

C-3.0 PLAN DEVELOPMENT

C-3.1 Introduction

The purpose of **DAMP Section 3.0** is to present the iterative water quality planning process that supports urban stormwater management in Orange County. A defining feature of this process is the cycle of analysis, measurement and improvement (see **Figure C-3.1**) that is conducted on 1 year and 5 year cycles:

Assess: Assessing environmental conditions, identifying candidate management actions to be undertaken, and determining the route to be taken and the measurements to track success;

Plan: Designing management actions protective of water quality, identifying the needed skills and expertise, and designating responsibility for achieving desired outcomes;

Implement: Bringing the process into effect in an efficient and effective manner, and

Monitor: Evaluating the impact of plan implementation.

C-3.1.1 Water Quality Planning

The DAMP sets forth the iterative management approach for urban stormwater quality protection and management by creating a basis for:

- Monitoring water quality and programmatic performance to assess progress and evaluate urban runoff impacts on receiving waters;
- Designing a set of *BMPs* that are applicable on a Countywide-basis and that are proven and cost-effective;
- Developing *Enhanced BMPs* for specific constituents of concern at a watershed or jurisdictional level, as appropriate;
- Implementing *Countywide BMPs* and *Enhanced BMPs*, and
- Evaluating BMP effectiveness.

Following adoption of the Third Term Permits, the DAMP was substantially revised to incorporate greater individual accountability through jurisdictional LIPs (see **DAMP Appendix A**). The LIPs provide a flexible jurisdiction-specific plan within the broader policy and model program framework of the DAMP.

With additional permit mandates to institute watershed-based activities, water quality planning supportive of the DAMP is now undertaken as two separate, but nonetheless similar and highly interdependent, processes targeting the control of pollutants in urban runoff. These processes (**Table C-3.1; Figure C-3.1**) are:

- DAMP/LIP - Directed by jurisdictional assessments completed individually by

each Permittee and complemented by a countywide assessment; and

- DAMP/Watershed Action Plan (WAP) or Watershed Workplan (See **DAMP Appendix D**) – Directed by watershed scale assessments.

At the countywide program level, the major assessment is done principally on a five yearly basis with an emphasis on using direct measures of progress. This assessment is targeted at informing the review and revision of the DAMP during preparation of the ROWD using information from the water quality monitoring program. In the intervening periods, this information may be used to direct LIP revision contingent upon its availability.

C-3.2 Accomplishments

C-3.2.1 Programmatic Enhancements

C-3.2.1.1 DAMP/LIP

To assist the Permittees with evaluating and reporting the status of LIP implementation, a PEA reporting framework (**DAMP Appendix C**) was developed in 2002-03 and has been used since that time. The PEA:

- Enables the collection and compilation of specific stormwater program implementation and progress validation indicators;
 - A PEA template was created in 2003 and has been the basis of the Annual Reports since that time.
- Provides for program effectiveness assessment by the individual Permittees and the Principal Permittee on a jurisdictional, watershed and/or countywide basis;
 - The PEA identifies specific programmatic and environmental performance metrics including specified “Headline Indicators” (See **Section C-1.2.2**).
- Ensures that an evaluation and improvement process is applied on a jurisdictional, watershed and/or countywide level to determine where modifications within the DAMP, LIP or WAP/Watershed Workplans may be necessary; and
- Provides a mechanism for the Permittees to identify and report modifications that have or will be made to their LIP.

C-3.2.1.2 Mapping

Hydromodification susceptibility and infiltration feasibility mapping for Orange County was completed during the current reporting period. Infiltration feasibility is being determined by overlaying and compositing maps of:

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- Depth to first groundwater is less than or equal to 5 feet below ground surface;
- Presence of Hydrologic Soil Group D (low infiltration potential);
- Landslide susceptibility (mapped by the California Geological Survey);
- Presence of groundwater contamination, and
- Zones of sanitary sewer infrastructure susceptible to inflow and infiltration.

The mapping is intended to be used as an initial screening of locations where infiltration is likely to be infeasible. Additional factors not shown on this map may further limit or prohibit stormwater infiltration.

