

Fact Sheet October 10, 2001

SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM
NPDES PERMIT NO. CAS 029718
AMENDMENT OF PROVISION C.3 OF ORDER NO. 01-024: NEW AND
REDEVELOPMENT PERFORMANCE STANDARD ENHANCEMENT

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
1515 CLAY STREET, 14TH FLOOR
OAKLAND, CA 94612

I. Reason for Amendment of Provision C.3

The Santa Clara Valley Water District (hereinafter District), County of Santa Clara, City of Campbell, City of Cupertino, City of Los Altos, Town of Los Altos Hills, Town of Los Gatos, City of Milpitas, City of Monte Sereno, City of Mountain View, City of Palo Alto, City of San Jose, City of Santa Clara, City of Saratoga, and City of Sunnyvale (hereinafter referred to as the Dischargers) have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program (hereinafter referred to as the Program). On February 21, 2001 the California Regional Water Quality Control Board San Francisco Bay Region (hereinafter referred to as the Regional Board) re-issued waste discharge requirements (Order No. 01-024) under the National Pollutant Discharge Elimination System (NPDES) to the Program to discharge stormwater run off from storm drains and watercourses within the Dischargers' jurisdictions by implementing a Storm Water Management Plan (hereinafter Management Plan).

Prior to the issuance of Order No. 01-024, the Dischargers gave their written consent to allow Provision C.3, concerning new and redevelopment performance standards, to be considered for amendment to address the "Cities of Bellflower, et. al." decision by the State Board (State Board Order No. 2000-11). A Revised Tentative Order has been prepared which would amend Provision C.3 of Order No. 01-024. The Regional Board intends to consider adoption of the Revised Tentative Order at a public hearing that will be held on October 17, 2001, at 9:00 AM in the first floor auditorium at the State Building located at 1515 Clay Street in Oakland, CA. The Tentative Order, comments received, and related documents may be inspected and copied at the Regional Board's office. For further information contact Janet O'Hara at (510) 622-5681 or jbo@rb2.swrcb.ca.gov.

II. Supplemental Fact Sheet

This Revised Fact Sheet includes the information in the original Fact Sheet circulated on May 18, 2001, and also describes significant changes made to the Tentative Order in the revisions transmitted on August 17, 2001, and prepared for review by the Board at its meeting of October 17, 2001. Changes are described in the Fact Sheet section describing the particular Tentative Order section that was changed.

III. Discharge Description and Location

The Dischargers each have jurisdiction over and/or maintenance responsibility for their respective municipal separate storm drain systems and/or watercourses in the Santa Clara basin. Discharge consists of the surface runoff generated from various land uses in all the hydrologic sub basins in the basin which discharge into storm drains and watercourses, which in turn flow into South San Francisco Bay.

The quality and quantity of these discharges varies considerably and is affected by hydrology, geology, land use, season, and sequence and duration of hydrologic event. Pollutants of concern in these discharges are certain heavy metals, excessive sediment production from erosion due to anthropogenic activities, petroleum hydrocarbons from sources such as used motor oil, microbial pathogens of domestic sewage origin from illicit discharges, certain pesticides associated with the risk of acute aquatic toxicity, excessive nutrient loads which may cause or contribute to the depletion of dissolved oxygen and/or toxic concentrations and dissolved ammonia, and other pollutants which may cause aquatic toxicity in the receiving waters. Pollutants wash off of the roofs, road pavement, parking lots, and other paved portions of new development particularly. However, all land use categories studied have been shown to contribute some pollutants.¹

¹ Heaney, J.B., Pitt, R., and Field, R. **Innovative Urban Wet-Weather Flow Management Systems**, 1999. USEPA Doc. No. EPA/600/R-99/029. Chapter 4 summarizes research on pollutant loadings based on broad category of land use (e.g., industrial, commercial, residential) and specific type of land uses (e.g., roadways, parking lots, roofs, loading docks, etc.).

Tiefenthaler, L.L., Schiff, K.C., and Bay, S.M. "Characteristics of parking lot runoff produced by simulated rainfall," July 2001. Westminster: Southern California Coastal Water Research Project, discusses results measuring toxicity of parking lot runoff based on parking lot use, maintenance (street sweeping), and duration and intensity of rainfall.

Oltmann, R.N., and Shulters, M.V., **Rainfall and Runoff Quantity and Quality Characteristics of Four Urban Land-Use Catchments in Fresno, California, October 1981 To April 1983**, 1987. USGS Open-File Report 84-710. Discusses results of sampling for a variety of urban runoff and dry weather urban pollutants in Fresno generally and with respect to land use type.

