMPs on additional project categories. The standards include design criteria for detention-based and flow-based treatment controls, with some flexibility in those standards if “approved by the Public Works Director”.

A formula with intensity rate is provided for volume based stormwater treatment flows. Guidelines are simultaneously specific (draw down times) and vague (a minimum flow-path length to width ratio of 3 is recommended and off-line from flood conveyance systems).

An impervious-based acreage formula with intensity rate is provided for flow-through facilities. Tributary area limitation of 1 acre for flow-through facilities (vegetated swales, infiltration facilities, bio-retention filters...) is unusually small. Typically tributary areas are required to be less than 10-acres, depending on the type of flow-through facility proposed.

4.3.2.5 *Long Term Maintenance Arrangements*

Per the Storm Water Management Plan, Public Works and Planning and Development staff are to provide regular inspection of discretionary projects during construction to ensure compliance with permit conditions and mitigation measures under CEQA. These site inspections are conducted separately and often in coordination with Building and Safety inspections discussed in the Grading Ordinance. All long-term measures require a maintenance program that is administered by a homeowners association (i.e., residential subdivision) or property owner (i.e., commercial or industrial). Inspection of facilities is also important for public education and outreach.

4.3.3 Waivers and Incentives

The Santa Barbara SWMP has a section on incentives for innovative projects that the County may consider. Potential incentives include “fast-tracking” of projects through design review, reduction in permit fees, or direct financial incentives. However, it is currently unclear how the incentive program could be implemented. The County has listed the development of an incentive program as a future (year 3) measurable goal in its SWMP

Alternative incentives suggested during public stakeholder meetings included: density bonuses, flood control volume credits, in-lieu fees and innovate design awards.

Waivers are outlined in Attachment 4(B(4)) and provide for a waiver from requirements if impracticability for a specific property can be established. The County’s current approach to implementing the waiver policy is implicit in the interpretive guidelines and application of standard conditions on discretionary projects.

4.3.4 Outreach and Education

Project Clean Water staff provides annual storm water quality training for planning and development staff. This training provides design review staff a review of County responsibilities under the General Permit.

Also through Project Clean Water, the county distributes educational resources to teachers, provides publications and brochures tailored for specific audience needs, maintains a list of water quality related guest speakers and sponsors a Storm Drain Marking program. To date, the County has provided several workshops on post-construction BMPs to interested stakeholders, Planning Commissions, and County Boards of Architectural Review.

4.3.5 Program Funding

During stakeholder meetings, concern was expressed over limited funding to implement the overall storm water management program, and in particular the post-construction MCM.

Funding for the post-construction MCM is currently provided by developer fees and to a lesser degree, through the County’s General Fund under the Project Clean Water program. While the County is currently in the process of implementing the Storm Water Management Plan, the rate at which the plan can be implemented is directly proportionate to the funding and staff available.

Many municipalities are leaning towards an impervious area fee to fund their programs. EPA has identified three major advantages of using stormwater utility funds to fund stormwater programs. They include

- (1) increased stability and predictability
- (2) greater equity, and
- (3) the opportunity for incorporating incentives for implementation of on-site stormwater management

However, in California a stormwater utility fund/fee and/or surcharge are considered an additional tax and therefore would require a two-thirds favorable vote in a Proposition 218 election. A recent Santa Barbara County poll in the unincorporated areas indicates that voters would not approve an additional tax for water quality / stormwater.

The American Public Works Association recommends the following 7-step process to implementing a successful 218 election.

1. Develop a formal, well-designed survey of your community to understand voters' hot buttons and issues of interest. By understanding the public's stated priorities, you'll have a much better opportunity to frame solutions in ways that respond to those needs and desires.
2. Package the solution in a way that responds to the community's stated priorities. In one California county, for example, the local utility needed to ask voters for money to solve flooding problems. The agency surveyed residents and found that they weren't interested in more concrete, trapezoidal flood control channels. They were, however, interested in more natural solutions, along with clean water and parks. With that information, the utility was able to design a solution that was appealing and responsive to the public. Titled the "Clean, Safe Creeks and Natural Flood Protection" measure, it was approved by 67 percent of voters. The measure needed 66 2/3 percent approval to pass.
3. Create a bipartisan, community advisory committee at the beginning of the study process to represent the many local interests who may speak out, for or against, a proposed tax. Ask this group to serve as an oversight committee for technical and cost studies that define the problem and proposed solution. The committee's close involvement will lend credibility to funding recommendations. It will also help insulate the agency requesting the funds as well as elected officials whose support and leadership for the tax or bond measure is critical.
4. Develop a clear, simple, technical study for decision-makers that defines the problem and evaluates the costs and benefits of several alternative solutions. Any time you ask the public to pay for something, it's wise to spend time looking closely at what needs to be done, as well as costs and possible alternatives. Make the study available for public review, and be able to justify your funding request with clear documentation. Focus on economic and social benefits of the solutions, not just costs.
5. Educate voters so they understand the problem, the solution, its cost, and the cost of similar solutions in other communities nationwide. An informed voter is more likely to support your recommendations and requests for funding.
6. Partner with private or nonprofit organizations to design a strong media campaign (local agencies in California are prohibited from actively campaigning for or against a proposed tax). Media is a key component of any public outreach and education program. It can help you positively present your point of view and capture the attention and participation of elected officials. If you're not proactively engaging the media with press releases and building relationships with reporters, chances are your story will be framed in terms of any controversy it may generate. If you have a proactive media strategy, however, news reports are more likely to recognize the value of your proposal.
7. Design solutions to accomplish multiple objectives. A creek restoration project, for example, can be integrated into stormwater pollution reduction facilities. Stormwater detention basins and

groundwater recharge facilities can serve a dual purpose as public parks. These innovative solutions may have added costs, but the additional benefits will typically attract other funding partners which will likely reduce the burden for all. They can also attract multiple local, state and federal funding partners, reducing the amount of funding for which you'll need voter approval

Examples of other funding sources can consist of a combination of developer fees (stormwater utility fees, user fees, impact fees, service charges, plan review fees and regional in-lieu fees), property taxes, bonds, loans, grants, innovative private funding (license plates, lottery revenues, etc) and special purpose districts contributions (water-sewer districts, harbor and irrigation districts, etc.).

