3.0 PLAN DEVELOPMENT

3.1 Introduction

The Permittees have developed a comprehensive approach to stormwater management. This approach includes the water quality planning process, which is referred to throughout the DAMP and is a systematic and detailed evaluation of the impacts of urban stormwater discharges on receiving waters to determine or validate that actual impairments exist that may warrant corrective action.

The DAMP sets forth a programmatic countywide approach for urban stormwater management by:

- Establishing a baseline set of BMPs that are applicable to all areas and that are proven and cost-effective;
- Focusing on solving water quality problems in receiving waters ;
- Prioritizing waterbodies for corrective action, with those listed as impaired having a higher priority; and
- Promoting a watershed-level approach and regional BMPs that may also address existing development and non-urban sources.

This programmatic approach utilizes information obtained from the countywide baseline water quality monitoring program (**Section 11.0**) and from the additional water quality planning initiatives being conducted in several of the watersheds to determine those with beneficial use impairments, potentially attributable to urban stormwater. Once a water quality problem is identified, additional or new Best Management Practices (BMPs) are evaluated for implementation to determine their effectiveness and applicability. Since the field of stormwater management is a dynamic one, it is necessary for the Permittees to continue this systematic and iterative process of revising, adding or deleting BMPs as necessary in order to maintain a successful and responsive program.

If, during this process, the Permittees identify a category of non-stormwater discharges that has not been prohibited as a significant source of pollutants (such as water line flushing), they will, nonetheless, either prohibit the discharge from entering the municipal storm drain system or require the implementation of BMPs to reduce pollutants in the discharge to the maximum extent practicable.

Overall, the DAMP programs fall into two general categories, pollution prevention-oriented programs and removal-oriented programs. The removal oriented programs include structural BMPs that are identified through the water quality planning process.

3.2 Regulatory Requirements

Federal regulations (40 CFR 122.26 (d)(2)(iv)) require that drainage area management plans include "a comprehensive planning process....to reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques and system, design and engineering methods, and such other provisions which are appropriate."

The regulations further state that "proposed programs may impose controls on a systemwide basis, a watershed basis, a jurisdiction basis, or on individual outfalls" and "shall describe priorities for implementing controls."

The regulations thus require the development, implementation and prioritization of BMPs to control the discharge of pollutants from municipal storm drains into waters of the United States. The vehicle for this BMP implementation is the DAMP, which includes new BMPs and modifications to existing BMPs and other stormwater management program elements to address stormwater runoff from industrial, commercial, and residential areas to reduce the discharge of pollutants from municipal storm drains to the MEP.

3.3 Plan Development

3.3.1 Approach to Plan Development

Overall, the DAMP programs fall into two general categories:

1) The prevention-oriented programs addressed in the DAMP include establishing adequate legal authority to control pollutant discharges (**Section 4.0**), implementing BMPs as part of routine municipal activities (**Section 5.0**), conducting an effective public and business education program (**Section 6.0**), implementing routine non-structural and structural BMPs in new developments and significant re-developments (**Section 7.0**), implementing structural and non-structural on-site BMPs for construction projects (**Section 8.0**), implementing BMPs for existing development (**Section 9.0**) and identifying and eliminating illegal discharges / illicit connections (**Section 10.0**).

2) The removal-oriented programs include structural BMPs identified through the water quality planning process and site specific or regional/ watershed Treatment Control BMPs for new developments necessary pursuant to **Section 7.0** of the DAMP. Water quality problems will be identified through the baseline countywide water quality monitoring program and other water quality assessments. Watersheds determined to require additional BMPs will be surveyed for potential retrofitting (see **Section 3.3.2**).

The water quality planning process currently includes planning initiatives. These initiatives will be expanded the Talbert / Lower Santa Ana River, Newport Bay / San Diego Creek, Aliso Creek watersheds in the watershed chapters being developed as a component of the DAMP (**Appendix D**).

The Permittees intend to continue implementing and refining both prevention and removal oriented programs described above utilizing the selection tools outlined in **Section 3.3.3**.

3.3.2 Methodology for Examining BMP Retrofit Opportunities

Watersheds determined to require additional BMPs will be surveyed for potential retrofitting. Where retrofitting opportunities are not found, new structural BMPs will be considered, consistent with the principles of MEP standard. Existing flood control, retarding, sediment

control, water conservation, recreation, habitat, and greenbelt facilities will be evaluated in terms of their potential for modification to provide water quality benefits.