C-3.2.1.3 DAMP/ Watershed Workplans and Watershed Master Plans

Order R9-2009-0002 requires the Permittees to develop Watershed Water Quality Workplans (Watershed Workplans) comprising:

- A characterization of receiving water quality;
- Identification of the highest water quality problems;
- Identification of the sources of the highest water quality problems;
- A watershed BMP implementation strategy;
- A strategy to model and monitor improvements, and
- An implementation schedule.

Watershed Workplans, which supersede the Watershed Action Plans, were updated for the six south Orange County watersheds during the reporting period and a public stakeholder meeting was held to review updates to the Workplans.

In the area of Orange County under the jurisdiction of the Santa Ana Regional Board, the Permittees are required to prepare Watershed Master Plans (WMPs) which integrate water quality, hydromodification, water supply, and habitat considerations for the Coyote Creek-San Gabriel River, Anaheim Bay-Huntington Harbor, Santa Ana River, and Newport Bay-Newport Coast watersheds. Order R8-2009-0030 requires the Permittees to include the following components into their WMPs:

- Maps to identify areas susceptible to hydromodification including downstream erosion, impacts on physical structure, impacts on riparian and aquatic habitats and areas where storm water and urban runoff infiltration is possible and appropriate.
- A hydromodification model to make available as a tool to enable proponents of land development projects to readily select storm water preventive and mitigative site BMP measures.

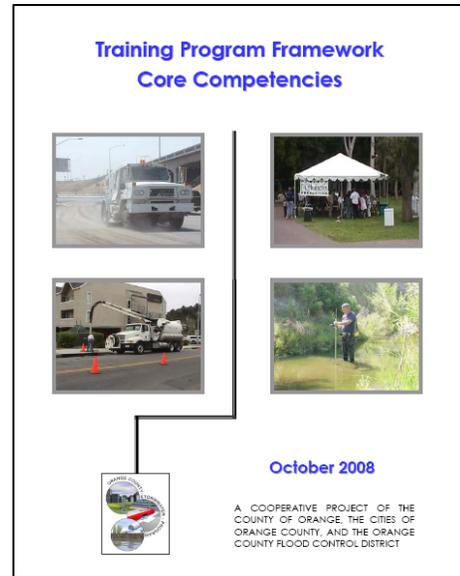
A Model Watershed Infiltration and Hydromodification Management Plan (WIHMP) was created for the Coyote Creek-San Gabriel River watershed. This document includes additional mapping including detailed delineation of subwatershed areas and identification of regional and sub-regional runoff retention opportunities.

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C-3.2.1.4 Training

The *Training Program Framework Core Competencies* document defines the core competencies (knowledge, level of experience, and skills) necessary to ensure the capabilities of individuals carrying out specialized municipal stormwater program compliance responsibilities. It is expected that an individual or group of individuals who has/have developed these competencies will be able to affect jurisdictional conformance with the DAMP/ LIP and the compliance of their jurisdiction with the Fourth Term Permits.

The core competencies are also the basis of a comprehensive training and development program which will be delivered on a two year schedule. The document was used to define the content and structure of the Model WQMP and TGD training as well as the content of the pre-wet season construction inspection training presented in September/October 2012.



C-3.2.2 Enhancements in Environmental Assessment

An extensive environmental monitoring program is undertaken to support the water quality planning process. While the permits prescribe specific monitoring program objectives, environmental monitoring enables the Permittees to: (1) determine compliance with standards; (2) construct, adjust and verify predictive models; (3) generate information to evaluate abatement measures and identify progress against control objectives, and (4) provide early indications of future problems.

The San Diego Region Receiving Waters Monitoring and Reporting Program comprises five program elements which are:

- Long term mass emissions monitoring;
- Ambient coastal receiving waters monitoring;
- Coastal stormdrain outfall monitoring;
- Urban stream bioassessment monitoring;
- Dry weather Non-stormwater Action Level (NAL) monitoring, and
- Wet weather Stormwater Action level (SAL) monitoring.

The Receiving Waters Monitoring and Reporting Program is discussed in **Section C-11.0 - San Diego Region**. Additionally, the Aliso Creek Permittees separately support a monitoring program in the Aliso Creek watershed referred to as the "13225 Directive Monitoring Program" and the City of Dana Point and the County of Orange separately support a monitoring program as part of the Baby Beach Dana Point Harbor Bacterial Indicator TMDL. Annual progress reports for these monitoring programs are subject to

separate reporting requirements.

