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NATURAL RESOURCES DEFENSE COUNCIL

July 12, 2007

Via FedEx and Email

Executive Officer and Members of the Board
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay St., Suite 1400
Oakland, CA 94612
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Re: Administrative Draft Municipal Regional Stormwater Permit, San Francisco Bay Region (NPDES Permit No. CAS002XXXX)

Dear Mr. Wolfe and Members of the Board:

The Natural Resources Defense Council ("NRDC") is a national environmental organization with over 675,000 members, more than 124,000 of whom are California residents and approximately 28,850 of whom live in the San Francisco Bay Area. Baykeeper is a San Francisco-based, non-profit organization dedicated to the protection and enhancement of the San Francisco Bay-Delta Estuary and its tributaries. NRDC and Baykeeper have reviewed the Administrative Draft NPDES Municipal Regional Stormwater Permit for the San Francisco Bay Region ("Draft Permit" or "Proposed Permit") and submit the following comments regarding the critical issue of controlling polluted runoff from new and redevelopment.

We appreciate the effort that has gone into producing this draft, and, as we mentioned during our last telephone discussion, we would welcome the opportunity to meet with you in person to discuss these comments and the Draft Permit generally. We submit these comments to urge staff to make certain amendments to the Draft Permit to ensure that it effectively implements water quality standards and meets the Clean Water Act's maximum extent practicable standard ("MEP") for municipal dischargers.

Our comments focus on the Draft Permit's low impact development ("LID") requirements for new development and redevelopment (Section C.3). As you know, LID encompasses a collection of site design and stormwater controls that maintain the pre-development hydrologic character of developed sites, and has been demonstrated to be the most effective and cost-efficient method for managing stormwater and protecting the environment.[1] We are pleased that Board staff has indicated that it recognizes the importance of LID.

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We believe that the LID framework discussed in the Draft Permit provides a starting point upon which to base future efforts to reduce stormwater rate, flow and pollutant-load. However, if the Board is to meet the requirement of "implement[ing] control measures/BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable,"[2] clearer, stronger permit provisions are necessary. Therefore, we urge the staff to develop language for the next draft of the Permit that clearly and specifically requires LID mandates in new and redevelopment projects. These requirements must not be merely aspirational but, rather, quantitative and enforceable.

In this connection, we request that the Board reconfigure and lower the threshold for LID applicability and other post-construction best management practices ("BMPs") for new and redevelopment projects. To this end, we have included a special study focused on the San Francisco Bay Area by Dr. Richard Horner, one of the nation's leading stormwater experts. This study demonstrates that over a broad range of development patterns, a LID-oriented regime implemented to the MEP standard will result the 100% capture of stormwater runoff. In other words, Dr. Horner's report shows that it is indeed feasible for the Board to adopt a zero runoff standard for development projects in the Bay Area, regardless of the size or classification of a given development project. In accordance with these findings, we urge staff to focus on including a zero runoff standard for new and redevelopment. As discussed in this submittal, such an approach not only promotes a variety of water quality and supply objectives, but is necessary to meet the MEP standard for municipal stormwater runoff treatment and control.

We believe the importance of translating policy into enforceable, clear requirements in this permit cannot be overstated. As recognized by the United States Environmental Protection Agency (EPA), a high level of specificity is necessary to provide MS4s with a "clear target to achieve."[3] It is also necessary to determine whether the permittee is in compliance with the terms of the permit and whether the terms of the permit are stringent enough to ensure compliance with applicable water quality standards. Our comments below focus on specific sections of the Draft Permit, but, in general, we ask that staff once again review the Draft Permit with an eye towards ensuring that all requirements and performance measures contain objective criteria against which compliance can be easily determined. If Board Staff have not already done so, we recommend review of EPA guidance entitled *Storm Water Phase I MS4 Permitting: Writing More Effective, Measurable Permits.*[4]

1. Water quality problems persist in S.F. Bay Region receiving waters.

The EPA reports that urban runoff is a major cause of water quality degradation in the nation's estuaries.[5] In the Bay Area, significant water quality problems persist; many pollutants in urban stormwater are known to impair beneficial uses of Bay Area receiving waters. According to the State 303(d) list, stormwater is a significant source of many impairing pollutants, including pesticides, PCBs, PAHs, selenium, nutrients and pathogens.[6] Not only has research showed that storm water runoff is a significant source

of pollutants found in the San Francisco Bay Area, but the State Water Resources Control Board has determined that "[m]unicipal point source discharges from urbanized areas remain a *leading cause* of impairment of surface waters in California."[7] And, as the Bay Area population continues to grow, "the control of stormwater runoff, particularly from urban areas, will need to be improved in order to reduce contaminant loads to the [San Francisco Bay/Delta] estuary."[8]

In light of the continuing water quality problems in the Bay Area, the Board should use the opportunity presented by reissuance to modify the permit's structure and requirements to better achieve the underlying goal of specifying "actions necessary to reduce the discharge of pollutants in stormwater to the maximum extent practicable" and so as to "achieve compliance with water quality standards and objectives."[9]

2. LID practices have significant benefits compared to conventional BMPs.

The Clean Water Act requires municipal dischargers to reduce storm water pollution to the maximum extent practicable ("MEP"), a standard that continually evolves and improves as better technologies become available.[10] As the Draft Permit notes, this standard requires that municipal stormwater permits "require controls to reduce the discharge of pollutants..., including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants."[11]. It is widely recognized[12]—and the Regional Board and staff have emphasized[13]—that urban development increases impervious land cover and exacerbates storm water volume, rate, and pollutant loading. Development and redevelopment activities that occur without effective pre- and post-construction BMPs contribute to these problems.

Therefore, we strongly support the Draft Permit's attempt to integrate LID principles into the New Development and Redevelopment provisions, in particular the requirement of a LID approach for project design in all Regulated Projects, with a one-year compliance schedule.[14] The inclusion of similar categories for stormwater quality mitigation conditioning in other stormwater permits, and the widespread adoption of LID practices throughout the nation (see Attachment B to this letter), demonstrates that this aspect of the permit is feasible and practicable, and therefore necessary to meet MEP.