In general, property taxes have not been viewed as an equitable means of assessing stormwater fees since some properties are tax exempt and others are fairly impervious and thus not likely to be a contributor to stormwater quality or volume problems.

4.4 SANTA BARBARA COUNTY STRENGTHS AND WEAKNESSES

The following section details strengths and weaknesses of the County's Storm Water Management Program Section 5.0 Post-Construction Runoff Control. Alternatives and opportunities for improvement are discussed in Section 5. A matrix that includes additional considerations is included in Appendix C.

Key strengths identified in the program include the following:

- Meets or exceeds the majority of Attachment 4(B) by applying conditions County-wide (see summary in Attachment A).
- Land Use Development Code provides authority to condition Attachment 4(B) category projects.
- County Storm Water Management Program, Flood Control and Fire Conditions of Approval, Environmental Health Services publications are available on-line.
- Project Clean Water Web site provides reports, studies, upcoming events and outreach links.
- Planning and Development Department active in Process Improvement Efforts, including updates to data tracking system, Accela.
- County in the process of initiating a comprehensive County-Wide Integrated Regional Water Management Plan to address the complex inter-relationships across water supply, demand, quality, source water protection, drought management and flood control.

Key weakness identified in the program includes the following:

- A lack of a one stop technical guidance manual that provides clear guidance on 1) the type of control measures required based on the project type and 2) how to design, build, and maintain each control measures.
- Identification of overall County approach to address requirements of General Permit that tie the numerous county land use code, policies, design standards, CEQA review/impact mitigation's, ordinances and standard conditions that pertain to stormwater quality with a clear legal authority to enforce such regulations.
- Predevelopment meetings are optional; not required.
- When pre-development meetings do occur, applicants are not prepared because there is no upfront guidance on storm water quality.

- Applicants often address treatment control BMPs after grading and drainage, facility layout, and landscaping is designed, when effective water quality measures are more difficult to address.
- The minimum detention requirement typically imposed only addresses 25-year storm events. The requirement to maintain pre-existing runoff rates for storms larger than the 25-year storm event are at the discretion of the Flood Control Engineer.
- Municipal staff required to review permit applications may not have the necessary training to provide adequate review of all types of management practices.
- Regular training is not provided to keep developers up to speed on County permit process procedures.
- There is no website that outlines the entire process an applicant must navigate and the documents the applicant either may use or are mandated to use.
- All relevant policy documents are not available from the web site (Planners Guide to Conditions of Approval and Mitigation Measures, Public Works Standard Specifications and Plans, etc).
- All relevant policies are not documented (i.e., Public Works Engineering Design Standards, Fire Department minimum road widths, etc.).

Specific items that may be clarified through standard mitigation measures or incorporated into existing policies or ordinances to assure consistency with Attachment 4(B) are summarized below (see Appendix A for entire review):

- Require stormwater diversion and roofing for outdoor material areas (B2f1-3).
- Require stormwater diversion for trash storage areas (B2g1).
- Clarify water quality and disposal requirements applicable to large commercial development maintenance bays, vehicle/equipment wash areas and loading docs. (B3a1-3)
- Clarify water quality and disposal requirements applicable to automotive repair shop maintenance bays, vehicle/equipment wash areas and loading docs. (B3d2-4)
- Formalize through documentation a process by which an applicant can obtain a waiver (B4)
- Implement an alternative certification process (B6)

5 LID IMPLEMENTATION IN SANTA BARBARA CO.

During this evaluation, four public meetings were held to gather input and feedback from interested stakeholders. At all of the four stakeholders meetings, developers universally agreed that there is a strong market force in place for projects that incorporate Low Impact Developments (LID) measures into their designs. However, the developers expressed reluctance to include LID because they believe the permit process would take longer and the designs would ultimately be rejected, resulting in a return to tradition practices long-accepted by the County. This section provides detail on LID measures that could be incorporated into Santa Barbara County development review practices, a summary of barriers (real or perceived) that hinder the implementation of LID measures, and suggestions to remove the barriers or encourage LID in the County.

5.1 LID CATEGORIES

As previously described, the goal of Low Impact Development is to mimic pre-development hydrologic conditions as much as possible through the use of a variety of structural and non structural practices that detain, retain, percolate and evaporate storm water in lieu of concentrated discharges.

The most cost-effective and environmentally superior means of implementing LID in Santa Barbara County is to incorporate LID into the design of the site up-front. The following LID measures could be better incorporated into Santa Barbara County practices:

- Reduced impervious surfaces
- Disconnecting hydrologic elements / strategic runoff timing

5.1.1 Reducing Impervious Surface

The percent impervious area has been directly associated with the overall health of a watershed. Reducing impervious areas associated with a development reduces the volume of runoff that leaves the development, assists in recharging the groundwater table and reduces the heat island effect associated with hardscape developments. LID practices that could readily be incorporated into County development review strategies to reduce impervious surfaces include:

- Improved parking lots design (an Attachment 4 Permit requirement)
- Narrowed roads & driveways
- Vegetated roofs
- Clustered Developments (also an Attachment 4 Permit requirement)

5.1.1.1 *Improved Parking Lot Design*

Traditional parking lot design strategies often focus on minimum parking requirements for the specific development without considering the proximity of the development to mass transit or residential hubs or ability to share parking with compatible developments (for example schools need Monday through Friday parking while many Churches require only evening and weekend parking). LID parking design criteria, in contrast, place maximum limits on the amount of parking and provides for shared parking.