Ebbert et al., **Water Quality in the Puget Sound Basin, Washington and British Columbia, 1996-98**, USGS Circular 1216, and Ayers et al., **Water Quality in the Long Island-New Jersey Coastal Drainages, New Jersey and New York, 1996-98**, USGS

As shown by the body of literature on urban runoff, including the cited references, pollutants in urban stormwater runoff from all land uses, including already-built projects, contribute to impacts to water quality and beneficial uses of waters of the State.

IV. General Rationale for Amendment of Provision C.3

- Water Quality Control Plan, San Francisco Bay Basin, June 21, 1995 (Basin Plan).
- The Urban Runoff Management, Comprehensive Control Program section of the Basin Plan requires the Dischargers to address existing water quality problems and prevent new problems associated with urban runoff through the development and implementation of a comprehensive control program focused on reducing current levels of pollutant loading to storm drains to the maximum extent practicable. The Basin Plan comprehensive program requirements are designed to be consistent with federal regulations (40 CFR 122-124) and are implemented through issuance of NPDES permits to owners and operators of storm drain systems. The Dischargers, having jurisdiction over and/or maintenance responsibility for storm drains and water courses within their boundaries, have assumed responsibility for complying with the Basin Plan's requirements. Order No. 01-024 recognizes submittal of the Programs' Urban Runoff Management Plan (Management Plan) as the Dischargers' Comprehensive Control Program and requires implementation of the Management Plan.

The Management Plan describes a framework for management of stormwater discharges. The 1997 Management Plan describes the Program's goals and objectives and contains Performance Standards, which represent the baseline level of effort required of each of the Dischargers. The Performance Standard and Supporting Documents for Planning Procedures for new development are contained in Attachment 1.

- The Basin Plan identifies the beneficial uses of waters and establishes water quality objectives necessary to protect these beneficial uses that apply to certain receiving waters within the Dischargers' boundaries. These water quality objectives serve as receiving water limitations for waters that receive discharges of pollutants.
- Pursuant to the State Water Resources Control Board's "Statement of Policy with Respect to Maintaining High Quality of Waters in California," known as the Antidegradation Policy (SWRCB Resolution 68-16), existing high quality waters

Circular 1201, summarize major findings about water quality based on broad land use categories. and,

The **National Urban Runoff Program** (NURP) Study (USEPA 1983).

must be maintained. Under the Antidegradation Policy, changes in water quality must:

- a. Be consistent with maximum benefit to the people of the State;
- b. Not unreasonably affect present and anticipated beneficial uses of water; and,
- c. Not result in water quality less than that prescribed in water quality control plans or policies.

- Several sections of the Clean Water Act (CWA) and implementing federal regulations pertain to requirements that Municipal Separate Storm Sewer Systems (MS4) dischargers control stormwater discharges from new development and redevelopment:

- **CWA 402(p)(3)(B)(ii) – Prohibit Non-Storm Water:** The CWA requires in section 402(p)(3)(B)(ii) that a stormwater program “shall include a requirement to effectively prohibit non-stormwater discharges into the storm sewers.”
- **CWA 402(p)(3)(B)(iii) – Require Controls:** The CWA requires in section 402(p)(3)(B)(iii) that a stormwater program “shall require controls to reduce the discharge of pollutants to the maximum extent practicable (MEP), 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.”
- **CWA 402(p)(6) – Municipal Stormwater Discharges – Regulations:** The CWA requires in section 402(p)(6) that the EPA’s program to regulate stormwater discharges, at a minimum, shall establish priorities, requirements for State stormwater management programs, and expeditious deadlines, and “...may include performance standards, guidelines, guidance, and management practices and treatment controls, as appropriate.”
- **40 CFR 122.26(d)(2)(iv)(A)(2) – Enforce Controls on New Development and Significant Redevelopment:** Federal NPDES regulations have required since 1990 that dischargers utilize “planning procedures including a master plan to develop, implement and enforce controls to reduce the discharge of pollutants from [MS4s] which receive discharges from areas of new development and significant redevelopment.” The measures in the Tentative Order are intended to comply with the Clean Water Act’s MEP standard, and the continuous improvement process for performance standards and management measures envisioned by the Clean Water Act as permit cycles progress.

V. Specific Rationale for Amendment of Provision C.3

Provision C.3 calls for the enhancement of the Dischargers’ existing Performance Standard for Planning Procedures (Attachment 1) to address the post-construction and some construction phase impacts of new and redevelopment projects on stormwater

quality. The Performance Standard enhancement is intended to address impacts of these projects to downstream beneficial uses from both pollutants and changes in amount and timing of stormwater runoff, such as increases in peak runoff flow and duration that can cause increased erosion of stream banks and channels.