LID practices, including site design, source control, and soil-based treatment control techniques, are often more protective of water quality than many types of conventional structural treatment BMPs. By addressing stormwater at its source, LID techniques can prevent site runoff altogether, reducing the necessity of after-the-fact, or "end-of-pipe" mitigation efforts, which focus on the removal of a percentage of the pollution after it has already entered stormwater runoff.[15] In fact, LID practices offer myriad advantages over conventional BMPs—not only the primary benefits of pollution reduction and reduction of runoff rate and volume, but secondary benefits such as increased cost-effectiveness, groundwater recharge, habitat protection, resource

conservation and increased land value.[16] NRDC's report on storm water management strategies, *Rooftops to Rivers: Green Strategies for Controlling Stormwater and Combined Sewer Overflows* (2006), comprehensively addresses both the primary and secondary benefits of LID practices and is included in the collection of LID reference materials that are collectively attached to these comments as Attachment B.

NRDC has commissioned a formal study and report by a leading, nationally-recognized expert, Dr. Richard Horner, entitled *Initial Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Francisco Bay Area* (2007) (attached hereto as Attachment A and referred to herein as the "Horner San Francisco Study" or the "Study"). Dr. Horner confirms that the benefits of LID would be substantial throughout the San Francisco Bay Region and that these benefits can, in fact, be obtained given building patterns. The Study verifies that implementation of a robust and feasible suite of LID practices would make the Permit more consistent with MEP and, notably, that such a regime would result in zero runoff in a variety of Bay Area development/soil/rainfall scenarios.

A. The primary benefits of LID are proven and effective.

The primary benefits of LID techniques—reductions of runoff volume, rate, and pollution load— have been studied and documented in dozens of reports, case studies, and pilot projects in California and across the nation.[17] These benefits are described in great detail in the materials that accompany this letter, including reports by state and federal government agencies, building industry organizations, scientists, and non-governmental organizations.[18] Indeed, as the Board is aware, the Bay Area Stormwater Management Agencies Association, through its publication, *Start at the Source: Guidance Manual for Stormwater Quality Protection*, has already recognized the important role that LID must play in an effective, integrated, region-wide stormwater management plan. Though rarely, if ever, employing the phrase, "low impact development," this document discusses the application of LID strategies in various development contexts, noting that LID practices "are a collection of *proven* methods and techniques that integrates stormwater management into planning and design, that reduces overall runoff, and manages stormwater as a resource."[19] In short, the overwhelming body of literature shows that LID strategies are effective and can be cost-saving in both the short and long term.

B. The use of LID practices for stormwater runoff control has significant secondary benefits.

In addition to being a superior approach to reducing pollutant loading in stormwater and the volume and rate of stormwater runoff, LID offers developers, municipalities and homeowners other economic, aesthetic, and practical benefits by conserving natural resources such as soil, water, and vegetation and restoring natural hydrologic processes in watersheds. The following summary of the secondary benefits of

LID practices is but an overview of the voluminous information in the resources provided in Attachment B.

Groundwater recharge – Impervious land coverage is a feature of urban and suburban development. Therefore, as the Bay Area becomes more developed, rainwater that previously infiltrated the ground will instead hit impervious surfaces such as streets, sidewalks, and parking lots.[20] This results in reduced groundwater recharge, which in turn reduces local drinking water supply and the stability of critical base flows that are essential to the biological and ecological integrity of streams.[21] However, by applying LID techniques that reduce the amount of impervious surfaces and increase vegetation and soil features, the landscape can retain more of its natural hydrological function.[22] Thus, LID practices have the added benefit of recharging groundwater aquifers and preserving baseflow to streams and wetlands.[23] The use of LID practices is even more critical where, as in certain sections of the Bay Area, soils are naturally resistant to recharge. In such instances, LID techniques – such as water harvesting – that do not rely on soil characteristics for their efficacy are particularly valuable.[24]

Water Conservation - As the Board and Staff are well aware, Southern California, with its lack of plentiful natural water sources and ever-swelling population, has long faced serious water supply challenges.[25] The California Department of Water Resources (DWR) projects that by 2020, the state as a whole, including the Bay Area, may experience shortfalls of over 2 million acre-feet of water in a normal year, and over 6 million acre-feet in a drought year.[26] Even today, during drought periods, locally-developed water supplies potentially fall short of user need.[27] With the nine-county Bay Area expected to add 2 million people and 750,000 households by 2030,[28] and water demand expected to grow by 3.6 million acre-feet between 2000 and 2030,[29] this problem "is expected to worsen over time."[30]

Compounding the stress that growth places on the size and quality of regional water supply is the prospect of global climate change – and its concomitant impact on both water quality and the frequency of drought conditions. Temperature increases will not only affect demand,[31] but the health and sustainability of crucial aquatic ecosystems.[32]A warmer climate is also likely to lead to a greater risk of flooding – and impaired water quality - due to increased snowmelt and runoff in the winter months.[33] Because of this, the DWR has recommended that the state government help prepare for the effects of global climate change on state water resources and management systems.[34]

It should be clear, then, that the traditional stormwater management regime, with its emphasis on the processes of collection and discharge, is ill-suited to serve California and the Region's water conservation needs. We therefore strongly urge the Board to take note of the resource conservation dimension of LID. As Dr. Horner's research shows, LID practices have the ability to capture 100% of storm water runoff in many typical development types. Captured water can be used to recharge the water supply or be otherwise reused for beneficial purposes; in both scenarios, LID's runoff prevention

creates a significant economic benefit that represents substantial cost savings, as further shown in Table 1. This table shows the economic value of water retained by LID practices across six typical development types in the San Francisco Bay Area.

Table 1. Post-Development Water Saving Comparisons – Blended California Water Rates[35, a]

	MFR	Sm-SFR	REST	OFF	Lg-SFR	SINGLE
Annual post-development water recharged from site with basic treatment BMPs	6.0-10.8	2.56-3.56	.61-.88	2.39-2.86	111-155	0.16-.22
Annual post-development water recharged and harvested from site with LID	18.2	5.06	1.29	3.54	220	.30
Annual water saved through LID per site	7.4-12.2	1.5-2.5	.41-.68	.68-1.15	65-109	.08-.14
Value of annual LID water savings per site (untreated/non-potable water)	$4,440-$7,320	$900-$1,500	$246-$408	$408-$690	$39,000-$65,400	$48-$84
Value of annual LID water savings per site (treated/potable water)	$4,601-$7,585	$933-$1,554	$255-$423	$423-$715	$40,411-$67,765	$50-$87

[a] Figures given in acre-feet
[b] MFR (156-unit multi-family residential complex); Sm-SFR (23-unit single-family residential development); REST (3220-sq ft restaurant); OFF (7500-sq ft office building); Lg-SFR (1000-unit single-family residential development); SINGLE (single-family home)

For these reasons, the Board should take the present opportunity to include the strongest possible LID requirements in the Permit. By taking such action now, the Board would not only help the San Francisco Bay Region meet the MEP standard, but also encourage behavior patterns that will help the Region as a whole deal with future water supply challenges.