Examples of maximum parking limits include:

- *No more than 3 off-street parking spaces per 1000 square feet of gross floor area in professional office buildings (from Massachusetts LID Toolkit).*

- *No more than 4.5 off-street parking spaces per 1000 square feet gross floor area of shopping centers (from Massachusetts LID Toolkit).*
- *No more than 2 off-street parking spaces per single family home (from Massachusetts LID Toolkit).*
- *Except for properties located in the Downtown Subarea, the minimum number of parking spaces required is 1 per 400 gross square feet, and the maximum number is 1 per 250 gross square feet (from City of Sequim WA).*

Designs that reduce the overall imperviousness are a fundamental LID measure. One technique to reduce imperviousness is to encourage drainage into planting areas. Example conditions of approval that encourage planting in parking areas include:

- *No parking row shall contain 30 contiguous parking spaces without a curbed planting area or bioretention cell. These areas shall include trees to a minimum height and diameterand these areas shall contribute to small-scale control of stormwater runoff. If the Landscape Plan incorporates the retention of significant trees above the requirements specified, the City may approve a reduction of up to 10% of the required number of parking spaces if adequate parking is available for entire site build-out. (City of Sequim WA)*
- *The number of trees required in the internal planting areas in parking lots shall be dependant upon the location of the parking lot in relation to the building and public right-of-way:*
 - *where the parking lot is located between the building and the public right-of-way, one tree for every five spaces shall be provided (1:5).*
 - *where the parking lot is located to the side of the building and partially abuts the public right-of-way, one tree for every six spaces shall be provided (1:6).*
 - *where the parking lot is located behind building and is not visible from the public right-of-way, one tree for every seven spaces shall be provided (1:7).*

Existing trees shall be retained unless they are unhealthy, cause public safety hazards, or cannot be reasonably retained due to site specific limits. (City of Sedro-Wooley, WA)
- *Interior landscaping must be provided for sites where there is more than 3,000 square feet of parking and loading areas, not including driveways and perimeter landscaped areas. At least 10 percent of the parking and loading area, not including driveway area, must be landscaped (City of Portland, OR) :*
- *Perimeter landscaping may not substitute for interior landscaping. However, interior landscaping may join perimeter landscaping as long as it extends 4 feet or more into the parking area from the perimeter landscape line. Where a surface parking area abuts a street lot line... therequired setbacks must be landscaped (City of Portland, OR).*

LID also encourages parking lots to be constructed with porous pavers/pavements. Permeable pavements reduce the volume of runoff leaving a site while also providing improved water quality and reduced heat contents. A typical cross-section of a permeable pavement parking lot is provided in Figure 2.

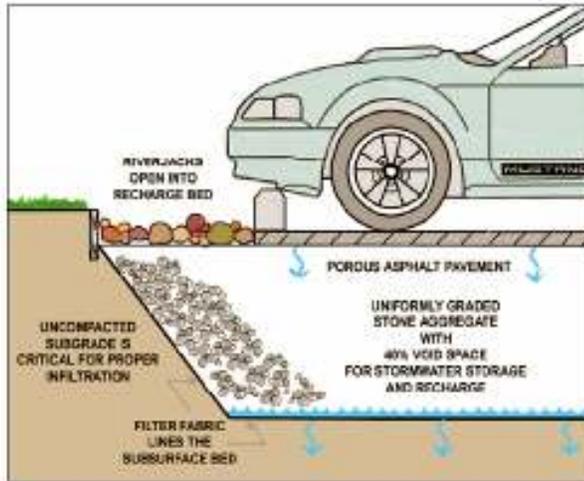


Figure 2 – Permeable pavement cross-section (Source Cahill and Associates)

At locations where the native soil is impermeable (clay or hard pan) or has less than ideal percolation rates, an under drain system may be necessary to collect runoff and convey it from the site. The following pictures depict permeable surfaces that are well-suited for parking lots.



Figure 3 – Various surface alternatives to impervious pavements



Figure 4 – Permeable pavers, porous asphalt, and bioretention cells at the Silver Lake beach parking lot, Wilmington (Source: GeoSyntec Consultants)



Figure 5 – Porous Asphalt Parking Lot, University of Rhode Island, Kingston (Source: http://efc.muskie.usm.maine.edu/docs/LID_Fact_Sheet.pdf)

5.1.1.2 Narrowing Roads and Driveways.

One means of reducing impervious areas is to reduce the minimum road and driveway widths. The underlying rationale for narrowing the width of local streets is that most homes are built with garages and driveways that can typically accommodate up to three vehicles. Additionally, wide streets tend to promote higher traffic speeds. By reducing street width, additional land is available for development or open space and materials are conserved.

Santa Barbara County Engineering Design Standards specified paved road width of 40-feet for primary residential streets and 36-feet for secondary residential streets, where the road and right-of-way is publically-owned and maintained, exceeds the minimum road width of 20-feet established by the National Fire Protection Administration Uniform Fire Code (2003) Section 503.2. For privately owned and maintained roads, the standard is set by the County Fire Department and is based upon California Fire Code. See Development Standard #1: *II. PRIVATE ROAD A. Roadways serving two or more residential parcels or dwellings shall have a minimum width of 24 ft.*

As shown in Table 1, many other jurisdictions allow narrower street widths:

Table 1 – Other Jurisdictional Minimum Road Widths

MINIMUM ROAD WIDTH (FEET)	SOURCE
16*	City of Denver, CO (Private or public streets serving single-family detached buildings or town homes with alleys & Private or public streets serving single-family detached buildings or town homes, without alleys but with driveways that reach the street)
18*	City of Denver, CO (Private or public streets serving single-family detached buildings or townhomes, without alleys OR driveways that reach the street); Mariposa County.
20	City of Edmond, OK; City of Mesa AZ (when parking is not allowed on either side of the roadway); City of Denver CO (Multi-family buildings, two stories or less, 15 units maximum per building; buildings with interior corridor(s) and a fire standpipe system complying with City ordinance); City of Kent WA (roads without fire hydrants), West Des Moines, IA
20	Skinny streets are 20 feet wide with parking on one side or 26 feet wide with parking on both sides. Both streets have an effective travel lane of about 12 feet. (DESIGN GUIDE FOR PUBLIC STREET IMPROVEMENTS, City of Portland, OR)
24	City of Fallen Nevada; City of Edgewood
25	City of Denver CO (Multi-family buildings, three or more stories, 16 or more units)
26	City of Layton, UT; City of Kent WA (on roads with fire hydrants); San Luis Obispo County (typical rural section with less than 250 future ADT)
28	City of Mesa AZ (when parking is allowed on one side of the roadway); San Luis Obispo County (typical rural section with future ADT of 401 to 1000 mountainous terrain with dike specified)
34	City of Mesa AZ (when parking is not restricted); San Luis Obispo County (typical rural section with future ADT of 401 to 1000 on flat and rolling terrain)

*Fire Protection Administration Uniform Fire Code (2003) Section 503.2.1 allows local authorities to set lower standards if turnouts or alternate exits are available however California Fire Code currently does not.