In 1997-98, the feasibility of incorporating these types of retrofits to optimize beneficial use attainment began to be addressed in the context of the long-term water quality planning initiatives being conducted within Orange County, a number of which are in cooperation with the Army Corps of Engineers.

To supplement these earlier efforts, a countywide evaluation was initiated in 2003 to identify opportunities within the existing storm drain infrastructure for configuring / reconfiguring storm drains or channel segments in order to improve water quality and maintain the designated beneficial uses. This effort is discussed further in the following section.

3.3.3 BMP Selection and Implementation

Current BMPs

The Permittees have historically conducted activities that provide ancillary water quality benefits (street sweeping, catch basin cleaning etc.). During the First and Second Term Permits, the Permittees developed and implemented additional BMPs as a result of the commitments within the 1993 DAMP and to meet the objectives of the Orange County NPDES Stormwater Program. The DAMP and the Third Term permits continue to recognize the importance of continuing the BMPs that have been initiated and include new commitments to enhance these current countywide efforts. In many instances changes have been included to further improve their effectiveness over the Third Permit Term and to increase the Permittee commitment to their implementation.

New BMPs

Although the DAMP provides for the implementation of a successful Orange County NPDES Stormwater Program through the BMPs that have already been developed and implemented, the Permittees recognize that the field of stormwater management is highly dynamic and that the BMPs within the 2003 DAMP must be revised, deleted or added to in order for the program to remain successful. In addition, water quality degradation caused by urban stormwater discharges that is identified either through the water quality monitoring program or the water quality planning process may elevate the need for additional or new BMPs to be implemented in order to effectively address the problem.

New candidate BMPs can be prevention or removal oriented and are generally identified from one or more of the following:

- A review of technical literature (such as the ASCE / EPA database);
- A review of existing control programs;
- Demonstration or research projects;
- Input from consulting firms and municipalities already involved in new BMP implementation; or
- Other sources.

New structural BMPs, chosen for broad implementation, should be selected from candidate BMPs that have been field-tested and evaluated as to their pollutant removal efficiency and cost effectiveness. They should also be planned and located to maximize their cost-effectiveness.

Assessment of BMP Effectiveness

There are generally two accepted methodologies for assessing the performance of BMP effectiveness: conventional monitoring (such as water quality monitoring) and non-conventional monitoring.

The California Stormwater BMP Handbooks (1993) define "non-conventional monitoring" as the enumeration of some indicator other than water quality data to infer pollution reduction or water quality improvement. Examples cited include surveys of public opinion to demonstrate increasing environmental awareness, monitoring of the amount of used oil being delivered to household hazardous waste collection centers, etc.

An accurate, quantifiable assessment of the cumulative effectiveness of current BMPs is difficult for a variety of reasons, including:

1. Non-structural BMPs began to be implemented prior to the first municipal stormwater permit requirements, meaning no "baseline" monitoring data representative of "pre-BMP" conditions can be identified;

2. The BMPs identified in the 2003 DAMP are being implemented incrementally on a countywide basis. Since, to date, no watershed has been uniquely subject to a single BMP, the influence of an individual BMP upon the overall surface water quality cannot yet be readily determined;

3. There is considerable variability in water quality data that complicates any statistical correlation of the data with storm frequency, storm length and intensity, land use, or land management practices. This is even more compounded by storm seasons in recent years that have varied much in their intensity, duration and volume;

4. Many of the BMPs identified in the 2003 DAMP are implemented to address the issues associated with a specific land use. However, since the land uses are extremely varied within the watersheds, it has not proven possible to characterize the effects of those specific BMPs; and

5. Factors other than chemical water quality may be more directly responsible for impairment of beneficial uses, yet all these factors combine in their effects and are difficult to separate one from another.

Assessing the cumulative effect of BMPs employed countywide on the water quality of receiving waterbodies may take a number of years. There are, however, a number of programs that are currently contributing to the assessment of individual project BMP performance. The

Permittees have conducted several studies discussed below to evaluate and assess BMP performance and efficiency.