Provision C.3 calls for enhancement of this existing performance standard to increase the effectiveness of existing implementation, primarily by: (1) setting volume and flow based hydraulic sizing criteria for stormwater treatment measures, (2) setting minimum sizes of new development and redevelopment projects which must employ the treatment measures, (3) creation of a program to assure the adequate operation and maintenance of treatment measures occurs, (4) creation of standards for source control measures (such as covered dumpster areas) and site design measures which can lead to reduced impervious surface for a given equivalent land use, and (5) a requirement that the Dischargers develop a process and criteria to limit changes in the runoff hydrograph for new and redevelopment, where those changes could have a harmful effect on downstream beneficial uses by excessive erosion of the bed and bank of downstream watercourses.

1. Development Project Approval Process: Incorporating post-construction Best Management Practices (BMPs) into new development and redevelopment during project planning and approval is an effective means for controlling pollutants in urban runoff. The United States Environmental Protection Agency (USEPA) finds review of development plans during the project approval process necessary, stating: “Proposed stormwater management programs should include planning procedures for both during and after construction to implement control measures to ensure that pollution is reduced to the maximum extent practicable in areas of new development and redevelopment. Design criteria and performance standards may be used to assist in meeting this objective. A municipality should describe how it plans to implement the proposed standards (e.g., through an ordinance requiring approval of storm water management programs, a review and approval process, and adequate enforcement).” For these reasons, the amended Provision C.3 includes a requirement for the development project approval process to implement the stormwater management requirements of Provision C.3.

August 17, 2001 T.O. change: Changed the T.O.’s language regarding which projects that are “in the pipeline” must comply with revised Provision C.3’s requirements. The language was changed to include projects that had received vested development approvals, based on comments received, in order to better reflect the stage at which projects could still comply with the Provision’s requirements without significant delay.

October 10, 2001 T.O. change: The subject language was returned to its original form, based on comments received, and a separate section was added to separately describe the approval stage at which public projects (as differentiated from private projects) would be required to comply with the Provision’s requirements. This was

done to better reflect the project approval process for both public and private development projects.

2. **New and Redevelopment Project Categories:** The ultimate definition of Group 1 Projects (projects creating 5,000 square feet or more of impervious surface) is intended to include an area of additional impervious surface from new and redevelopment that will have a potential to introduce significant additional pollutants to receiving waters and/or cause a significant change in the runoff hydrograph, which has potential to impact downstream watercourse beneficial uses by significant increased erosion of bed and banks of the watercourse. Provision C.3 approaches this threshold in a phased way over several years, to allow the municipalities to gain experience with specifying controls for larger projects (projects creating 1 acre or more of impervious surface) before considering smaller ones.

Pollutants wash off from new and significant redevelopment projects and can be (and generally are) ultimately discharged to waters of the State, causing impacts to water quality and beneficial uses of waters of the State, potentially including impairment of waters. The relative composition of the pollutant spectrum in runoff from new and significant redevelopment projects can vary depending on the type of development, occupancy status, adjacent land uses, antecedent weather conditions, and other factors. Therefore, even though essentially all urban land uses contribute pollutants, as described above, it is difficult to specify projects or development types that are clean enough to be excepted from urban runoff control requirements. The level of information necessary to do so is not presently available, and may in some cases not become available until after a project is built. Therefore, the T.O. would implement the Provision's requirements on projects based on the area of impervious surface they generate—a metric known before they are built, and one that is straightforward to calculate and which bears a rough relationship to pollutant-generating and hydrograph-modifying potential.

Urban development and redevelopment projects can provide benefits to water quality: For example, infill projects, transit village housing, and high density development and redevelopment projects located within a highly developed urban core can reduce overall runoff pollutants by reducing overall motor vehicle traffic and associated pollutants, by concentrating urban growth in urban areas, reducing urban sprawl in outlying areas. Traffic commutes are shortened and pedestrian activity increases when more people live in close proximity to mass transit systems, which reduce the number of trips. The reduction of automotive exhaust pollutants, and brake pad and tire wear, can lead to a reduction in certain pollutants in stormwater runoff from an urban watershed.

The definition of significant redevelopment is intended to include projects in which the magnitude of the rework of an existing built project is such that the cost

of the addition of structural treatment measures, site design measures, and source control measures would be a reasonably small percentage of the overall project cost. Relative cost comparisons and BMP cost calculations performed indicate that the costs of stormwater treatment BMPs at new and redevelopment sites are expected to be reasonable for the water quality benefits they will bring, in the range of 1-2% of total project costs.² In addition, significant redevelopment may include removal and replacement of structures that would present a practical opportunity for overall improvements to the long-term stormwater pollutant runoff condition of the site. Inclusion of this category in Order No. 01-024 is required by federal regulation, and is important because there is an existing water quality impact associated with these projects. As is true with urban runoff impacts generally, the impacts are cumulatively significant, and can be individually significant, depending on the project (see cited water quality studies above). Implementation of stormwater controls in significant redevelopment projects over time is expected to help reduce this known and existing significant impact.