While many studies correlate increased traffic safety with narrower roads, road width standards must be based on design speed and volume.

While Section 902.2.2.1 California Fire Code requires Fire apparatus access roads to have an unobstructed width of not less than 20 feet, the National Association of Home Builders (NAHB), in a 2001 report, provided the following recommended pavement widths:

Table 2 – Recommended Minimum Road Widths

ROAD WIDTH (FEET)	TYPE OF STREET
18	Local Streets – No on-site parking
22 to 24	Local Streets – Parking on one side
24-16	Local Streets – Parking on both sides
32 – 36	Collector Streets

Additional pervious areas can be gained by reducing cul-de-sac geometry or replacing them altogether with hammerheads. The radii of Cul-de-sacs in Santa Barbara County varies with the width of the main street feeding it. Two methods can be undertaken to reduce the extent of impervious area associated with cul-de-sacs: (1) reduce Cul-de-sac radii and (2) provide a landscape island in the center of the cul-de-sac.

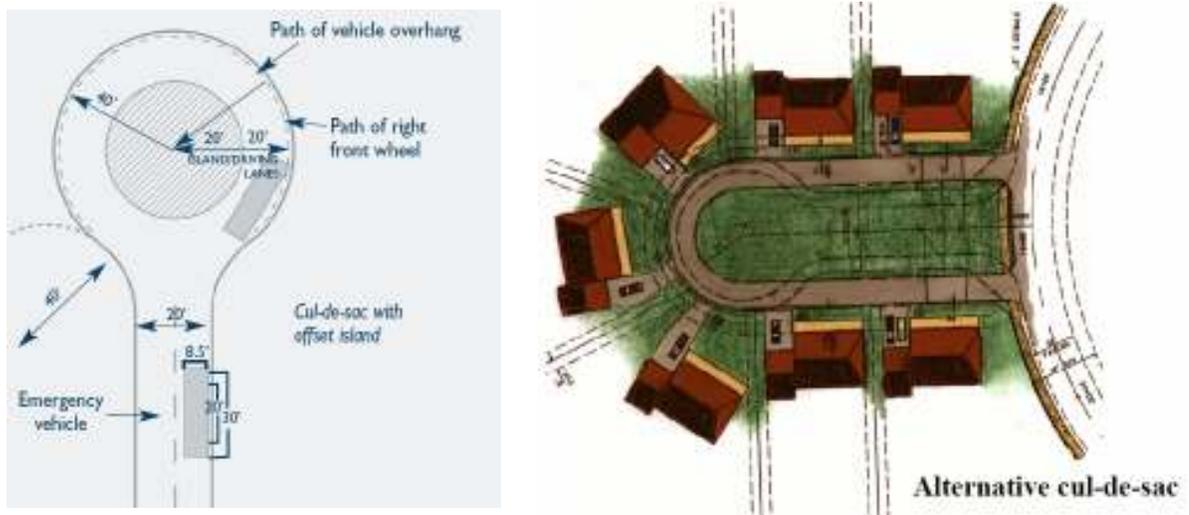


Figure 4 – Alternative Cul-de-sac designs
(left, 2004 Connecticut Storm water Quality manual & right, 2002 Horsley Witten Group Tools for Watershed Protection)

U.F.C. Section 902.2.2.3 states that the turning radius of a fire apparatus access road shall be as approved by the Fire. For the City of Santa Cruz, the minimum inside turning radius shall be 28 feet and minimum outside turning radius shall be 48 feet. While Orange County requires that the turning radius for the apparatus roads shall be not less than 17 feet inside radius and 38 feet outside radius.

Sidewalks can also be modified to reduce stormwater runoff by placing sidewalks only where they will be used (based on street classification, land use type and density) and by using porous materials in lieu of traditional concrete.

Reducing the curb radii at intersections not only reduces the impervious surfaces but also increases pedestrian safety by narrowing the distance required to cross the street. Vehicles must slow down to safely navigate the curves. Table 3 provides the recommended minimum curb radii based on various types of intersections per the 2003 U.S. Housing and Urban Development sponsored report “Practice of Low Impact Development” report. The type and frequency of large vehicle using the intersection should be considered prior to reducing the curb radius.

Table 3 – Recommended Minimum Curb Radii

CURB RADIUS (FEET)	TYPE OF INTERSECTION
10 to 15	Local / Local
15 to 20	Local / Collector
15 to 25	Collector / Collector

5.1.1.3 *Vegetating Roofs.*

Rooftop runoff management refers to the modification of existing rooftops to retard runoff. Eco-roofs are lightweight roof systems supporting a few inches of soil and small plants. Roof gardens differ in being heavy roofs, usually with a foot or more of soil supporting large plants, shrubs, or trees, either directly on the roof or in planters. Eco-roofs are widely used in Europe, but have not yet been commonly accepted in the U.S. Eco-roofs can be an economical and effective stormwater management technique. In areas where rooftops or pavement cover a high percentage of the land, there is little land left for controlling stormwater runoff in the landscape. Particularly in such circumstances, eco-roofs can make substantial improvements in stormwater runoff quality and quantity. Both of these BMPs provide substantial stormwater management benefits by slowing runoff and increasing interception, evaporation, and transpiration. Eco-roofs and rooftop gardens help maintain lower stormwater runoff temperatures. There are also aesthetic, air quality, and ambient temperature benefits from eco-roofs and rooftop gardens. In some circumstances or areas, it may even make sense to require eco-roofs; for example, where soil contamination can make stormwater infiltration inadvisable, or where commercial or industrial areas adjoin environmental zones. With careful selection vegetating existing flat roofs can be accomplished without additional structural support. Drainage nets or sheet drains construction from lightweight synthetic materials can be used as underlayments to carry away water and prevent ponding. Vegetated roof covers intercept rainfall during the early part of a storm and limit the volume and rate of runoff.



Figure 5 – Vegetated Rooftop over car wash facility in San Luis Obispo

Supplemental irrigation may be needed, depending on the plants selected, during the non-rainy season.

There are numerous municipalities that encourage the use of Green Roofs.