BMP Effectiveness and Applicability. This study provides: 1) a review existing information on the broad array of structural stormwater BMPs presently available; and 2) organizes and presents specific information that will allow the Permittees to properly select, site, design, construct, and maintain the most appropriate and cost-effective BMP for a particular site condition and its corresponding receiving water quality or beneficial use objective. The study reviewed performance experience of both established and innovative BMPs on a local, regional, national, and international basis for their potential applicability to Orange County. The evaluation effort included a review of technical literature, a review of existing control programs and demonstration or research projects, and input from consulting firms and municipalities already involved in control program implementation. Performance review included consideration of pollutant removal effectiveness, cost-effectiveness, long term operational potential, and identification of various design considerations that would facilitate site-specific selection within Orange County. A number of candidate BMPs are described, a summary of the advantages and limitations are provided, and generally accepted siting and design criteria are presented. Published performance data, maintenance needs, and construction and operation costs also are summarized, and data gaps are identified for each of the candidate BMP technologies. Finally, a BMP selection matrix has been developed to help in the selection of the appropriate BMP for a particular site. The BMP Effectiveness and Applicability Study is presented in **Appendix E1**.

Trash and Debris BMP Evaluation. To assist the Permittees in developing and maintaining effective programs to prevent the deposition of trash and the removal of it from the drainage systems, the Permittees conducted an evaluation to: 1) review characterization information on trash and debris in Orange County; and 2) identify potential structural BMP devices available and review performance and cost-effectiveness. BMP device and removal matrices have been developed, along with a site selection strategy. The Trash and Debris BMP Evaluation is presented in **Appendix E2**.

Erosion Control BMP Effectiveness Study. The Permittees have developed a proposal for a study to evaluate the effectiveness of a group of selected BMPs for controlling erosion during construction. The study proposal, a cooperative effort between the Orange County and San Bernardino County NPDES Stormwater Programs, proposes five BMPs for study, based on those most commonly used in the area, those recommended in the California BMP Handbooks, as well as promising emerging technologies, such as the use of polyacrylamides (PAM) for soil erosion control. The recommended approach for the study is to pursue a qualitative assessment of BMP performance that would consist of field evaluation and empirical observations to indicate whether a given control performed effectively in the installation observed. The qualitative program would assess under what conditions (slopes, soil types, traffic level, etc.) each of these products provide adequate water quality protection by performing site inspections over the course of one or more wet seasons and documenting the performance through photographs and narrative descriptions as appropriate. The proposed study also includes an analysis of existing

guidance documents and related published reports such as the CASQA (California Stormwater Quality Association) BMP Handbooks, and published reports of erosion control performance. Objectives of this review are to refine the previous guidance so that it applies specifically to Orange and San Bernardino Counties with respect to soil types, rainfall characteristics, and climate, and to reformat the material so that it is more useful for a construction person in the field, rather than being part of an inaccessible technical report. Once the field evaluation has been completed, a guidance document for the area will be developed that incorporates the results of the field testing program and the modification of existing erosion control manuals. The result will be a document that specifically addresses conditions commonly encountered in Orange and San Bernardino Counties and serves as a practical guide for implementation of erosion controls in the two counties. The Erosion Control BMP Effectiveness Study Proposal is presented in **Appendix E3**.

Septic System Inventory and Assessment. The objective of this study was to develop an inventory / database of the septic systems in Orange County and to estimate the potential impact of septic systems on the quality of selected receiving waters. Septic systems throughout the County were inventoried, and placed in a GIS layer for ease of viewing and inventory maintenance. A random field survey of septic system owners within four selected major areas of the County was undertaken to evaluate existing system performance. The overall failure rate was determined via a survey of the homeowners and visual inspection of the septic system where possible, and then verified by findings from similar surveys reported in the literature. Of the eighty field surveys that were conducted, only one failed system was noted, representing a failure rate of 1.25%. An analysis was also performed on the extent septic systems may impact water quality in Orange County based on the results from the field survey findings. A spreadsheet model was developed to estimate the loading of pathogen indicators and total Kjeldahl nitrogen (TKN) from the failed systems. The model indicates that the load from the failed septic systems is a very marginal contributor to pathogen indicators in the receiving waters and is an insignificant contributor for TKN. Based on the analyses conducted, the study concludes that septic systems do not represent a significant source of constituents of concern for Orange County receiving waters. The Septic System Inventory and Assessment is presented in **Appendix E4**.

Portable Toilet Pollution Prevention Program. The Permittees conducted an evaluation of practices and impacts associated with the use, maintenance, and oversight of portable toilets in Orange County. The objectives of the evaluation were to: (1) determine the nature of existing operational practices and regulatory oversight structure; (2) assess the extent to which the present practices associated with their use and maintenance were adversely impacting surface water quality; and (3) recommend appropriate revisions to current operational practices or regulatory oversight as warranted. Industry standard practices were identified and described, and current practices related to siting, maintenance, transport, disposal, and storage are presented. Water quality impacts associated with portable toilets were assessed based on a review of reported pollution incidents and anecdotal information derived from interviews. The assessment found a small number of formal incidents over the past several years where an observed or potential direct impact to a drainage channel from a portable toilet occurred, probably

through flooding or vandalism. The study finds that current standard industry practices for use, maintenance, transport and storage of portable toilets within Orange County are generally sufficient to prevent impacts to receiving waters, but that these practices should be formalized and shared with suppliers and users within Orange County to ensure their consistent application. The Portable Toilet Pollution Prevention Study is presented in **Appendix E5**.