Minimize infrastructure requirements – Low impact development practices can also reduce conventional stormwater drainage infrastructure, such as pipes, gutters, and detention basins, thereby reducing infrastructure costs.[36] Traditional curbs, gutters, storm drain inlets, piping and detention basins can cost two to three times more than engineered grass swales and other low impact development techniques to handle stormwater runoff from roadways.[37] Clustering homes can reduce infrastructure costs to the builder, since fewer feet of pipe, cable, and pavement are needed, and maintenance costs are reduced for homeowners.[38] "Studies in Maryland and Illinois show that new residential developments using green infrastructure stormwater controls saved $3,500 to $4,500 per lot (quarter- to half-acre lots) when compared to new developments with conventional stormwater controls."[39]

Low impact development can also minimize the need for irrigation systems.[40] This can be crucial in warmer climates, where as much as 60 percent of the municipal water demand can be attributed to irrigation.[41] LID techniques can even improve air quality by filtering air pollution and helps to counteract urban heat island effect by lowering surface temperatures.[42]

Increased parkland and wildlife habitat, preserving natural features and natural processes – LID strategies include vegetative and grassy swales, tree-box filters, and preserved vegetation, thereby increasing the amount of green spaces in a community.[43]

These strategies have the added benefit of protecting regional trees, flora and fauna.[44] That is, through reduced disturbance of the development area and greater conservation of natural features, LID results in greater preservation of the *entire* pre-development environment - above and beyond the primary LID goal of preserving the pre-development hydrologic regime.[45] In fact, harvesting rainwater for use in gardens, rather than allowing stormwater runoff into storm drains, can even result in "bigger, healthier plants" because rainwater is better for plants than chlorinated tap water.[46]

Using LID techniques, development can also be reconfigured in a more eco-efficient and community-oriented style.[47] Clustering homes on slightly smaller lot areas can allow more preserved open space to be used for recreation, visual aesthetics, and wildlife habitat.[48] Builders in many areas have been able to charge a premium price for "view lots" facing undisturbed natural vistas, or pond areas that also function as bioretention cells.[49]

Enhanced property values – In addition to the aesthetic appeal of more parkland and vegetation, "greening" a neighborhood can often increase property values.[50] "Visitors stroll down Seattle's 'SEA [Street Edge Alternatives] Streets' project marveling at the beautiful landscaping while residents in adjacent blocks continually ask the city when their street will be redesigned to be a 'SEA Street.'[51] The NOAA Coastal Services Center reports that the Trust for Public Land and National Park Service provide many examples of communities whose property values increased due to their proximity to open space. For example, a cluster development in New York that preserved 97 acres of natural wooded environment is benefiting from its open space. One developer commented, "It may not be the woods that bring (buyers) to us initially, but it seems to make all the difference when they see what it's like."[52]

Cheaper development costs – LID not only raises property values for owners, but it can result in more cost savings for developers as well.[53] Among other industry organizations, the National Association of Home Builders recognizes LID's economic and environmental desirability:

> Ever wish you could simultaneously lower your site infrastructure costs, protect the environment, and increase your project's marketability? Using Low Impact Development (LID) techniques you can. LID is an ecologically friendly approach to site development and storm water management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site.[54]

LID can reduce land clearing and grading costs, potentially reduce impact fees and increase lot yield, and increase lot and community marketability.[55] For example, by using LID techniques instead of conventional methods, developers of the Gap Creek residential subdivision in Sherwood, Arkansas, gained 17 additional lots, $3000 more per lot than the competition, savings of $4800 per lot, 23.5 acres of green spaces and parks, and ultimately, over $2.2 million in additional profit.[56]

3. The new Permit should ensure full implementation of the most effective storm water management strategies by setting clear, enforceable LID requirements.

As urban runoff continues to be a leading cause of water quality impairment in California and the San Francisco Bay Area, a need for better stormwater management remains.[57] We recognize and appreciate aspects of the Draft Permit that represent significant improvements over the past permit—especially the discussion and integration of LID principles in section C.3.a.i (10)-(11), which require covered development projects to incorporate LID into project design (on a one-year compliance schedule) and select an "integrated approach" to stormwater pollution mitigation (with LID singled out as the most-desired approach).[58]

However, more specificity and clearer LID-related regulatory requirements are needed if the Permit is to meet the MEP standard and effectively reduce water pollution and its impacts. As discussed above, studies show that impacts to receiving waters result when any natural areas are converted to impervious surface. A voluminous body of literature shows that LID is effective, practicable and available—and therefore represents the MEP standard. And the Horner San Francisco Study shows that LID provisions can be feasibly implemented in a full-range of development types, and result in most soil types in a runoff capture rate of 100%. In light of this overwhelming evidence, and given the scope of the stormwater challenge that still confronts the Bay Area, we urge the Board to propose a final draft Permit with the following amendments in order to attain water quality objectives and meet the MEP standard.

A. Re-structure and revise the Draft Permit's section on New Development and Redevelopment to offer a clearer, more comprehensive discussion of LID and its role in the Board's efforts to improve water quality. As noted above, we support the Board's decision to integrate LID principles into the New and Redevelopment provisions, and are pleased to see that the Draft Permit has already required Regulated Projects to integrate LID principles into project design or take action that is otherwise consistent with LID principles.[59] Still, the structure and organization of this section of the Permit should be improved. The Board's initial definition of LID is buried far down in the latter portion of section C.3.a.i[60] – *after* the Permit has already discussed what are, in essence, LID principles such as minimization of impervious surfaces, use of micro-detention and disconnection of roof downspouts.[61] Not only should LID be defined before it is ever discussed, but the Permit should, for the sake of organizational clarity, also define LID in the Permit Glossary.[62] And while we also support the Board's decision to

specifically rank "LID strategies, site design and source control measures" as the most-preferred method for Regulated Projects to mitigate stormwater pollution,[63] this ranking is confusing: the LID strategies – examples of which are difficult to locate within the Permit - are first in order of preference, followed by still more LID techniques – "landscape-based bioretention systems and green roofs."[64] Furthermore, in this context, the Board must do more than classify LID as merely a "preferred" method of mitigating stormwater pollution; it should authoritatively state its support of LID practices and principles by *requiring* LID. As the Horner San Francisco Study shows, and as discussed below, this is a workable approach.