The Santa Ana Region Monitoring Program comprises seven program elements which are:

- Long-term mass emissions;
- Estuary/wetlands monitoring;
- Bacteriological/pathogen monitoring;
- Urban stream bioassessment monitoring;
- Reconnaissance (dry weather) monitoring, and
- TMDL monitoring.

The Monitoring Program is discussed in **Section C-11.0 – Santa Ana Region**. The core monitoring and assessment questions considered in **Section C-11.0** are:

1. Are conditions in receiving water protective, or likely to be protective, of beneficial uses?
2. What is the extent and magnitude of the current or potential receiving water problems?
3. What is the relative MS4 discharge contribution to the receiving water problem(s)?
4. What are the sources that contribute to receiving water problems(s)?
5. Are conditions getting better or worse?

Additional monitoring is undertaken for TMDL compliance and these efforts are subject to separate reporting requirements.

C- 3.2.3 Enhancements in Assessment Methodologies

There are a number of initiatives, being supported by the Permittees, which are aimed at the further development of assessment techniques and methodologies to support more informed and consistent decision making across Southern California. Notable amongst these initiatives are the collaborative studies being conducted by the Stormwater Monitoring Coalition (SMC) and participation by the Principal Permittee in the CASQA and the Southern California Coastal Water Research Project (SCCWRP).

Stormwater Monitoring Coalition (SMC)

The goal of the SMC is to develop the technical information necessary to better understand stormwater mechanisms and impacts, and then develop the tools that will effectively and efficiently improve stormwater decision-making. The SMC develops and funds cooperative projects to improve the knowledge of stormwater quality management. The SMC projects that were active during 2012-2013 included:

- Stormwater Data Compilation
- Implementing a Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program

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- Hydromodification Assessment Tool Development
- Effects of Wildfires on Contaminant Runoff and Emissions
- Low Impact Development
- Barriers to Low Impact Development
- Development of Regional Approaches and Protocols for Trash Monitoring and Management
- Regional Stormwater Monitoring Comparison and Evaluation

The agencies currently participating as members in the SMC are:

- California Regional Water Quality Control Board, Los Angeles Region
- California Regional Water Quality Control Board, San Diego Region
- California Regional Water Quality Control Board, Santa Ana Region
- California Department of Transportation (CalTrans)
- City of Long Beach
- City of Los Angeles, Water Protection Division
- County of Orange, OC Public Works.
- County of San Diego Stormwater Management Program
- Los Angeles County Department of Public Works
- Riverside County Flood Control and Water Conservation District
- San Bernardino County Flood Control District
- Southern California Coastal Water Research Project
- State Water Resources Control Board
- US Environmental Protection Agency, Office of Research and Development
- Ventura County Watershed Protection District

The status of the projects at the end of the reporting period is presented in *Annual Report 2012-2013: Stormwater Monitoring Coalition of Southern California* which was still being finalized at the time of this report's preparation.

CASQA Program Effectiveness Assessment White Paper

The PEA strategy (see **Section C-1.0**) is based on the approach to program effectiveness assessment presented in *Municipal Stormwater Program Effectiveness Assessment Guidance* (CASQA, May 2007) which has been integral to the Reports of Waste Discharge and each Annual Report since the 2005-06 reporting year. Its taxonomy of assessment measures is also the basis of this report. This approach was re-evaluated by CASQA in September 2010¹ and the SWRCB conducted a series of workshops in November 2010 to receive comments on the guidance document. A final copy of *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits* is available on the SWRCB's website at the following link:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/municipal.shtml 1). This guidance has informed modifications to annual program effectiveness

¹ *A California Perspective On The Assessment Of Municipal Stormwater Programs*, Stormwater Magazine, September, 2010.

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assessments through the incorporation of assessment outcomes that define specific measurement points to which our Program can be targeted, evaluated, and periodically modified (see **Figure C-3.2**).