August 17, 2001 T.O. changes:

- Significant redevelopment was redefined to be “land-disturbing activity, in a project category that meets the Group 1 or Group 2 size requirements, that results in the creation or addition or replacement of 5,000 square feet of impervious surface on such an already developed site. This was an effort, in response to comments, to clearly define which projects fell into the significant redevelopment category. The 5,000 square foot threshold was chosen based on consideration of requirements and implementation elsewhere, the pollutant-generating potential of the many small projects in the Bay Area, including the pollutant-generating capacity of existing projects, and Clean Water Act requirements to consider significant redevelopment

² References and case studies suggest that stormwater treatment controls can be constructed at a reasonable cost, and can even save money while resulting in more desirable, faster-selling projects as compared to standard projects. References include:

- *Bridging the Gap: Developers Can See Green; Economic Benefits of Sustainable Site Design and Low-Impact Development*, Ron Tyne. Land Development: Magazine of the National Association of Home Builders, Spring/Summer 2000, pp. 27-31.
- *Better Site Design: Changing Development Rules to Protect the Environment*, Thomas R. Schueler and Richard A. Claytor, Jr. Land Development, Spring/Summer 1999, pp. 16-18.
- *Low-Impact Development: A Builder-Friendly Approach to Stormwater Management*, Neil Weinstein. Land Development, Winter 2000, pp. 22-25.
- Costs of Urban Nonpoint Source Pollution Control Measures, 1991. Waukesha: Southeastern Wisconsin Regional Planning Commission. 109 pp.
- Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, 1993. Washington, D.C.: USEPA. pp. 4-12 – 4-62.
- *Economic Benefits of Runoff Controls*, 1995. Washington, D.C.: USEPA. Doc. No. EPA 841-S-95-002. 16 pp.
- Corbett, Judy, and Corbett, Michael. *Designing Sustainable Communities: Learning from Village Homes*. Washington, D.C.: Island Press.
- Regional Board staff analyses of two projects using detention-based treatment controls and one project using vegetated swales, Staff Report of July 2001, Response to Comments of October 2001, and Staff Report of October 2001..

projects.

- Eliminated the exclusion from the Provision's requirements for redevelopments that decreased impervious surfaces by 20%, due to lack of supporting data for this exclusion, as pointed out by public comments.
- Added one year to the implementation date for Group 2 projects, based on comments received, in order to ensure greater knowledge and ability to implement the Provision's requirements for smaller projects on behalf of the municipalities.
- Made the Alternate Group 2 Project Definition criteria more general, to allow the municipalities greater flexibility in defining Group 2 projects in ways that function within the cities' bureaucracy and are most beneficial to water quality.
- Clarified the Group 2 Project Definition in response to questions and comments. This did not change the substance of the T.O., but rather clarified the existing language.
- Clarified that projects smaller than the Group 1 and Group 2 project categories are not subject to the Provision's requirements. This did not change the substance of the T.O., but rather clarified the existing language.
- Clearly excluded interior remodels and routine maintenance of roofs and parking lots from the Significant Redevelopment definition. This did not change the substance of the T.O., but rather clarified the existing language.

October 10, 2001 T.O. changes:

- The definition of significant redevelopment was again modified for clarity, and was modified to trigger for Group 1 projects at 43,560 square feet of impervious surface, the same level as new development projects. This was done in response to comments that the definition remained unclear, and that starting with significant redevelopment projects at the lower 5,000 square foot threshold would be inefficient, given municipalities' lack of experience addressing the Provision's requirements for such small projects, and the potential for confusion with the initially higher new development threshold of 1 acre of impervious surface.

- 3. Numeric Sizing Criteria – Volume & Flow Basis:** The American Society of Civil Engineers (ASCE) and the Water Environment Federation (WEF) have recommended a numerical BMP design standard for stormwater that is derived from a mathematical equation to maximize treatment of runoff volume for water quality based on rainfall/ runoff statistics and which is economically sound (ASCE/ WEF 1998).³ The maximized treatment volume is cut-off at the point of diminishing returns for rainfall/ runoff frequency. On the basis of this equation, the maximized runoff volume for 85 percent treatment of annual runoff volumes