- Portland requires all building projects in the city that will result in at least 500 square feet of impervious surface to implement stormwater pollution reduction and flow control measures. Green roofs are one of the acceptable measures.
- Portland also has provided an incentive for developments to increase their floor area ratio larger than the zoning might otherwise allow when they include a green eco-roof. For eco-roofs that cover a minimum of 60% of the roof surface, the floor area bonus is an additional three square feet of floor area (either up or down) per square foot of green eco-roof to be added to the footprint of the building. The ratio of additional floor space is reduced based on the total ratio of eco-roof area to building footprint area.
- The City of Chicago's Building Green/Green Roof policy applies to construction projects that receive public assistance or are subject to review by the Department of Planning and Development as a "Planned Development." They require a 50% green roof and LEED certification for all public projects except community centers and schools. The percent green roof requirement varies with private developments (50% Green Roof for office space greater than 80 square feet, 25% for multifamily units with market rate greater than or equal to 4 units).
- Closer to Santa Barbara, and effective since 2002, the City of Los Angeles requires all building projects 7,500 square feet or larger to achieve Leadership in Energy and Environmental Design (LEED) 'Certified' standards (Council File 02-0182). A number of LEED certified City buildings have already been designed. LEED certification is awarded based on a point system that gives a building points for numerous different conservation measures (26 points achieves certification). Among the possible measures is the installation of a green roof.

For additional information, see <http://www.greenroofs.com/Greenroofs101/how-tos.htm>

By minimizing the footprint of a development and allowing the undeveloped portions to remain as open space, some of the hydrologic functions for a site can be maintained. The County utilizes the Environmental Threshold and Guidance manual to allow a 'less than significant finding' for projects that do not increase impervious surfaces. While zoning ordinances currently limit the area to be occupied by buildings and structures, this concept could be expanded by allowing smaller lot sizes if a part of the parcel is left as open space or require a minimum area to be left as opens space. As shown in Figure 6, clustering reduces the extent of impervious surfaces.

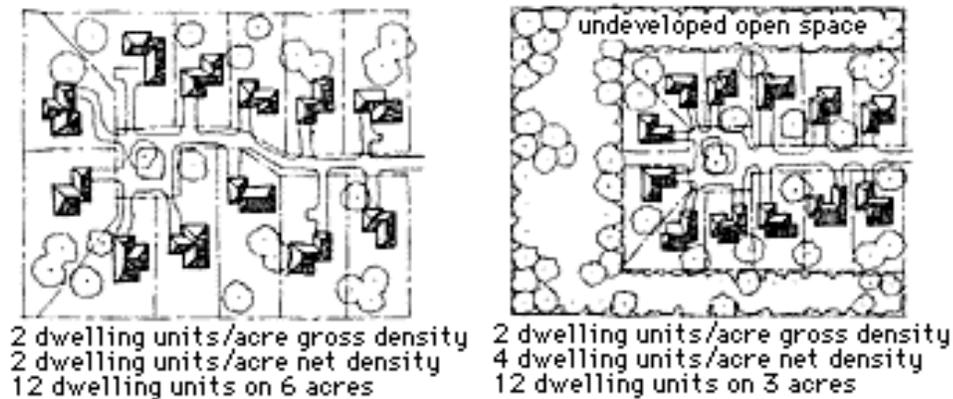


Figure 6 – Clustering Example (Protecting Water Quality in Urban Areas: Best Management Practices for Minnesota)

Reducing home set-back requirements encourage smaller lots as well as minimize driveway lengths. Side yard setbacks reduce the ability to have shared driveways.

5.1.2 Disconnecting Hydrologic Elements

Conventional stormwater system efficiently collect and convey stormwater away from a site. A LID stormwater system strives to slow the collection and conveyance of stormwater by disconnecting hydrologic elements. LID practices that disconnect hydrologic elements include:

- Roofs downspouts
- Parking areas
- Sidewalks

In all of the above approaches to disconnecting hydrologic elements, careful attention should be given to the design to assure that stormwater is transported away from foundations.

5.1.2.1 Roof Downspouts.

Installing a dry well at the base of a rooftop drain can reduce the volume of runoff while improving water quality and groundwater recharge rates during small storm events. An example of a rooftop runoff drywell is provided below.

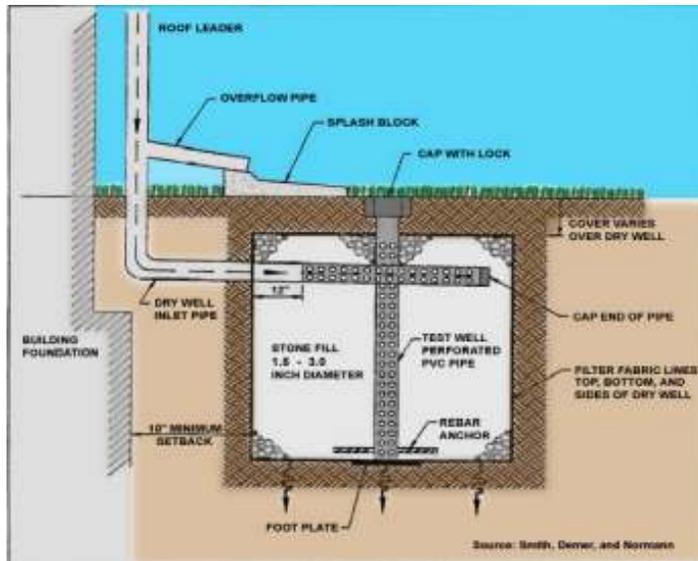


Figure 7 – Rooftop runoff dry well

In areas with larger rainfalls, cisterns can be placed to intercept and store rooftop runoff.

Rather than directing rooftop drainage to the street, it can be directed into on-site rain gardens such as the one shown in the picture to the right.

Depending on the existing site infiltration rate, the soil in the rain gardens may have to have modified or replaced with a better draining soil.