Southern California Coastal Water Research Project (SCCWRP)

The Principal Permittee, on behalf of the Program, participates in SCCWRP as a Commissioner and Commission Technical Advisory Group (CTAG) representative. The SCCWRP Commission meets quarterly to direct and foster impartial research that will improve environmental management. CTAG acts as the primary link between the SCCWRP Commission and member agencies and SCCWRP staff. It fulfills this purpose by providing guidance on the SCCWRP research plan, transferring scientific and technical information to member agencies, and collaborating closely with SCCWRP staff on special projects that require a high level of integration of managerial, technical, and scientific issues. The focus of SCCWRP's research output during the reporting period was assessing stream susceptibility to hydromodification, water quality impacts arising from wildfires and antifouling biocides, and microbiology and beach water quality monitoring (see SCCWRP 2012 Annual Report, available at: <http://www.sccwrp.org/Documents/AnnualReports/BrowseAllAnnualReports/2012AnnualReport.aspx>)

C-3.2.4 Enhancements in BMP Knowledge

During the reporting period, the Program continued development and expansion of the *Countywide Area Spill Control (CASC) Program*, commenced development of a *Newport Bay Trash Management Plan* and supported an *Infiltration Well Pilot Project*.

Countywide Area Spill Control (CASC)

The CASC program began in 2000 as a pilot project between the County and the Orange County Sanitation District (OCSD) to proactively prevent and respond to sanitary sewer overflows (SSOs) in the unincorporated North Tustin area. CASC has since evolved into a true countywide program. The main focus of CASC remains the containment and recovery of large SSOs which have the potential to significantly impact receiving waters resulting in beach closures and health advisory postings.

The overall objectives of CASC are to:

- Create broader awareness regarding the causes of SSOs and development of measures that can be implemented in order to prevent them;
- Improve the interagency coordination when responding to SSOs;
- Identify the resources needed when responding and mitigating impacts;
- Develop predictive tools for identifying potential impacts; and
- Protect the beneficial uses of the local water bodies.

Since implementation of the program countywide in 2010, CASC has been activated a total of 8 times, resulting in the diversion of almost 3.8 million gallons of impacted

receiving waters to the sanitary sewer system:

Newport Bay Trash and Litter Investigation Special Study

The objectives of the *Newport Bay Trash and Litter Investigation Special Study* are:

- Developing a resource library of structural and institutional trash control BMPs;
- Examining the relationship between BMPs and stream condition;
- Evaluating various rapid assessment monitoring protocols;
- Developing approaches to identifying and prioritizing trash sources, and
- Implementing a pilot trash control project on a priority sub-watershed basis.

Recent activities have been focused on data collection including structural trash BMP locations and maintenance records. It is anticipated that data concerning non-structural BMPs will be available by the end of November, 2013. As a result of this data collection effort the GIS mapping process has begun and much of the structural trash BMP information has been translated into a GIS environment. In addition, the locational data for structural BMPs has allowed for the delineation of catchment areas.

Moving forward, data will be solicited from the nine stakeholder cities. This data will be reviewed for geospatial and temporal coverage as well as accuracy and reliability. Opportunities for collaboration are also being explored. The Bay Area Stormwater Management Agencies Association (BASMAA) is conducting a similar study to the Newport Bay Trash Management Plan. Opportunities for collaboration have been identified for the BMP toolbox, rapid assessment protocol and baseline trash assessment.

This study is expected to be completed over the next 12-24 months.

South Orange County Trash and Litter Special Study

The study is a regional scale investigation to assess trash impacts on streams in South Orange County. The goal of the project is to answer the following questions

- 1.) What is the magnitude and extent of trash in south Orange County watersheds?
 - a) What percent of stream miles have an impacted condition?
 - b) What are the magnitude and proportions of trash by category?
- 2.) Do sites significantly change in trash levels between events within a year and between years?

The data collection and analysis will continue until the 2013-14 reporting period and a complete report summarizing the findings will be prepared at the completion of the special study.

Infiltration Well Pilot Project

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The *Infiltration Well Pilot Project*² involved replacement of an existing stormwater collection sump and pump at the City of Anaheim Utility Services Center with a stormwater pre-treatment system that discharges to an infiltration well. This new system captures runoff from approximately 3 acres of fully paved or roofed tributary area and prevents pollutants mobilized in surface runoff from flowing to downstream receiving water bodies. Concurrent with the operation of the well, the City of Anaheim is studying, in collaboration with Orange County Water District which will provide laboratory analytical services, the potential impacts to the vadose zone and groundwater in the immediate vicinity of the infiltration system. The project was approved for Expanded Use Clean Water State Revolving Fund Loan Program, authorized by the 2009 American Reinvestment and Recovery Act (ARRA) in 2010.