Dry Weather Diversion Study. This study evaluates dry weather diversions to the sanitary sewer that are in place or proposed within Orange County. Based on the assessment of current dry weather diversions and review of POTW policies, a Dry Weather Diversion Plan has been developed to serve as a framework for decision-making, identification of additional potential diversion locations, BMP type selection and prioritization of implementation of the proposed sites. The dry weather diversion plan includes: 1) dry weather diversion decision process; 2) water quality data availability; 3) beneficial uses downstream of diversion; 4) source control – bacteria and dry weather runoff; 5) equally effective and cost-effective BMPs; 6) impacts to downstream recreation uses; 7) impacts to habitat downstream; and 8) community / regulatory agency support. The Dry Weather Diversion Study is presented in **Appendix E6**.

<NOTE TO COUNTY: Use the following two paragraphs only in the Santa Ana Region DAMP submittal.>

Retrofitting Opportunities Assessment. As required by the Santa Ana Third Term Permit, the Permittees conducted an assessment of existing flood control channels for their potential for modification to enhance receiving water quality. Based on a qualitative assessment of flood control channels, channel locations were identified where there appeared to be an opportunity for modification. However, quantitative engineering studies must be conducted to ensure that the potential reconfiguration for water quality improvement does not adversely affect the primary flood control / drainage function of the facility. Also, project design and costs must be developed, environmental documents, right-of-way issues, and other permits must be addressed, and funding must be secured before a potential retrofit for any particular location can be implemented. Therefore, this assessment of existing flood control channels is not itself an actual implementation program or plan, but rather a first step in identifying opportunities for channel modification. The Retrofitting Opportunities Assessment is presented in **Appendix E7**.

In addition to the assessment of flood control channels, the Permittees initiated a study to similarly identify opportunities for configuring / reconfiguring existing storm drain infrastructure to improve water quality and / or maintain designated beneficial uses. A Geographical Information System (GIS) model is being used to initially identify possible retrofit locations that meet selected search criteria. Field reconnaissance of preliminary sites identified by the GIS model is then conducted to refine site information and focus on technical feasibility by considering site-specific factors that might preclude a successful retrofit project. The end product of this study will not be a defined implementation plan or water quality capital improvement program. Instead, the outcome of this study will be the presentation and explanation of a logical, iterative process used to develop a list of sites throughout the County where there appear to be

opportunities to further pursue regional storm drain infrastructure projects for water quality improvement. Therefore, the identification of these retrofit opportunities will support collaboration and decision making to incorporate regional BMPs where deemed feasible. When completed, the results of the this study will be reported in future Annual Progress Reports and / or regional watershed management plans being developed by the Permittees.

The Permittees will continue to assess and evaluate the data from these and other studies in order to try and determine the overall effectiveness of the implementation of the BMPs on water quality within Orange County.

3.3.4 Plan Revision

The 2003 DAMP will be revised and submitted as the proposed plan for the Report of Waste Discharge in 2006. The TAC will review, and submit to the Permittees for local approval, the updated DAMP. The documents will then be submitted to the Regional Boards.

3.4 Funding of Structural Controls

3.4.1 New Development BMPs

Each developer will finance and implement the construction site controls specified in this plan and will institute the appropriate post-construction BMPs. If an approved regional or watershed plan is in place that anticipates the new development, the developer may be required to contribute to the implementation of the regional or watershed structural BMPs. This may be accomplished by establishing a water quality plan and funding program for each affected watershed (see **Section 7.0** for more detail).

3.4.2 Watershed Structural BMPs

Financial requirements for the construction, operation and maintenance of watershed structural BMPs (water quality wetlands, biofiltration swales) will continue to be evaluated on a watershed scale on a case by case basis. Appropriate financing programs will be proposed, including consideration of means to assure appropriate participation by land developers, project proponents, and any other local stakeholders.

Those structural BMPs, which are retrofitted existing structures, will continue to be operated and maintained by the present owners for each new structure. The planning process will include consideration and determination of maintenance responsibility for each new structure.