To improve organization and better stress the important role LID plays in efforts to improve regional water quality, we recommend that the Board start from the example set by the Los Angeles Regional Board in its Draft Ventura County MS4 Permit ("Ventura Permit") and craft a clear, organized separate section, dedicated exclusively to a discussion of LID principles and practices.[65] At a minimum, a well-drafted LID section would (i) provide a clear, definitive description of LID; (ii) clarify the importance of LID to overall efforts to reduce stormwater pollution; (iii) offer a (non-exhaustive) list of planning and design techniques that the Board specifically recognizes as "LID";[66] and (iv) offer additional direction to assist permittees with their implementation of LID policies by, for example, requiring the preparation of a LID "guidance document."[67] This section would both serve as a reference point to assist permittees in their efforts to explain LID requirements to regulated parties and assist the Board in oversight and monitoring efforts.

Ideally, this separate section could also serve as the centerpiece of the Board's LID policy as it relates to stormwater runoff; its components could thereafter be incorporated by reference in any other sections of the Permit where LID measures are relevant. This approach would bolster the Permit with a much-needed element of internal consistency. For example, under current section C.3.i. (Single-Family Homes) Permittees are to require at least one of three specified "lot-scale BMPs."[68] A restructured New Development and Redevelopment section would not only clarify that "lot-scale BMPs" are in fact "LID," but would also offer (or incorporate by reference) a more extensive list of LID techniques beyond the three that are currently listed in Section C.3.c. Permittees and regulated parties (not to mention regional water quality) would then benefit not only from more clarity, but from the flexibility that comes with a greater choice of LID practices. The section C.3.g. provisions for Alternative Compliance could similarly be improved; the "Maximizing Site Design Treatment Controls" that are permitted as alternative compliance with numeric sizing criteria for stormwater treatment systems are essentially LID practices and should be referred to as such.[69]

B. **Consistent with the Horner San Francisco Study, adopt a "zero runoff" standard for all development.** Dr. Horner's LID analysis was undertaken with the purpose of comparing the water quality and reuse benefits of LID practices to those that result from the use of conventional BMPs. The study also seeks to address the issue of practicability, by examining the ability of current development patterns to integrate LID

practices on site. The Study makes this comparison and analysis for six case studies representative of different Bay Area development scenarios - large and small scale single family residential developments, multi-family residences, housing developments, restaurants, office buildings and a single home. In each case, Dr. Horner compared runoff volume, pollutant loading, and availability of water for reuse. The results show that, for each development pattern, and assuming typical rainfall scenarios, LID methods outperform traditional BMPs and can in fact be implemented to limit all stormwater discharge during rain events equal to water quality design storm conditions.[70] In short, the Study shows that LID practices will limit 100% of site runoff volume and pollutant loading.[71]

Given these findings, the Draft Permit should be amended to clarify that the currently-required limitation of runoff and reduction of stormwater pollutant discharge to the MEP standard[72] requires a total, 100% limitation of site runoff volume. Furthermore, because this goal is attainable in a diverse array of projects, this "zero runoff" standard should not be limited to only those projects that meet the threshold impervious surface criteria of 10,000 square feet, but to all development projects, regardless of their size or classification.

C. Adopt a standard of three percent maximum allowable Effective Impervious Area in all new development and redevelopment projects. In order to support attainment of this no-discharge requirement, and to provide additional specificity and clarity as to the Permit's regulatory requirements, the Permit should include provisions that limit the allowable effective impervious area (EIA) of development sites. While the Board correctly acknowledges that significant adverse impacts to the physical habitat and biological integrity of receiving waters occur when natural vegetated pervious ground cover is converted to impervious surfaces,[73] it has underestimated the extent of this risk, stating that the biological integrity of receiving waters can occur "with as little as a 10% conversion from natural to impervious surfaces."[74] In fact, as the Los Angeles Regional Board has recognized, such impacts can occur much earlier, with as little as a *3%* conversion from natural to impervious surfaces.[75] Moreover, other west coast studies show a direct correlation between the creation of new impervious surface and impacts to receiving waters at *all* levels.

In light of the well-documented connection between impervious surface and receiving water quality, the Permit should set a maximum (EIA) percentage of 3% for all new development and redevelopment projects. The Draft Permit's current strategy - focusing on overall impervious square footage of development projects[76] – will leave smaller projects that, individually, do not meet the current 10,000 square foot threshold (or even the four-year 5,000 square foot standard) unregulated, even though such projects may result in the conversion of more than 3% (or more than 10%) of natural surface. By allowing cumulative impacts from these projects, the Board would effectively endorse biological and chemical degradation. We doubt that the Draft Permit was drafted to create this result. Furthermore, as discussed in the *Horner San Francisco Study*, each site

analyzed in the Study was demonstrated to have the capacity to infiltrate total annual runoff volume from pervious areas where EIA was limited to 3% of total site area.[77] And, in 5 of the 6 development types studied, all runoff could be infiltrated to the ground, including runoff from the site's EIA.[78] In the sixth, all runoff could be retained on site, with 84% able to be infiltrated and the remaining 14% easily handled through the implementation of other LID retention techniques. The Study thus demonstrates that a three-percent standard is feasible and practicable.

Even if the Board was to retain threshold criteria based "lot-size" or square footage, which we do not support, that standard should, at a bare minimum, be set immediately at no greater than 5,000 square feet. The reduction strategies of numerous states, counties, and cities across the nation clearly illustrate that it is easily practicable to impose standards on development and redevelopment projects (regardless of how a project is categorized) that disturb greater than 5,000 square feet.[79] Furthermore, any standard that is thusly focused on lot size, or "square footage," should concern itself not solely with "creation of impervious surface," [80] but also the amount of land "disturbed." By stressing "impervious surface" and ignoring the concept of "disturbed" land, the current Permit overlooks those cases – such as when land is cleared and graded but not paved - where the infiltration capacity is reduced, even though no impervious surface (as that term is strictly defined by the Board) is created.[81] The Board should therefore revise its definition of "impervious surface" to include packed earth or compacted soil.[82]

D. Limit exclusions to the category of Regulated Projects. Insofar as the Permit sets a threshold for covered, or "regulated" projects, the Board should re-draft the permit to limit any ambiguities that could potentially limit the effectiveness of the Permit. For example, the Permit currently offers an exclusion to for any "routine maintenance" to any otherwise covered redevelopment project.[83] If the Board retains this carve-out, it must, at a minimum, provide a specific, targeted definition of what exactly constitutes "routine maintenance or repair" beyond the two suggested examples (roof or exterior wall replacement; pavement resurfacing within the existing footprint) currently offered. For instance, while the Ventura Permit similarly excludes "routine maintenance activities" from the definition of "Redevelopment" in its Post-Construction Storm Water Mitigation Criteria,[84] it unambiguously identifies certain activities that are specifically exempted.[85] Most notably, that Permit makes clear that "[i]mpervious surface replacement, such as the reconstruction of parking lots and roadways, is *not* considered a routine maintenance activity."[86] Therefore, at a minimum, the S.F. Board must likewise include a statement that replacement of impervious surface is *not* routine maintenance, and is therefore *not* excluded (on that basis) from the class of Regulated Projects.