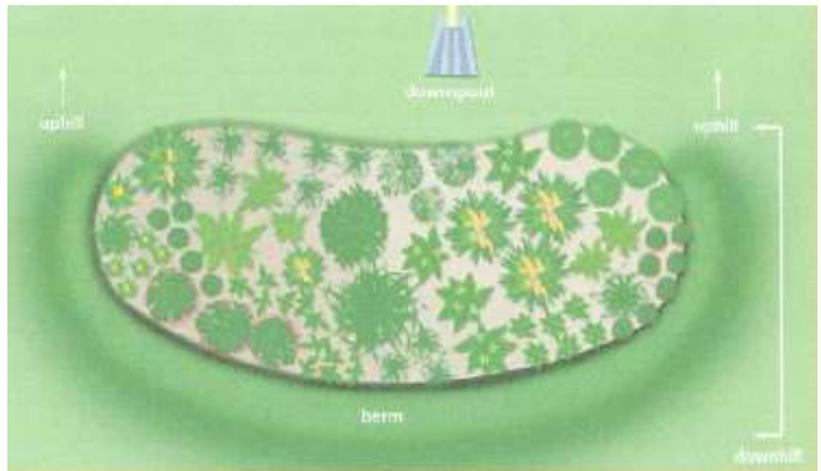


Figure 8 – Rain Garden (City of Maplewood, MN)

Portland has a voluntary Downspout Disconnection program implemented since 1996 to reduce the amount of roof runoff directed to their stormwater system. Homeowners that disconnect downspouts to the surface can have it done free by the city or do the work themselves and receive a \$35 per downspout credit.

5.1.2.2 *Parking Areas.*

By routing stormwater into planter or infiltration areas, nuisance flows and rainfall volumes of smaller storms can be infiltrated rather than discharged from a site.



Figure 9 – An example of parking lot runoff draining to linear bioretention areas (Aqua-Tex Scientific Consulting Ltd.)

5.1.2.3 Sidewalks

Sidewalks can also be modified to reduce stormwater runoff by placing sidewalks only where they will be used (based on street classification, land use type and density) and by using porous materials in lieu of traditional concrete. Some communities require that impervious sidewalks be sloped towards the lot and not towards the street.

5.1.3 LID Resources

Additional LID site design criteria is available through the Bay Area Stormwater Management Agencies Association publication “Start at the Source: Design Guidance Manual for Stormwater Quality Protection” and Prince George’s County “Low Impact Development Design Strategies: An Integrated Design Approach.”

Other commonly sited resources include:

Low Impact Development Center
 U.S. Environmental Protection Agency
 Stormwater Manager’s Resource Center
 National NEMO Network
 LID Urban Design Tools
 National Association of Home Builders
 California Stormwater Quality Association

www.lowimpactdevelopment.org
www.epa.gov/owow/nps/urban.html
www.stormwatercenter.net
www.nemonet.uconn.edu
www.lid-stormwater.net
www.toolbase.org/index-toolbase.asp
www.cabmphandbooks.com

5.2 BARRIERS TO IMPLEMENTING LID

There are numerous examples of Standard Plans that are contrary to LID practices. Each are presented in Appendix C. Examples shown in Appendix C include mandatory minimum road width, driveway and fire

truck turn-around widths, requirement to provide pipe culverts instead of open channels or to provide sidewalks on both sides of the road, etc.

Additional barriers, real or perceived, expressed during the Stakeholders meetings include:

- Developers are hesitant to propose alternative approaches such as LID because if there are inter-departmental conflicts, especially regarding issues of public safety, they believe County staff is unable to coordinate and resolve the issue(s) on their behalf.
- Since LID is not integrated with other County development design practices, developers believe they will have to address the entire infrastructure using a traditional design approach including Engineering Design Standards design criteria and then separately dedicate land for LID measures such as infiltration or bioretention. In other words, LID measures would result in less developable area. With the ever increasing costs associated with development in general, adding additional costs by conserving land for LID will be passed onto the buyer-- making housing and commercial properties more expensive.
- It is thought that the LID measures shown on approved plan sets (such as specifying that down spouts shall not drain directly to the curb) would be eliminated by building inspectors at the time of installation because the building inspectors will follow traditional practices.
- There is not enough local expertise in the design, construction and maintenance of LID facilities. Until local contractors become proficient in LID practices (such as porous pavements), there is an increased cost and hassle associated with implementing these new-to-the-area technologies.
- Some practices associated with LID can be in conflict with other County-identified goals. For example, LID practices that may be in conflict with water conservation goals include:
 - Green roofs may require irrigation.
 - Plants specified for inclusion in bio-retention areas must be able to withstand periods of inundation. Thus many drought tolerant plants preferred by the County Department of Planning & Development may not be appropriate for use in bio-swales and the plants most likely to succeed in these conditions will require watering during the non-rainy season.
- Post-construction detention basins might not be allowed to be used during construction for temporary sediment control. Combining purposes would save developer costs. A combination facility could be noted on the plans, for example, "permanent flood control detention basins may be used during the course of construction as temporary BMP for sediment control. If so, detention facility shall be restored prior to acceptance."

Another difficulty considered by County staff lies in specifying which LID measures should be considered, and once selected how big, how long, how extensive, etc. It would be awkward to establish a minimum set of LID measures, or to place value on some measures over others. Implementation of LID is more qualitative than quantitative. Design requires specialty of training in engineering and landscape architecture to determine which are most appropriate, how to combine and design given a project setting and development type, etc.

5.3 REMOVING BARRIERS TO LID

The best way to reduce costs associated with LID, whether real or perceived, is to provide the development community with specific design criteria for certain LID approaches, or revise existing design criteria (i.e. Engineering Design Standards), and have those criteria already accepted by those divisions responsible for project review. Creation of LID standards would build confidence in the development community that the

potential conflicting issues associated with LID have been worked out between the various departments and therefore their proposed design would require no additional time to process, nor would it be rejected late in the review process. One of the recommendations of this report is to develop a County-wide Technical Guidance Manual. The Technical Guidance Manual would be a resource that identifies integrated LID measures. The Technical Guidance Manual would be consistent with the overall development review process, including the review authorities from various departments and their respective goals and objectives.

For example, the Flood Control District evaluates projects to assure that the development is reasonably protected from flooding, that flows are released in a non-erosive manner, and that downstream impacts are mitigated. Protection of human health and safety and protection of property is accomplished through consistent application of Flood Control development standards. These standards would not be diminished or compromised through inclusion of LID measures. However, implementation of LID measures such as greater imperviousness, less directly-connected impervious areas, increased flow paths, increased storage, etc. can result in smaller sized detention basins than would otherwise be required for a traditionally-built development.