³ In *Urban Runoff Quality Management*, WEF Manual of Practice No. 23, ASCE Manual and Report on Engineering Practice No. 87. WEF, Alexandria, VA; ASCE, Reston, VA. 259 pp. (1998). Urbonas, Guo, and Tucker, "Optimization of Stormwater Quality Capture Volume," in **Urban Stormwater Quality Enhancement—Source Control, Retrofitting, and Combined Sewer Technology, Proceedings of an Engineering Foundation Conference**, Harry C. Torno, ed. October 1989. New York: ASCE, pp. 94-110. In their paper, Urbonas, Guo, and Tucker discuss the principles behind the approach set forth in *Urban Runoff Quality Management*.

in California can range from 0.08 to 0.86 inch depending on the imperviousness of the watershed area and the mean rainfall.⁴

Other methods of establishing numerical BMP design standards include: (i) Percent treatment of annual runoff; (ii) Full treatment of runoff from rainfall event equal to or less than a predetermined size; and (iii) Percent reduction in runoff based on a rainfall event of standard size.⁵ These numerical design standards have been applied to development planning in Puget Sound, Washington; Alexandria, Virginia; Montgomery County, Maryland; Denver, Colorado; Orlando, Florida; Portland, Oregon; and Austin, Texas. The City of Seattle requires that where new development coverage is 750 square feet or more, stormwater detention be provided based on a 25-year storm return frequency and a peak discharge rate not to exceed 0.2 cubic foot per second.⁶ Additionally, for projects that add more than 9,000 square feet in developmental coverage, the peak drainage water discharge rate is limited to 0.15 cubic feet per second per acre for a two-year storm. The City of Denver requires new residential, commercial, and industrial developments to capture and treat the 80th percentile runoff event. This capture and proper treatment is estimated to remove 80 to 90 percent of the annual total suspended solids (TSS) load, which is a surrogate measure for heavy metal and petroleum hydrocarbon pollutants.⁷

Some States have established numerical standards for sizing stormwater treatment BMPs for new development and significant redevelopment. The State of Maryland has established stormwater numerical criteria for water quality of 0.9 to 1 inch and BMP design standards in a unified approach combining water quality, stream erosion potential reduction, groundwater recharge, and flood control objectives.⁸ The State of Florida has used numerical criteria to require treatment of storm water from new development since 1982 including BMPs sized for 80 percent (95 percent for impaired waters) reduction in annual TSS load derived from the 90 percent (or greater for impaired waters) annual runoff treatment volume method for water quality.⁹ The State of Washington has proposed at least

⁴ Sizing and Design Criteria for Storm Water Treatment Controls, Presentation to California Storm Water Quality Task Force, November 13, 1998, Sacramento, CA; L.A. Roesner, Camp Dresser McKee.

⁵ Sizing and Design Criteria for Stormwater Quality Infrastructure, Presentation at California Regional Water Quality Control Board Workshop on Standard Urban Storm Water Mitigation Plans, August 10, 1999, Alhambra, CA., R.A. Brashear, Camp Dresser McKee.

⁶ City of Seattle Municipal Code, Chapter 22.802.015 – Stormwater, drainage and erosion control requirements.

⁷ Urban Storm Drainage Criteria Manual – Volume 3, Best Management Practices, Urban Drainage and Flood Control District, Denver, CO (1999). Manual provides detailed design criteria for new development for the Denver Metropolitan area.

⁸ Maryland Storm Water Design Manual - (Maryland Department of the Environment 2000).

^{8a} Florida Development Manual: A Guide to Sound Land and Water Management (Florida Department of Environmental Protection 1988). The manual describes structural and non-structural construction and post construction BMP design criteria.

⁹ Storm Water Management Manual for Western Washington Volumes 1 – 5. September 2001 (Washington Department of Ecology). The Manual constitutes a state standard for Western Washington. Volumes 1,3

six different approaches of establishing stormwater numerical mitigation criteria for new development that adds 10,000 square feet of impervious surface or more for residential development and 5,000 square feet of impervious surface or more for other types of development.¹⁰ The mitigation criteria options include the 90th percentile 24-hour rainfall event and the six month 24-hour rainfall event.

On a national level, the USEPA is planning to standardize minimum BMP design and performance criteria for stormwater treatment BMPs under Title III of the Clean Water Act and will likely build from the experience of effective state and local programs to establish national criteria.¹¹ The USEPA, based on the National Urban Runoff Program, supports the first half-inch of rainfall as generating first flush runoff. First flush runoff is associated with the highest pollutant concentrations, and not pollutant load. The USEPA considers the first flush treatment method, the rainfall volume method, and the runoff capture volume method as common approaches for sizing of water quality BMPs.