E. Standardize hydromodification requirements across the entire Region. Because we firmly support the Board's effort to "improve consistency among all Phase I permittees,"[87] we ask why the Proposed Permit's current HM provisions include a section that applies both across-the-board standards[88] and a section which incorporates by reference *five* different sets of HM requirements for permittees in different Bay Area

counties.[89] We question whether the various Bay Area counties covered by the Permit differ in any material way that would justify such an unwieldy HM scheme; if such justification exists, it should be disclosed in subsequent versions of the Permit. In any case, the Board has plainly stated its intent to incorporate the requirements of the current separate Stormwater Management Plans into one document, correctly noting that it is "a natural evolution in process" that the new Permit incorporate the specific details of individual permits into one whole document.[90] Acting in accordance with this natural progression, the Board should seize the opportunity presented by reissuance to promote regional consistency in water quality and HM standards. Additionally, the goal of HM consistency would be further limited if Permittees are merely given the choice to use the Bay Area Hydrology Model (BAHM).[91] To do otherwise would leave too much room for evasion and abuse at the sub-regional level.

Moreover, for similar reasons we question why HM measures for the City of Vallejo are segregated from the rest of the Region.[92] Though we are aware that Vallejo has never been required to address HM impacts, there likely is no reason why, again – in the interests of regional consistency - it cannot be required a standard, region-wide HM regime. In any case, even if there was a legitimate reason to allow Vallejo to craft a separate HM policy, the deadline for its submission of a Hydrograph Modification Management Plan (HMP) – July 1, 2009 – is too far in the future.[93] Given the current availability of "off-the-shelf" resources (e.g., BAHM) and the expertise of both the Board and its regional neighbors, Vallejo should be able to draft its HMP much earlier.

In any case, assuming, for the sake of argument, that Vallejo will go forward with its own HMP, a number of issues in these Vallejo-specific provisions should be addressed. First, it appears that, as applied to Vallejo, the term "Applicable Projects" remains undefined. We presume that the Board intends that term to have the same meaning for Vallejo as it does with other Permittees. See Draft Permit, at p. 41. Also, the Vallejo HM provisions do not appear to be drafted with the same level of specificity as those applicable to the rest of the Region; while we would agree generally with the idea that Vallejo permittees are to manage increases in runoff peak flows and durations "where such increased flows and durations can cause increased erosion of creek beds and banks… or other impacts to beneficial uses,"[94] Vallejo should, at a minimum be required to comply with the "no-increase" standard for erosion potential that is applicable to other Permittees, and set forth in section C.3.f.ii (and which we support).[95] Finally, the Proposed Permit allows Vallejo permittees an exemption from HM provisions "where the potential for erosion, or other impacts to beneficial uses is "minimal."[96] This term is not clearly defined. Any exemptions for HM requirements for Vallejo (and indeed any regional) permittees should be clearly defined and narrowly circumscribed.

F. Revise provisions that apply to newly constructed and replaced roads. We are pleased to see that the Draft Permit acknowledges the negative impact that road construction and renovation has on the quality of stormwater runoff. The very fact that the Draft includes certain roads and highways in the "Regulated Project" category is a step in

the right direction.[97] Nevertheless, these provisions suffer from some ambiguity and should be strengthened. Regardless of whether the Permit sets a "Regulated Project" threshold standard of 10,000 square feet, 5,000 square feet, or otherwise, that standard should apply with equal force to roads as it does to all other Regulated Projects. We therefore question why the Permit imposes the C.3 stormwater treatment systems requirement on projects that create 10,000 square feet or more of "impervious surface" while newly constructed and replaced arterial roads are required to comply only when they create and/or replace 10,000 square feet or more of "*contiguous* impervious surface."[98] This would appear to exclude, for example, a road construction/replacement project along different, non-contiguous sections of a road that cumulatively create or replace a level of impervious surface beyond the current threshold. We suggest removal of the threshold criteria requirement that the impervious surface for road and highway projects be contiguous, and replacing it with the standard that is eventually applied to new and redevelopment projects in section C.3.b.i (1)-(2).

Also, while we support the Board's decision to include replaced arterial streets or roads, we disagree with the threshold criteria that these roads are regulated only if there are "rehabilitated down to the gravel base."[99] This standard excludes the frequently-occurring instances in which road construction does not disturb the gravel base. Therefore, the Board should excise this qualifying language. Furthermore, by excluding "replacement of local and connector[100] non-arterial roads and paved trails" from the category of covered replaced roads, the Permit narrows the class of roads that are covered by the Permit.[101] We suggest that the Board explore an approach to streets that focuses not on square footage, but anticipated traffic volumes. Such an approach may prove beneficial, if there are roads that, while meeting the Board's current definition of "local road" or "collector road" nevertheless accommodate a sufficiently heavy flow of traffic to warrant coverage as "Regulated Project."[102]

We thank the Board Members and Board Staff for this opportunity to comment on the Draft Permit, and for your continued commitment to protecting the water resources in the Bay Area.

Sincerely,

David S. Beckman
Senior Attorney

ENDNOTES

[1] See e.g., California Water & Land Use Partnership, *Low Impact Development: A Sensible Approach to Land Development and Stormwater Management*, available at http://www.oehha.ca.gov/ecotox/pdf/lid071106.pdf, last accessed July 10, 2007; R. Horner, *Initial Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Francisco Bay Area* (2007) (attached hereto as Attachment A) (hereinafter "Horner San Francisco Study"); see also LID reference documents attached hereto as Attachment B and Table of Contents to those materials, attached hereto as Attachment C.

[2] California Regional Water Quality Control Board, San Francisco Bay Region, *Administrative Draft Municipal Regional Stormwater Permit, San Francisco Bay Region* (NPDES Permit No. CAS002XXXX) (hereinafter "Draft Permit") at p. 25.

[3] Gentile, L. and Tinger, J, *Storm Water Phase I MS4 Permitting: Writing More Effective, Measurable Permits* at p. 139, available at http://www.epa.gov/owow/nps/natlstormwater03/

[4] Id.