Other BMP Evaluations

BMP evaluations conducted by the Permittees are reported in **Section C-3.0** of the jurisdictional PEAs. Over the reporting period, the findings from these evaluations have been provided to the Permittees through the program management framework.

C-3.2.5 Enhancements in Data Management

As the Principal Permittee, the County of Orange conducts water quality monitoring and manages a countywide 24-hour bilingual water pollution reporting hotline (1-877-89SPILL) on behalf of the Permittees. Findings arising out of these activities oftentimes require prompt response and the need to have access to field findings, photos, and other pertinent details. In order to manage this data and share it with the Permittees in real time, the County evaluated several options and elected to use a web-based, Geographical Information System (GIS) integrated proprietary software system known as CBI MS4 Web.

Deployment of the CBI MS4 Web system occurred during the 2010-11 reporting period and County staff is now utilizing it to manage and share data associated with the Non-stormwater Action Level (NAL) Monitoring program in the San Diego region, Dry Weather Reconnaissance Monitoring in the Santa Ana region, and the Countywide Pollution Notification/Investigation Inventory to track calls received through the water pollution reporting hotline.

C-3.2.6 BMP Selection

The Permittees recognize that the field of stormwater quality is highly dynamic and that the BMPs within the DAMP/LIP must be revised, deleted or added to in order for the Program to remain effective. In addition, water quality problems caused by urban stormwater that are identified through the water quality monitoring program may elevate the need for additional or new BMPs to be implemented in order to effectively

² *City of Anaheim, Infiltration Well Pilot Project Assessment and Evaluation Plan (PAEP)*, City of Anaheim, 2010.

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 American Society of Civil Engineers/USEPA database);
- A review of existing control programs;
- Demonstration or research projects, and
- Input from consulting firms and municipalities already involved in new BMP implementation.

During the reporting period, several Permittees reported the selection and/or implementation of additional structural and/or non-structural BMPs to enhance their local efforts including hydrodynamic separators and drain inlet filters and screens for trash control, treatment technologies for rising groundwater containing selenium and various devices targeting pathogens including constructed wetlands [see **Exhibits 1-11** (San Diego) and **Exhibits 1-27** (Santa Ana)].

C-3.2.6.1 BMP Retrofitting Opportunities

In 2003-04, a countywide evaluation was initiated 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 (see **DAMP Appendix E**). This study used a GIS model to create a database with information about runoff volume, constituents of concern, and BMP citing opportunities. The first step in the model development was to create a digital database of the region. A digital elevation model and digital ortho-photography were used to delineate stream networks. Land use information was obtained as a zoning overlay to identify publicly owned and undeveloped parcels.

The developed GIS model has been used to identify potential BMP retrofit sites that had drainage areas of 50 to 500 acres. Sites were initially identified on parcels that were publicly owned, in proximity to receiving waters, and where there appeared to be sufficient available space for a regional BMP. The model was subsequently used to investigate potential BMP retrofit opportunities within Caltrans, County of Orange and Orange County Transportation Authority highway projects, homeowner association parcels, and finally excess highway right-of-ways.

Identification of Regional BMP retrofitting Opportunities: Phase II Draft Report – was completed in March 2008. It identifies 163 locations throughout the county that can potentially be modified to protect beneficial uses or provide a water quality (pollution control) function. These locations comprise 23 locations identified in the initial screening effort, 30 Natural Treatment System sites, 22 locations identified by the Permittees during the study, 20 in-channel locations, 34 locations identified within Caltrans, County of Orange or OCTA transportation projects, 31 locations within HOA parcels, and 3 locations within excess highway right-of-way.

In 2008-09, a Hydrologic Simulation Program in Fortran (HSPF) water quality modeling study³ was undertaken to develop recommendations on the types and locations of potential BMP retrofit sites that would achieve the greatest benefit to receiving water quality. Water quality models were developed to simulate the hydrologic and water quality processes within two impaired Orange County watersheds, Aliso Creek and Anaheim Bay/Huntington Harbour.