The structural treatment control measures proposed for new and redevelopment have been demonstrated to remove pollutants, when properly operated and maintained.¹²

October 10, 2001 T.O. changes:

- Removed one of the flow numeric sizing criteria, because stakeholders concurred it was not useful, and further clarified all of the sizing criteria, based on the source references, per the Dischargers' suggestions. With the exception of the removed criterion, which was confusing and unclear how to implement, this change did not alter the substance of the T.O., but rather clarified the existing language.

and 5 are most relevant to new development standards and cover Hydrologic and Flow Control Designs, Minimum Technical Requirements and Treatment BMPs.

¹⁰ Storm Water Management in Washington State Volumes 1 – 5. Public Review Draft (Washington Department of Ecology 1999). The volumes 1,3 and 5 are most relevant to new development standards and cover Hydrologic and Flow Control Designs, Minimum Technical Requirements and Treatment BMPs. The volumes will be adopted as statewide standards in early 2000 after completion of public hearings according to the agency.

¹¹ Storm Water Phase II Final Rule – 64 Fed. Reg. 68759. See USEPA's discussion on construction and post-construction BMP requirements for Phase II. -. A Watershed Approach to Urban Runoff: Handbook for Decisionmakers, Terrene Institute and USEPA Region 5 (1996). See discussion on sizing rules for water quality purposes, p 36.

¹² USEPA, Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, 1993. Section 4 summarizes research on a wide variety of treatment controls. Schueler, Thomas, A Current Assessment of Urban Best Management Practices: Techniques for reducing non-point source pollution in the coastal zone, 1992. Washington, D.C.: Metropolitan Washington Council of Governments.

Lichten, K.H. Adapting Engineered Vegetated Swales to the San Francisco Bay Area's Mediterranean Climate: Law, Design, and Pollutant Removal Effectiveness, Master's Thesis, 1997. UC Berkeley, summarizes research on pollutant removal seen in vegetated swales.

- 4. Operation and Maintenance of Treatment Measures:** All treatment BMPs require some degree of maintenance in order to remain effective for pollutant removal long term. It is the duty of the Dischargers to ensure that adequate and appropriate maintenance and operation occurs, whether the systems are maintained by a public or private entity. This assurance may take the form of an inspection of a random subset of treatment measures in a given year, with effective follow-up. Regulations issued by USEPA in 1990 in response to the 1987 CWA amendments require that municipal urban runoff programs include "...[a] description of **maintenance activities and a maintenance schedule** for structural controls to reduce pollutants (including floatables) in discharges from municipal separate storm sewers" (40 CFR 122.26(d)(2)(iv)(A)(1)).

August 17, 2001 T.O. changes:

- Made the operation and maintenance requirements more flexible, in order to better allow municipalities to ensure that appropriate operation and maintenance of controls can occur at the lowest reasonable cost.
 - Eliminated the operation and maintenance requirements for Group 2 projects for this permit term. This was done in response to comments, to ensure that the significant effort that will be required of the Dischargers to ensure appropriate operation and maintenance for Group 1 projects will be focused and completed in an effective way.
- 5. Limitation on Increase of Peak Storm Water Runoff Discharge Rates:** New development and redevelopment can impact water quality and beneficial uses of waters by altering a watershed's patterns of runoff and particularly by increasing the rates, durations, and frequencies of peak flows. These alterations to runoff patterns, or "hydromodification," result from the addition of impervious surfaces such as rooftops, roads, parking lots, and sidewalks, and the construction of an efficient storm drain system, replacing previously undeveloped land in a watershed. The land use changes associated with urbanization increase the total volume of runoff and increase the speed with which runoff is conveyed to downstream watercourses and receiving waters.

Increases in flows from impervious surfaces associated with urbanization can result in:¹³

¹³ Selected references reviewed for this section include:

, "The Importance of Imperviousness," in *Watershed Protection Techniques* 1(3). p.100-111.

Booth, Derek B., June 1990. "Stream Channel Incision Following Drainage-Basin Urbanization," Paper No. 89098, *Water Resources Bulletin* 26(3), p.407-417.

Brown, Kenneth B., "Housing Density and Urban Land Use as Indicators of Stream Quality," in *Watershed Protection Techniques* 2(4). p.735-739.

Hollis, G.E., 1975. "The Effect of Urbanization on Floods of Different Recurrence Interval," *Water Resources Research* (1975). p. 431-435.

Klein, Richard D., August 1979. "Urbanization and Stream Quality Impairment," Paper No. 78091, *Water Resources Bulletin* 15(4), p.948-963.