[5] EPA 841-F-03-003, *Protecting Water Quality from Urban Runoff* (February 2003).

[6] California State Water Quality Control Board, 2006 Clean Water Act Section 303(D) List Of Water Quality Limited Segments, available at http://www.swrcb.ca.gov/tmdl/303d_lists2006.html, last accessed July 10, 2007.

[7] State Water Resources Control Board 2002 CWA § 305(b) Report; see also EPA, National Assessment Database, available at http://www.epa.gov/waters/305b/index.html, last accessed July 10, 2007.

[8] California Department of Water Resources, *Water Plan Update 2005, Volume 3: Regional Reports*, (hereinafter "California Water Plan Update 2005") at p. 3-13, available at http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm#vol3, last accessed July 12, 2007.

[9] Draft Permit at p. 3. See also 61 Fed. Reg. 43,761 (Aug. 26, 1996); EPA, *Questions and Answers Regarding Implementation of an Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits*, available at 61 Fed. Reg. 57425-26 (Nov. 6, 1996) and also at: http://www.epa.gov/fedrgstr/EPA-WATER/1996/November/Day-06/pr-21053DIR/pr-21053.html, last accessed July 10, 2007 (noting that the interim permitting approach "uses best management practices (BMPs) in first-round storm water permits, and *expanded or better tailored BMPs in subsequent permits, where necessary, to provide for the attainment of water quality*

standards") (emphasis added); EPA, *Interpretative Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems*, available at 61 Fed. Reg. 41,697 (Aug. 9, 1996)and at http://www.epa.gov/fedrgstr/EPA-WATER/1996/August/Day-09/pr-21008.html, last accessed July 10, 2007 (reapplications for reissuance of new five-year permit should contain certain basic information, information for proposed changes, and proposed improvements to the storm water management program and monitoring program).

[10] See 33 U.S.C. § 1342(p)(3)(B)(iii); EPA, *Questions and Answers Regarding Implementation of an Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits*, available at 61 Fed. Reg. 57425-26 (Nov. 6, 1996) and also at: http://www.epa.gov/fedrgstr/EPA-WATER/1996/November/Day-06/pr-21053DIR/pr-21053.html, last accessed July 10, 2007 (noting that stormwater permits are expanded, or better-tailored in comparison to first-round permits).

[11] Id.; Draft Permit at p. vii.

[12] See e.g., Michael Mallin, *Wading in Waste*, SCIENTIFIC AMERICAN, June 2006, at pp. 54-56; NRDC, *Stormwater Strategies: Community Responses to Runoff Pollution* (1999); NRDC, *Rooftops to Rivers: Green Strategies for Controlling Stormwater and Combined Sewer Overflows* (2006) at pp. 2-5 (hereinafter "Rooftops to Rivers") (included in LID reference materials attached hereto as Attachment II); U.S. EPA *Preliminary Data Summary of Urban Storm Water Best Management Strategies* (Aug. 1999) at p. 85.

[13] See e.g., Draft Permit at pp. 6-7 (finding that urban development results in the conversion of natural vegetated pervious ground cover to impervious surfaces, creates new pollution sources, and results in increased flows and volumes of stormwater that "can significantly impact beneficial uses of aquatic ecosystems due to physical modifications of watercourses, such as bank erosion, deepening and widening of channels.").

[14] See Draft Permit at p. 34.

[15] See *Horner San Francisco Study*, Tables 7-10 and accompanying text; San Diego Municipal Stormwater Copermittees, *Report of Waste Discharge* (Aug. 2005) at p. 43. See also Bay Area Stormwater Management Agencies Association (BASMAA), *Start at the Source: Design Guidance Manual for Stormwater Quality Protection* (1999) (hereinafter "Start at the Source") at p. 1.

[16] See BASMAA, *Start at the Source* at p. 13 (LID "not only reduces cost while achieving environmental goals, but it also maximizes land values, improves marketability, adds aesthetic interest, and provides increased recreational opportunities."); and p. 80 ("[u]rban runoff systems that appear to be natural systems are most effective at commanding increases in property values.").

[17] See e.g., State Water Resources Control Board, *Low Impact Development – Sustainable Storm Water Management*, (Jan. 2005), available at: http://www.swrcb.ca.gov/lid/index.html, last accessed July 10, 2007 ("LID is a sustainable practice that *benefits water supply and contributes to water quality protection*. . . . LID has been a *proven approach* in other parts of the country") (emphasis added).

[18] See Attachments B and C (collection of LID reference materials and Table of Contents).

[19] BASMAA, *Start at the Source* at p. 26 (emphasis added).

[20] See BASMAA, *Start at the Source* at p. 5.

[21] Prince George's County, Maryland, Dept. of Environmental Resources, *Low Impact Development Hydrologic Analysis* (July 1999) at p. 4, available at http://www.epa.gov/owow/nps/lid_hydr.pdf, last accessed July 10, 2007; Devinny, J. Kamieniecki, S., Stenstrom, M., *Alternative Approaches to Stormwater Quality Control* (June 2004) at p. 42 (University of Southern California and University of California at Los Angeles study prepared for the Los Angeles Regional Water Quality Control Board).

[22] PATH, Technology Inventory, *Low Impact Development (LID) Practices for Storm Water Management*, available at http://www.toolbase.org/techinv/techDetails.aspx?technologyID=223, last accessed July 10, 2007 (hereinafter "PATH Technology Inventory"); EPA, *Low Impact Development Hydrologic Analysis* (July 1999) at p. 4.

[23] *PATH Technology Inventory*; State of Massachusetts, *Smart Growth Toolkit*, available at http://www.mass.gov/envir/smart_growth_toolkit/, last accessed July 10, 2007.

[24] See *Horner San Francisco Study*, Table 8 and accompanying text.

[25] See Gary Polakovic, *Water Quest Shifts Course*, L.A. TIMES, June 11, 2006 at B.1, available at http://www.venturacountytrails.org/News/0146-WaterQuest.htm, last accessed July 10, 2007.

[26] Governor's Office of Planning & Research, *State of California General Plan Guidelines 2003* at p. 128, available at http://www.opr.ca.gov/planning/PDFs/General_Plan_Guidelines_2003.pdf, last accessed July 12, 2007.

[27] See *California Water Plan Update 2005* at p. 3-7 ("drought supply reliability will continue to be a major challenge for water supply planning in the bay region.').

[28] See *California Water Plan Update* 2005 at p. 3-1.