For the modeling study, the retrofit sites identified during the prior GIS-based studies were reviewed and the most appropriate BMP (infiltration basin, wet basin, extended detention basin, constructed wetlands) for implementation at each potential retrofit site was selected. The HSPF models show that the potential BMP retrofits identified during the retrofitting opportunities studies are able to reduce wet weather loads of pollutants of concern within the Aliso Creek and Anaheim Bay/Huntington Harbour watersheds. The report's recommended BMP implementation strategy is based on the prioritization of BMPs that will provide the greatest amount of pollutant reduction.

Orange County Transportation Authority's (OCTA) Environmental Cleanup Program – The Orange County Transportation Authority's (OCTA) Environmental Cleanup Program (Program), provides for the allocation of approximately \$300 million to improve overall water quality in Orange County from transportation-generated pollution. The Program was approved under Orange County Measure M2 (M2), the half-cent sales tax for transportation improvements approved by Orange County voters in 2006. In August 2007, the OCTA Board of Directors (Board) approved a five-year M2 Early Action Plan, covering the years 2007 to 2012, to advance the implementation of several key M2 projects, including the water quality program.

Program funds will be allocated on a countywide competitive basis to assist jurisdictions in meeting the Clean Water Act for controlling transportation-generated pollution. Eligible applicants include city and county agencies. Funds will be awarded to the highest priority projects that improve water quality in streams, harbors, and other waterways that have a nexus to transportation generated pollution. The Environmental Cleanup Allocation Committee is responsible for developing the Program and making funding recommendations to the Board and is co-chaired by the Principal Permittee.

In May 2010, the OCTA Board approved the recommended Allocation Committee's two-tier grant funding approach. The Tier 1 Grant Program is designed to mitigate the more visible form of pollutants, such as litter and debris that collects on roadways and in storm drains prior to being deposited in waterways and the ocean. Tier 1 consists of funding for equipment purchases and upgrades to existing catch basins and related BMPs such as screens, filters, inserts and other streetscale low-flow diversion projects. A total of up to \$19.5 million is available for the Tier 1 program over a seven year period from 2011-12 through 2017-18.

³ *Identification of Retrofitting Opportunities: Watershed HSPF Model Development* – Draft Report, December 15, 2008.

The Tier 2 Grant Program consists of funding regional, potentially multijurisdictional, capital-intensive projects. Examples include constructed wetlands, detention/infiltration basins and bioswales, which mitigate pollutants including litter and debris, but also heavy metals, organic chemicals, sediment and nutrients. The Tier 2 program will be funded beginning in fiscal year 2012-13 using bond financing revenues with up to \$38 million allocated through fiscal year 2015-16. The first call for projects for Tier 2 is expected to be issued in Spring 2012.

The Principal Permittee worked closely with OCTA on the development of a Structural BMP Prioritization and Analysis Tool (SBPAT) to inform future decisions regarding the disbursement of Tier 2 project funds. SBPAT is a GIS-based decision support tool that will be used to identify and prioritize potential structural BMP retrofit projects throughout Orange County. The tool will help prioritize catchments areas within Orange County according to relative pollutant loading and receiving water impairments.

C-3.3 Assessment

The Permittees recognize that knowledge in the field of stormwater quality is rapidly evolving and that jurisdictional and watershed-based water quality planning processes must continue to evolve in order for the Program to make sustained progress toward attainment of water quality standards and maintain compliance with an increasing number of regulatory mandates, notably TMDLs.

C-3.3.1 Programmatic Assessment

The PEA template created in 2003, which has been used as the basis of the 2002-03 through 2012-13 Annual Reports, has established a series of metrics for spatial (i.e. jurisdictional comparisons) and temporal (i.e. year-to-year comparisons) assessments of program effectiveness. However, as noted in the prior annual report, the reporting has highlighted significant inconsistencies in metric interpretation across the jurisdictions of the Program. This issue was initially addressed in June 2006 with the publication of metric definitions and guidance.