In this example, the Technical Guidance Manual would integrate with Flood Control objectives by addressing those LID measures that affect the developed area runoff analysis and subsequent detention basin sizing criteria. LID has been demonstrated to be less expensive to install and maintain because the overall infrastructure for stormwater conveyance is reduced. By minimizing street widths, modifying parking lot design criteria, eliminating curb and gutter requirements, or reduced sizing for treatment control facilities through increased onsite imperviousness, LID becomes economically preferable to traditional approaches.

6 OVERALL ASSESSMENT AND RECOMMENDATIONS

An overall assessment of the County's post construction BMP program is provided in this section. First the characteristics of an effective program are identified. Next opportunities to enhance the current County review procedures to make it more responsive to the requirements of the General Permit are presented. And finally recommendations are provided for making a more effective County stormwater program in the post-construction aspects of planning and land development

6.1 CHARACTERISTICS OF AN EFFECTIVE PROGRAM

Based on the review of other municipal new development programs regarding post construction BMPs the following characteristics reflect an effective program:

- BMP requirements are clearly identified for the developer and municipal staff to avoid disagreement and provide for consistent and complete project applications. Specifications and design standards must be accurate and reflect local conditions.
- There are clean lines of responsibility for plan review and approval by municipal staff. Optimally it would be preferred to assign specific staff for the review and approval of post construction BMPs.
- There is broad support among the municipal departments, the development community and interested parties for implementing post construction BMPs.
- The development standards and policies reflect local constraints and interest.
- Sufficient and specific legal authority is provided to ensure proper design, implementation and maintenance of post construction BMPs.
- Adequate funding is provided to the program.

6.2 OPPORTUNITIES TO REVISE THE COUNTY REVIEW PROCEDURES

The following lists potential opportunities to revise current County procedures. The opportunities are grouped by the various stages of the review process and in key additional considerations.

6.2.1 Project Application Submittal

Opportunities to improve the application package include:

- Address stormwater BMPs at all pre-application meetings for categorical projects listed in Attachment 4.
- Ensure P&D counter staff consistently identifies and routes projects subject to additional storm water review to the Project Clean Water staff.

6.2.2 Preliminary Review by Staff

Opportunities to improve the preliminary review process include:

- The preliminary site plan reviewed by all departments' must identify approximate areas reserved for post construction management BMPs and approximate ROW lines. Public and private facilities need to be clearly identified.
- Redlines from one department can be in conflict with redlines received from another department (i.e. one department can request a BMP at a location that another department might object to). Inter- or intra-departmental comments should be compiled into a single set of redlines or otherwise coordinated (i.e., designated permit coordinator staff) and redistributed to appropriate staff when conflicts are identified. When conflicts occur and the applicant has been unable to resolve the issues independently, the Subdivision Review Committee (SDRC), a designated permit coordinate, and/or Planning and Development staff should meet to reconcile the discrepancy.

6.2.3 Staff Report

Opportunities to improve the staff report process include:

- Sample operation and maintenance agreements should be available to the applicant for long term water quality BMPs and flow control facilities (swales and basins).

6.2.4 Compliance with Conditions of Approval

Opportunities to improve the conditions of approval process include:

- Redlines from one department can be in conflict with redlines received from another department (i.e. one department can request a BMP at a location that another department might object to). Inter- or intra-departmental comments should be compiled into a single set of redlines or otherwise coordinated (i.e., designated permit coordinator staff) and redistributed to appropriate staff when conflicts are identified. When conflicts occur and the applicant has been unable to resolve the issues independently, the Subdivision Review Committee (SDRC), a designated permit coordinate, and/or Planning and Development staff should meet to reconcile the discrepancy.
- Ensuring maintenance for the life of the project is addressed in the CC&Rs, a special stormwater utility district, or other mechanism.

6.2.5 Land Use and Building Permit Issuance

An opportunity to improve the permit compliance includes the definition of an inspection process to describe criteria and outcome of enforcement actions. Inspections include P&D permit compliance staff, building inspectors, and as appropriate, staff from other divisions (Public Works, Fire, Public Health, etc.).

6.2.6 Long Term Maintenance Arrangements

Opportunities to improve the implementation of the Long Term Maintenance Agreements process include:

- A formal inspection and review process should be documented and include standardized inspection forms, inspector "certification" requirements and examples of citation letters. A model that could be used in the development of an inspection, and maintenance tracking program is available on line under "STP Maintenance Resources Introduction" at <http://www.stormwatercenter.net/>.
- Creation of Stormwater Special Maintenance District which could be retained to perform stormwater maintenance for HOAs, businesses, etc.

6.2.7 Outreach and Education

An opportunity to improve outreach and education suggested by the stakeholders includes a technical manual that clearly defines County expectations for stormwater quality BMPs and related limitations (outside of ROW, emergency vehicle requirements, building set backs).

6.3 RECOMMENDATIONS

This section is divided into three subsections. The first section identifies enhancements/clarifications to the County's program for ensuring the program complies with Attachment 4 requirements. The second and third sections provide recommendations for opportunities to improve the implementation of the Post Construction Stormwater Management component of the Storm Water Management Plan.

Recommendations have been divided into two categories:

Staff Items that could be modified/adopted and implemented by County staff without Board of Supervisor action

Decision Maker Items that may best be implemented by Board of Supervisors direction to staff

The recommendations have been further categorized as either near or long term based upon the level of perceived difficulty to implement. For instance, items that currently do not have a known source of funding or that require concurrence from multiple agencies or departments and the public were deemed more difficult to implement than items under a single department.

Additionally, some recommendations in this report will require a considerable amount of staff time and could be supported through consultant contracts, such as staff training, educational workshops / outreach programs, and the Technical Guidance Manual. In order to help implement some of the recommendations contained in this report, develop a long-term strategy / campaign to provide stabilized, dedicated funding for implementing the post-construction control measure (MCM 5.0) of the Storm Water Management Program, such as through a Prop 218 voter approved measure to establish dedicated storm water fees.