[29] Ellen Hanak, Public Policy Institute of California, *Water for Growth: California's New Frontier* (2005) at p.18, available at http://www.ppic.org/content/pubs/report/R_705EHR.pdf, last accessed July 12, 2007.

[30] See *California Water Plan Update* 2005 at p.3-7 .

[31] See California Department of Water Resources, *July 2006 Technical Memorandum Report at p. 2-5, 2-54, 2-55* (noting that domestic water uses – such as drinking, bathing, laundering of clothes and recreation - typically increases as temperatures increase).

[32] See California Department of Water Resources, *July 2006 Technical Memorandum Report* at 2-5.

[33] See NRDC, *Energy Down The Drain: The Hidden Costs of California's Water Supply*, at p. 4, available at http://www.nrdc.org/water/conservation/edrain/contents.asp, last accessed July 12, 2007.

[34] See California Department of Water Resources, *Water Plan Update 2005, Volume 1: Strategic Plan,* at p. 5-16, available at http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm#vol, last accessed July 12, 2007.

[35] Table 1 is adapted from the *Horner San Francisco Study*. The data in Table 1 is based on an average water cost figure derived from water delivery rates charged by the Metropolitan Water District of Southern California ("MWD") (which supplies water to residents throughout Los Angeles, Orange, San Diego,Ventura, Riverside and San Bernardino Counties) and the East Bay Municipal Utilities District ("EBMUD") (which serves water to over 1.2 million users in Alameda and Contra Costa Counties). The MWD charges between $478 and $574 per acre-foot for treated water and between $331 and $427 per acre foot for untreated water. See Metropolitan Water District of Southern California, *Water Rates and Charges*, available at http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html, last accessed July 11, 2007. For the purposes of Table 1, these MWD figures have been averaged to $526 per acre-foot for treated water and $379 per acre-foot for untreated water. EBMUD's rate for delivery of potable water service on either a one-month or two-month billing cycle to single family residential water users is $1.65 per 100 cubic feet. Its rate for delivery of non-potable water on either billing cycle is $1.89/100 cubic feet. See EBMUD, *Schedule of Rates and Charges to Customers of the East Bay Municipal Utilities District*, (effective July 1, 2006), available at http://www.ebmud.com/about_ebmud/financial_information/fy07_rates,_charges_and_fees/old_pdfs/fy07_sch_a.pdf, last accessed July 11, 2007. EBMUD's rate for potable water is equivalent to $717.40 per acre-foot ($1.65 per.0023 acre-feet) and its non-potable rate is

equivalent to $821.74 per acre-foot ($1.89 per .0023 acre-feet). See National Weather Service, Southern Region Headquarters, *Hydrologic Conversions*, available at http://www.srh.noaa.gov/wgrfc/resources/convert.html#volume, last accessed July 11, 2007. For the purposes of determining the LID cost-savings from a "blended" water rate in Table 1, MWD's averaged $526 rate for treated water and EBMUD's $717.40 rate for potable water were averaged, resulting in a blended rate of $621.70 for potable/treated water. Similarly, MWD's averaged $379 rate for untreated water and EBMUD's $821.74 rate for non-potable water were averaged, resulting in a blended rate of $600 for untreated/non-potable water.

[36] Puget Sound Online: Puget Sound Action Team, *Benefits of Low Impact Development*, available at http://www.psat.wa.gov/Programs/LID/LID_benefits.htm, last accessed July 10, 2007; Dept. of Defense, *United Facilities Criteria: Low Impact Development* (Oct. 2004) at p. 3.

[37] Dept. of Defense, *United Facilities Criteria: Low Impact Development* (Oct. 2004) at p. 5.

[38] See *PATH Technology Inventory*; U.S. EPA, *Preliminary Data Summary of Urban Storm Water Best Management Practices* (Aug. 1999) at pp. 6-25-27; BASMAA, *Start at the Source* at p. 80.

[39] NRDC, *Rooftops to Rivers,* at p. 12; see also Puget Sound Online: Puget Sound Action Team, *Benefits of Low Impact Development* ("A developer in Maryland saved 30 percent in construction costs by using LID practices rather than conventional mitigation methods. AHBL Engineering of Tacoma conducted a study that showed that a conventional residential development could have been designed at significant cost savings if LID techniques had been used rather than conventional ones."), available at http://www.psat.wa.gov/Programs/LID/LID_benefits.htm, last accessed July 10, 2007.

[40] See *PATH Technology Inventory.*

[41] Texas Water Development Board, *The Texas Manual on Rainwater Harvesting* (3d ed. 2005) at p. 36, available at http://www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual_3rdedition.pdf, last accessed July 10, 2007.

[42] NRDC, *Rooftops to Rivers* at p. 10.

[43] NEMO California Partnership, *Low Impact Development (LID)*, available at http://www.usc.edu/org/seagrant/calnemo/ last accessed July 10, 2007.

[44] National Association of Home Builders (NAHB) Research Center, *Builder's Guide to Low Impact Development*, available at http://www.toolbase.org/PDF/DesignGuides/Builder_LID.pdf, last accessed July 10, 2007.

[45] EPA, *Low Impact Development: A Literature Review* (Oct. 2002) at p. 2, available at http://www.epa.gov/nps/lid.pdf, last accessed July 10, 2007.

[46] Sam Williams, *Harvesting the Rain*, GOTHAM GAZETTE, May 2006 ("It's a win-win for the environment and for gardeners."), available at http://www.gothamgazette.com/article/environment/20060531/7/1871, last accessed July 10, 2007.

[47] EPA, *Low Impact Development: A Literature Review* (Oct. 2002) at p. 3.

[48] *PATH Technology Inventory*; NRDC, *Rooftops to Rivers*, at p. 10 ("Green infrastructure also improves urban aesthetics, has been shown to increase property values, and provides wildlife habitat and recreational space for urban residents.").

[49] See *PATH Technology Inventory.*

[50] See, e.g., *PATH Technology Inventory*; Devinny, J., *et al.*, *Alternative Approaches to Stormwater Quality Control* (June 2004) at p. 43; BASMAA, *Start at the Source,* at p. 80.

[51] Puget Sound Online: Puget Sound Action Team, *Benefits of Low Impact Development.*

[52] National Oceanic and Atmospheric Administration, *Alternatives for Coastal Development: One Site, Three Scenarios,* available at http://www.csc.noaa.gov/alternatives/openSpace.html, last accessed July 10, 2007.

[53] See e.g., BASMAA, *Start at the Source* at p. 80; see generally Attachment B.