In 2006-07 further guidance (*Technical Memorandum: Implementation of Preferred Options for Fiscal Reporting*) was developed to improve the accuracy of the fiscal element of the annual report. For the current reporting period, the report preparation schedule was advanced and a formal presentation of the performance data, compiled to facilitate jurisdictional comparison, was provided to the Permittees (on October 24, 2013) as an additional quality control step in the report preparation process. While these efforts have contributed to better data quality, jurisdictional comparisons continue to show marked variability in performance across key program elements which suggest that additional effort is needed to continue to improve metric reliability. At the same time, the Fourth Term Permits explicitly require the use of assessment measures that reflect each of the outcome levels described in CASQA's *Municipal Stormwater Program Effectiveness Assessment Guidance* (CASQA, May 2007).

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The *Training Program Framework Core Competencies* document defines the content and schedule of a comprehensive training and development program to be delivered on a 2 year schedule. *Planner* and *Plan Checker* and *Program Manager* training has necessarily been deferred in the reporting period pending approval of the *Model WQMP* and *Technical Guidance Document* for the San Diego Region, which is currently pending. Also, developing new programs to address the additional regulatory requirements of the Fourth Term Permits has led to a deferment in the development of the training program with the exception of *Investigative Guidance*.

2013-14 Program Focus:

- Complete training program for all core competencies.

The Fourth Term Permits have placed a renewed emphasis on water quality planning at the watershed scale. The WMPs were in development over the reporting period and the Watershed Workplans were updated.

2013-14 Program Focus:

- Complete annual update and implementation of the Watershed Workplans in south Orange County.
- Complete WIHMPs for all North Orange County Watersheds.

C-3.3.2 Environmental Assessment

The seven program elements that comprise the *Santa Ana Region Monitoring Program* are necessary to maintain compliance with the monitoring provisions of the permit. The Permittees will continue to implement this program concurrent with implementation of the *Source Control Plan and Monitoring Program for Coyote Creek Watershed Metals TMDL within Orange County* and the monitoring program obligated by the Newport bay TMDLs.

2013-14 Program Focus:

- Continue implementation of *Santa Ana Region Monitoring Program, Receiving Waters Monitoring and Reporting Program* and TMDL monitoring programs within Orange County.

C-3.3.3 Assessment Methods

The development by the SMC of a research agenda and its progress on completing

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projects is evidence of its effectiveness in both identifying region-specific research needs and developing assessment techniques and methodologies that will enable more informed, consistent and cost-effective stormwater management decision-making across the region.

C-3.3.4 BMP Knowledge

The major emphasis placed by the Fourth Term Permits on Low Impact Development strategies for land development, which presume that site runoff will be retained and infiltrated in the first instance, has focused attention on groundwater quality protection. During permit renewal, Orange County Water District requested that the Permittees be required to investigate surface water infiltration projects for potential impacts to groundwater quality. Since that time, the District has worked closely with the City of Anaheim on devising and providing analytical services support to its *Infiltration Well Pilot Project*.

2013-14 Program Focus:

- The Permittees will continue to coordinate with Orange County Water District to identify additional potential runoff infiltration evaluation projects for development and implementation.

C-3.3.5 BMP Retrofitting

OCTA completed a study to determine the strategically effective areas, opportunities and types of investment necessary to reduce road/freeway runoff impacts to impaired waters in Orange County. The study has resulted in the creation of a GIS stormwater BMP model, referred to as SBPAT, that will enable OCTA to evaluate the potential cost and strategic effectiveness of proposed BMP retrofit projects for which funding will be allocated on a competitive basis. This study was informed by the Permittees' GIS-based retrofitting investigations and should be considered to be the next phase of this effort.

2013-14 Program Focus:

- The Permittees will continue to coordinate with OCTA regarding the future competitive disbursement of Measure M funding for BMP retrofit projects.

C-3.4 Summary

While environmental quality data and programmatic assessment metrics have been used to assess the overall effectiveness of the Program, much of the focus during the reporting period has been the further development and deployment of model programs to address additional regulatory requirements imposed by the Fourth Term Permits. This continued development of the Program is seen as foundational to a likely further shift in

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emphasis toward watershed-based approaches in response to TMDLs and the Water Quality Improvement Plan requirements of the Regional Permit.