- Increases in the number of bankfull events and increased peak flow rates in downstream watercourses;
- Sedimentation and increased sediment transport in downstream watercourses;
- More frequent flooding;
- Stream bed scouring and habitat degradation;
- Stream channel widening and shoreline erosion, including threats to infrastructure (e.g., bridges, utility line crossings, and adjacent roads) and existing structures (e.g., homes, businesses, fences, etc.);
- Decreased stream baseflow;
- Aesthetic degradation; and,
- Changes in stream morphology.

This section requires appropriate control of both changes in peak runoff discharge rates and durations. Efforts to mitigate these impacts in other areas, including Ontario and British Columbia, Canada, and Maryland, initially focused on reducing the increases only in peak flows. However, this approach was often ineffective, and sometimes exacerbated the problems it attempted to solve, by reducing the peak flow, but increasing the duration of erosive flows.¹⁴ To appropriately address hydromodification impacts, it is necessary to address changes to both peak flows and the duration of erosive flows. Thus, this section requires, under certain circumstances, limits on urban runoff flows from new and redevelopment projects. Further, this section recognizes that while the impacts it describes are accepted, the exact runoff control requirements necessary to address those impacts may vary by creek location, condition, and other factors, and therefore requires development of a Hydromodification Management Plan to better address appropriate management of these changes.

August 17, 2001 T.O. changes:

- Clarified that the Dischargers were allowed to develop an “equivalent limitation of peak flow impacts” under the Hydrograph Modification Management Plan (HMMP). This equivalent limitation had been written into the section previously, but the wording and formatting were changed to make clear this was an option. This option is desirable, based on the literature reviewed for this section, to help enable the Dischargers to appropriately mitigate identified impacts to beneficial uses in the most efficient manner.
- Simplified the interim standard for limiting peak flow impacts, by removing the reference to the duration of increased erosive flows. Done in response to comments

U.S. Environmental Protection Agency, 1999. Preliminary Data Summary of Urban Storm Water Best Management Practices. EPA-821-R-99-012. p.4-24 to 4-26.

Washington State Department of Ecology, August 2000. Stormwater Management Manual for Western Washington (Final Draft), Publication 99-11. Volumes 1 and III.

¹⁴ MacRae, C.R., ~1996. “Experience from morphological research on Canadian Streams: Is control of the two-year frequency runoff event the best basis for stream channel protection?” in **Effects of Watershed Development and Aquatic Management on Aquatic Ecosystems**, Larry A. Roesner, ed. New York: ASCE. pp. 144-162.

stating that the detailed interim standard would be confusing in advance of preparation of the HMMP, which could substantially alter it, that the standard might not appropriately mitigate impacts, and due to a lack of extensive supporting data that clearly and directly supported the exact numbers in the interim standard.

October 10, 2001 T.O. changes:

- Clarified the Peak Flow Limitation provision by defining the term “flow duration,” in order to address stakeholder concerns that any increase in flow duration, no matter how minor, was prohibited for applicable projects. This change did not alter the substance of the T.O., but rather clarified the existing language.
- Required the HMMP to be approved by the Regional Board, rather than the Executive Officer, and allowed an additional three months for its preparation. This was done in order to help ensure appropriate opportunity for public comment on the HMMP prior to Board consideration of it. The three-month extension was provided at the request of the Dischargers, in view of the time necessary to prepare and implement the HMMP, and in view of the added time on the process prior to Board consideration since the preparation of a previous T.O. draft.
- Removed the interim standard for the peak flow limitation, which would have been in effect while the hydrograph modification management plan is under preparation. This was done because the Dischargers believed implementation of the Interim Standard would not be cost-effective and would be counterproductive to their efforts to develop the HMMP, as described above.

6. Exemption or Waiver Based on Impracticability and Compensatory

Mitigation: In certain circumstances, after all reasonable options have been examined by a project proponent and the Discharger, it may be determined that key aspects of this Provision, primarily structural post-construction, treatment measures designed to operate for the life of the project, are infeasible to integrate into the project. This section allows the Discharger to make this determination under criteria described. It also provides that the Discharger may petition to expand the allowable criteria. If such a determination is made by the Discharger, the project proponent’s cost savings, arrived at by comparison to similar projects, must be applied to the removal of stormwater pollutants through treatment measures elsewhere, preferably in the same catchment or watershed.

August 17, 2001 T.O. changes:

- Revised to allow Dischargers to develop their own Waiver Program, rather than follow prescribed waiver procedures, and provided for an interim waiver until the Dischargers’ waiver program is approved. Done at the Dischargers’ request, to better ensure an effective and implementable program that addresses both the need for waivers and the need to ensure their implementation appropriately mitigates project impacts to water quality.
- Allowed the Waiver Program to support “regional solutions,” also known as area-wide stormwater treatment facilities. Done at the Dischargers’ request, to better ensure an effective and implementable program that addresses both the need for

waivers and the need to ensure their implementation appropriately mitigates project impacts to water quality.