[54] NAHB, Guides to Low Impact Development (March 2003), available at http://www.toolbase.org/Home-Building-Topics/Land-Use/low-impact-development-guides, last accessed July 10, 2007.

[55] NAHB Research Center, *Builder's Guide to Low Impact Development*, at http://www.toolbase.org/PDF/DesignGuides/Builder_LID.pdf, last accessed July 12, 2007.

[56] NEMO California Partnership, *Low Impact Development (LID)*, available at http://www.toolbase.org/PDF/DesignGuides/Builder_LID.pdf, last accessed July 10, 2007.

[57] California State Water Quality Control Board, 2006 Clean Water Act Section 303(D) List Of Water Quality Limited Segments, available at http://www.swrcb.ca.gov/tmdl/303d_lists2006.html, last accessed July 10, 2007.

[58] Draft Permit at p. 34.

[59] For instance, we support the Draft Permit's basic "task description" set forth for Permittees in C.3.a.i, which requires site design measures that include "minimizing land disturbance and impervious surfaces," "clustering of structures and pavement," "disconnecting roof downspouts," "use of micro-detention", and "preservation of high-quality open space". Draft Permit, at p. 33. Each of these is consistent with basic LID principles.

[60] See Draft Permit at p. 34.

[61] See Draft Permit at p. 33.

[62] Although the current definition of LID is accurate, we recommend the integration of the following points into the definition so as to further explain to Permittees and regulated parties what LID is, and why it is an important tool for the control of stormwater pollution: (i) LID represents the best long-term solution to runoff; (ii) LID facilitates the reuse of water for beneficial purposes; (iii) Reduction of a site's impervious footprint will necessarily be a key component of any LID regime.

[63] Draft Permit at p. 34.

[64] See Draft Permit at p. 34. These measures are commonly considered to be LID. See generally NRDC, *Rooftops to Rivers*.

[65] See *Draft Ventura County Municipal Separate Storm Sewer System Permit*, at pp. 50-51 (hereinafter "Ventura Permit"), available at http://www.waterboards.ca.gov/losangeles/html/programs/stormwater/venturaMs4.html, last accessed July 12, 2007.

[66] LID practices that may be specifically referred to include use of (i) bioretention; (ii) green roofs and rooftop gardens; (iii) cisterns or other methods of water harvesting; (iv) vegetated swales; (v) roof leader disconnection; (vi) permeable pavement; (vii) soil amendment techniques; (viii) retention of native vegetation; and (ix) re-grading of paved areas so that they will drain into new or existing landscaping. See generally NRDC, *Rooftops to Rivers*.

[67] See, e.g.,Ventura Permit at p. 51.

[68] Draft Permit at p. 37.

[69] See Draft Permit at p. 45 n.23.

[70] Id.

[71] See *Horner San Francisco Study* at pp. 3, 19, Tables 7-9.

[72] Draft Permit at p. 33-35.

[73] See Draft Permit at pp. 6-7.

[74] Draft Permit at p. 7.

[75] See, e.g., Ventura Permit at pp. 4-5, at ("[s]ignificant declines in the biological integrity and physical habitat of streams and other receiving waters have been found to occur with as little as 3-10 percent conversion from natural to impervious surfaces.")

[76] See Draft Permit at pp. 34-35.

[77] See *Horner San Francisco Study* at p. 15, Table 7

[78] See *Horner San Francisco Study* at p. 15.

[79] See, e.g., Santa Monica Municipal Code, Chapter 7.10.030(d)(3) (defining "new development," as any construction project that (a) results in improvements to fifty percent or greater of the square footage of a building, (b) creates or adds at least five thousand square feet of impervious surfaces, or (c) creates or adds fifty percent or more of impervious surfaces); State of Washington Phase I Municipal Stormwater NPDES General Permit (Draft Feb. 15, 2006) Appendix I (Minimum Technical Requirements for New Development and Redevelopment), at pp. 7, 8, 20 (applying numeric storm water treatment requirements to any project adding 5,000 square feet or more of new impervious surface; Maryland Code, Title 26, Subtitle 17, Chapter 2, § 5B (requiring stormwater management plans for any development that disturbs 5,000 square feet or more); see also Maryland Model Stormwater Ordinance (July 2000) at pp. 2, 5, 8; City of Portland, Oregon Stormwater Management Manual (adopted July 1, 1999; updated September 1, 2004) Chapter 1.5.2 (Pollution Reduction Requirements) at p.1-25 (employing "a citywide pollution reduction requirement for all development projects with over 500 square feet of impervious development footprint area, and all existing sites that propose to create new off-site stormwater discharges).

[80] See, e.g., Draft Permit at p. 34-35.

[81] See Draft Permit at p. vii (defining "impervious surface" as "a surface covering or pavement of a developed parcel of land that prevents the land's natural ability to absorb and infiltrate rainfall/stormwater. Impervious surfaces include, but are not limited to, rooftops; walkways; patios; driveways; parking lots; storage areas; impervious concrete and asphalt; and any other continuous watertight pavement or covering. Landscaped soil… [is] not impervious []…")

[82] See, e.g., BASMAA, *Start at the Source* at p. 5 ("Impervious surfaces can be defined as any material that prevents or reduces the infiltration of water into the soil. While roads and rooftops are the most prevalent and easily identified types of impervious surface, other types include sidewalks, patios, bedrock outcrops, *and compacted soil*.") (emphasis added).

[83] See Draft Permit at p. 35.

[84] Ventura Permit at p. 57.

[85] These excluded activities are identified as those "that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety." Ventura Permit, at p. 57.

[86] Id. (emphasis added).

[87] RWQCB, San Francisco Bay Region, *Major Revisions to Administrative Draft of the MRP in Response to Stakeholders' Comments* (May 2007).

[88] See Draft Permit at pp. 41-43.

[89] See Draft Permit at p. 43.

[90] Draft Permit at p. 3.

[91] See Draft Permit at p. 9.

[92] See Draft Permit at p. 43-45.

[93] Draft Permit at p. 45.

[94] Draft Permit at p. 43.

[95] Draft Permit at p. 41.

[96] Draft Permit at p. 43.

[97] See Draft Permit at p. 35.

[98] Draft Permit at p. 35 (emphasis added).

[99] Draft Permit at p. 35.

[100] The Draft Permit does not appear to define the term, "connector road." Perhaps "collector road" is the intended term here, as that road classification is defined. See Draft Permit at p. v.

[101] Draft Permit at pp. 35-36.

[102] See BASMAA, *Start at the Source* at p. 22.