Table C-3.1: Comparison of Water Quality Planning Processes

	DAMP/LIP	DAMP/Watershed
Geographic Area Covered by Plan	Defined by political (city/County) boundaries	Defined by hydrologic boundaries
Planning Process	Focused on reducing discharges of pollutants in urban runoff and stormwater pollution on a uniform countywide basis. Directed by DAMP/LIP in conformance with NPDES permits requirements	Focused on improving local receiving water quality where it is adversely impacted by urban runoff and stormwater pollution. Directed by NPDES permits and 303(d) list
Framework	Directed by Stormwater Program committee structure and Regional Board review. Public consultation principally through advisory groups, CEQA process and Regional Board review	Directed by municipal and public agency stakeholders. Characterized by public participation.
Assessment	Based on countywide municipal and regional cooperative investigations of stormwater and receiving water quality. Assessments are undertaken annually (LIP) and every 5 years (DAMP).	Based on information from watershed specific investigations. Assessments are undertaken on an annual basis.
Planning	Broad based approach with emphasis on well established pollution prevention and source control measures	Pollutant specific approach with emphasis on treatment controls and consideration of innovative regional solutions
Implementation	Individually by Permittees	Individually and collaboratively by Watershed Permittees and other agencies
Monitoring	Considers pollutant load reduction	Considers beneficial use attainment

Figure C-3.1: Water Quality Planning Process

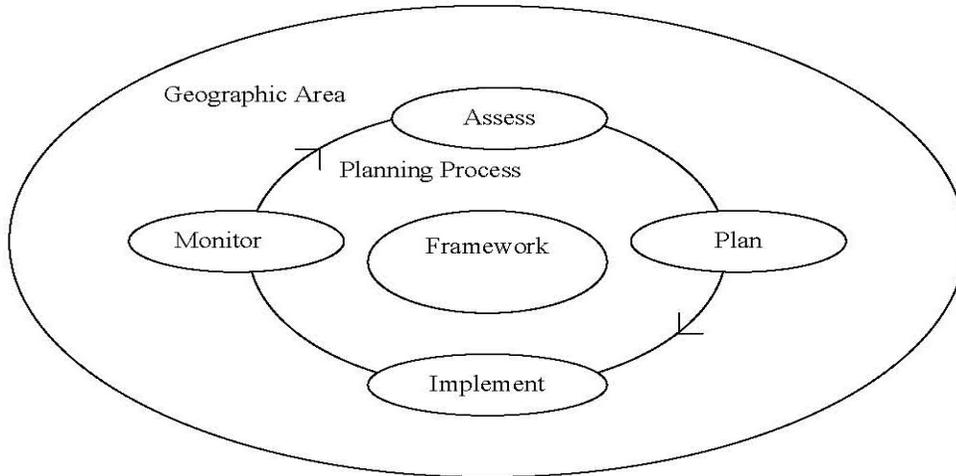


Figure C-3.2: Overview of Assessment Outcomes and Elements

Assessment Elements	Implementation Assessment	Target Audience & Pollutant Source Reduction Assessment			MS4 Discharge Effluent & Receiving Water Assessment	
	Integrated Assessment					
Outcome Levels and Types	Outcome Level 1 Storm water Program Activities	Outcome Level 2 Knowledge & Awareness	Outcome Level 3 Behavior	Outcome Level 4 Source Load Reduction	Outcome Level 5 MS4 Discharge Quality & Hydrology	Outcome Level 6 Receiving Water Conditions
	 <ul style="list-style-type: none"> ▪ Program administration ▪ Facilitation activities ▪ Feedback activities 	 <ul style="list-style-type: none"> ▪ Knowledge ▪ Awareness 	 <ul style="list-style-type: none"> ▪ Information seeking ▪ Pollution reporting ▪ Participation and involvement ▪ Administrative and procedural behaviors ▪ Implementation of control measures ▪ Regulatory compliance 	 <ul style="list-style-type: none"> ▪ Pollutant loads ▪ Reduction in runoff volumes 	 <ul style="list-style-type: none"> ▪ MS4 Discharge quality ▪ MS4 Discharge hydrology 	 <ul style="list-style-type: none"> ▪ Receiving water quality ▪ Hydromodification impacts ▪ Beneficial use protection

Source: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/effctve_assmnt.pdf