October 10, 2001 T.O. changes:

- Modified to allow “other benefits to water quality” in lieu of equivalent treatment at another location. Waivers granted on the basis of “other benefits to water quality” must be approved by the Executive Officer for the interim waiver. This change was made to allow the potential to take advantage of significant opportunities to improve beneficial uses of waters and/or prevent or reduce the discharge of pollutants as they arise, when they would be equivalent to or significantly better than implementing equivalent treatment.
- Modified the Interim Waiver to expire when the Waiver Program is approved by the Regional Board, in response to a comment. This would have effectively been the case already, but now was clearly stated.

- 7. Alternative Certification of Adherence to Design Criteria for Stormwater Treatment Measures:** This mechanism for review of designs by a competent party is intended to assist Dischargers in the period when they are developing in-house expertise on review of these project elements.
- 8. Limitations on Use of Infiltration Treatment Measures - Infiltration and Groundwater Protection:** The use of infiltration, where feasible and safe from the standpoint of structural integrity, must also pose no significant threat to beneficial uses of groundwater.
- 9. Site Design Measures Guidance and Standards Development:** The Dischargers have previously participated, through the Bay Area Stormwater Managers Agencies Association, in the preparation of the "Start at the Source" site design guidance. This section seeks to more fully incorporate these site design principles into the Dischargers' local site design guidance and standards.
- 10. Source Control Measures Guidance Development:** Many of the Dischargers have already developed planning guidance for this element, but review and augmentation of these efforts is appropriate.
- 11. Revise General Plans:** USEPA finds that an MS4 discharger “must thoroughly describe how the municipality’s comprehensive plan is compatible with the storm water regulations” (1992). To achieve this, the Dischargers shall incorporate water quality and watershed protection principles and policies into their General Plans (or equivalent plans). USEPA supports addressing urban runoff problems in General Plans (or equivalent plans) when it states “[r]unoff problems can be addressed efficiently with sound planning procedures. Master Plans, Comprehensive Plans, and zoning ordinances can promote improved water quality by guiding the growth of a community away from sensitive areas and by

restricting certain types of growth (industrial, for example) to areas that can support it without compromising water quality” (2000).

The principles included in amended Provision C.3, item I incorporate basic measures that have been found to minimize pollutants in urban runoff from new development and redevelopment.

12. Revise Environmental Review Processes: Consideration of the effects of new development and redevelopment on water quality during project approval processes will help ensure that potential water quality problems resulting from the development are identified and addressed. USEPA finds that “[p]roposed storm water management programs should include planning procedures for both during and after construction to implement control measures to ensure that pollution is reduced to the maximum extent practicable in areas of new development and redevelopment. Design criteria and performance standards may be used to assist in meeting this objective” (1992). USEPA further finds that “[t]he municipality should consider storm water controls and structural controls in planning, zoning, and site or subdivision plan approval” (1992). Provision C.3 requires the Dischargers’ CEQA initial study checklists be revised to include consideration of water quality effects from new development or redevelopment.

13. Annual Reporting including New Development Pesticide Reduction

Measures: Federal NPDES regulations 40 CFR 122.26(d)(2)(iv) require each discharger to develop and implement an urban runoff management program (URMP). The Regional Board must assess the URMP to ensure that it is adequate to prohibit non-storm water discharges and reduce pollutant discharges to and from the MS4 to the maximum extent practicable. In order to allow assessment of the URMP, each Discharger must submit an annual report describing the activities it undertook to meet the requirements of Provision C.3. The Annual Reports can also be useful tools for the Dischargers. Annual Reports provide a focus to review, update, or revise the URMP on an annual basis. Successful and unsuccessful measures can be identified, helping to focus efforts on areas or issues that provide the greatest results. Areas or issues that have received insufficient efforts can also be identified and improved.

14. Implementation Schedule: All of the implementation dates for this provision are presented in this table.**15. Provision C.14 Expiration Date:** The expiration date is extended by approximately three months to allow adequate time for implementation of the Tentative Order.

August 17, 2001 T.O. changes:

- Deleted changes that extended the expiration date of the T.O. because the attorney for the Dischargers commented that the Dischargers had not agreed to that permit modification. The change had been made based on an understood agreement. Because there was not an agreement, it was not appropriate to make the change.

VI. Written Comments

The formal written comment period for the revised Tentative Order ran from August 17, 2001, until **5 PM on September 19, 2001**. The Regional Board intends to consider the Revised Tentative Order and any revisions made in response to comments at its October 17, 2001, meeting. Oral comments may be made on the Tentative Order and any revisions at the October 17, 2001, meeting.

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