6.3.1 For Full Compliance

As mentioned in Section 4.4, the following items are either lacking or require clarification in existing standard conditions:

- Require stormwater diversion and roofing for outdoor material areas (B2f1-3)
- Require stormwater diversion for trash storage areas (B2g1)
- Clarify water quality and disposal requirements applicable to large commercial development maintenance bays, vehicle/equipment wash areas and loading docs (B3a1-3)
- Clarify water quality and disposal requirements applicable to automotive repair shop maintenance bays, vehicle/equipment wash areas and loading docs. (B3d2-4)
- Document a process by which an applicant can obtain a waiver (B4)
- Implement an alternative certification process (B6)

These items can be addressed in the Planner's Guide of Approval and Mitigation Measures, with direction to staff that such measures are mandatory.

6.3.2 Opportunities to Improve - Staff

This section provides a list of potential improvements to the Post Construction Stormwater Management component of the Storm Water Management Plan that could be considered by the County to enhance compliance with General Permit requirements. These items do not require Board of Supervisor or Planning Commission action to implement.

Near-term

- Create consistency between *A Planner's Guide to Conditions of Approval and Mitigation Measures* and Attachment 4 by incorporating the Attachment 4(B) Design Standards into the *Planner's Guide* either using exact terms from Attachment 4(B) or providing a more complete/specific language that improves upon Attachment 4(B) unless County requirements are stronger.
- Replace all "If feasible", "to maximum extent practicable" and "should" terminology in the *Planner's Guide to Conditions of Approval and Mitigation Measures* with "must apply per our NPDES permit".
- Identify mandatory standard water quality conditions of approval (i.e., Attachment 4(B)) vs. other conditions that protect water quality but are not mandatory (i.e., direct roof downspouts to landscaped area) to assure compliance with General Permit.
- Continue training P&D permit counter staff to identify and route projects subject to treatment control measures to the Project Clean Water office. Include a "post-class test for learning" at all mandatory stormwater training for staff.
- Require inspection of BMPs during construction by qualified inspectors who have the authority to inspect and enforce proper installation of BMPs.
- Allow signed certification from a licensed Civil Engineer or Architect that the Structural or Treatment Control BMP plans meets the criteria established.
- Have all relevant documents (*Planners Guide to Conditions of Approval and Mitigation Measures*, Public Works Standard Specifications and Plans, etc) available electronically from a single site on the County's web site.
- Require pre-development meetings to be mandatory for all County reviewers with water quality being an item of discussion.
- Provide applicants examples of specific maintenance requirements in sample maintenance agreements based upon the BMPs implemented (i.e. require percolation rates be verified for infiltration basins every 10 years)
- Document and publish current County written or unwritten policies (i.e. no private water quality features to be located within Public ROW) as related to post construction water quality BMPs.
- Periodically educate land use decision makers of the relationship between land use and water resource protection (model program after NEMO approach)
- Evaluate unincorporated urban areas under the NPDES permit and determine watershed conditions best suited for various LID measures, similar to City of Arroyo Grande (i.e., identify areas where increased detention is recommended vs. areas where less detention and improved conveyance is recommended, etc.)

Long-term/Ongoing

- Develop a standardized worksheet to determine the project's requirements under the post-construction program and use the worksheet for pre-application meetings.
- Develop requirements for a project-specific Storm Water Management Plan as part of initial application submittal.
- Provide regular training to the development community and on the post-construction program.

- Provide regular training to County staff involved in development review; use this training as opportunity to address potential conflicts between divisions/departments. Include a “post-class test for learning” at all mandatory stormwater training for staff.
- Establish a tracking system to compile information regarding post construction BMP implementation including location, type of control, ownership, and other special conditions.
- Evaluate opportunities for establishing service districts for long term maintenance of the post construction BMPs in major new development.
- Develop a comprehensive operation and maintenance strategy that includes regular inspections by the County and an enforceable course of action to address deficiencies in project maintenance.
- Coordinate with MS4-Permit cities for consistency in post-construction program.

6.3.3 Opportunities to Improve - Decision Maker Recommendations

Items in this section should be considered by the County to enhance compliance with General Permit requirements. Board of Supervisor or Planning Commission action may be helpful or required to implement these items.

- The regulatory authority to administer requirements placed on developers, whether through ordinance and/or building codes, must be clearly identified and explained. Consistent and specific legal authority provides for the foundation for implementing post construction BMPs. While the General Permit does not require one consolidated stormwater ordinance, some jurisdictions have developed an ordinance and accompanying guidance material, i.e., Ventura County. Since the County is not lacking the legal authority to implement the post-construction program, an alternative to a new ordinance would be a Technical Guidance Manual. A Technical Guidance Manual would clarify the legal authority and consolidate regulations pertaining to development. It would also include guidance on site design, source control, and treatment control BMPs. A Technical Guidance manual can be updated and revised by staff without Board action. Overall direction from the Board to develop a manual may be helpful since multiple departments would be involved.
- Clearly delineate each department’s responsibilities with regard to project review, provide funding to support those responsibilities, and assure regular training.
- Develop incentive program to implement source and site design BMPs. Examples of incentives that were suggested by the public during initial workshops for this evaluation included: density bonuses, in-lieu fees, awards and flood-control storage credits.
- To promote LID concepts, consider defining a minimum ground water recharge rate, or percent vegetative cover/landscaping necessary for categories of development similar to City of Portland.
- Consider requiring large building projects to achieve Leadership in Energy and Environmental Design (LEED) ‘Certified’ standards.
- Evaluate opportunities for community-wide special stormwater utility districts, especially for new, very large subdivision developments.
- Develop, through a stake-holder effort, a stand alone technical guidance manual that provides clear guidance on post construction BMP requirements (for the Attachment 4(B) category projects) including 1) the type of control measures required based on the project type and 2) how to design, build, and maintain each control measures. The Manual should include low impact development concepts (site design BMPs) and identify incentives for encouraging the use of LID concepts. The technical guidance manual must have supporting legal authority, either through direct inclusion in an ordinance, or by reference in a stormwater or building ordinance that a project proponent will use the latest version of a manual. The Technical Guidance Manual must integrate and support

the County's overall design review process, including other technical requirements and objectives implemented through Public Works, Fire, and other departments.

- Explore long-term strategies to provide stabilized, dedicated funding for the post-construction element of the overall Storm Water Management Program.

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