Attachment 6

Scientific and Technical Merit

San Diego Integrated Regional Water Management Grant Application

PIN 13105

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SCIENTIFIC AND TECHNICAL MERIT OF PROPOSED PROJECTS

The projects within the proposal have been developed based on sound technical analysis. The benefits claimed by the projects are well supported. This section provides details and documentation regarding the feasibility of projects from a scientific and technical standpoint. Documents supporting the scientific and technical feasibility of each project are included on a CD-ROM that is part of this attachment.

CONSERVATION PROGRAM

Work Item #1: Implementation of Integrated Landscape and Agricultural Efficiency Programs

The San Diego County Water Authority (Water Authority) has extensive experience in implementing water use efficiency (WUE) programs. Many of the programs in this project are based on existing programs while others represent innovative efforts that are based on sound feasibility studies and previous experience.

The following documents support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6.**

#	Document
1-1	Agricultural Water Management Plan
1-2	Agricultural Water Management Program Annual Report 2006-2007 (2007)
1-3	Energy Down the Drain (2004)
1-4	Refining Estimates of Water-Related Use in California (2006)
1-5	Blueprint for Water Conservation (2007)
1-6	Evaluation of the Landscape Performance Certification Program (2004)
1-7	Best Management Practices (BMP) 5 Handbook (1999)
1-8	Irrigated Vegetation Assessment in an Urban Environment (2005)
1-9	Classification of Irrigated Vegetation In the SDCWA Service Area (2005)
1-10	The Residential Runoff Reduction Study (2004)
1-11	Water Authority 2005 Urban Water Management Plan (2005)
1-12	DWR Model Water Efficient Landscape Ordinance: Section 492 (1993)
1-13	Water Conservation Maximum Applied Water Allowance Calculations (2007)

Location, Feasibility, Technical Methods and Benefits

This discussion is broken down by the programs in this proposal.

Agricultural Water Use Efficiency (WUE) Program (Audits, Assessment and Research)

- Location: Potential target agricultural sites for the agricultural WUE program are shown in **Reference (Ref.) 1-1** (Figures 2-1 and 2-2). Water Authority member agencies with agricultural customers that can participate in this program are shown in **Ref. 1-1** (p. 3) with associated crop types.
- Feasibility: Agricultural audits have proven to be feasible because over 90% of properties audited were found to possess potential opportunities for savings as discussed in **Ref. 1-2** (p. 8).
- Technical Methods: The components of agricultural audits are described in **Ref. 1-2** (pp. 4-6). Potential areas for future agricultural WUE research are contained in **Ref. 1-1** (p. 81).
- Benefits: The water savings benefits of agricultural audits are documented in **Ref. 1-2** (p. 9), which identified 839 acre feet per year (AFY) of savings potential for a set of 31 sites that were evaluated. Based on follow up re-evaluations for 6 sites, actual reductions in water requirements of 340 AFY were observed when audits had been performed and recommendations from the audits were followed. Energy savings benefits from reduction of imported water to the San Diego Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**. To estimate water savings from audits from this project, it was conservatively assumed that 250 mini-audits would achieve savings of 1 AFY each, and 125 full audits would achieve savings of 2 AFY each for a total of 1,000 AF over two years.

Web-driven Water Budget Program (Program)

- Location: The Program will deploy technology to support the issuance of water budgets by retail water agencies. Program tools will be available throughout San Diego County to all Water Authority member agencies. Initially, targeted sites will be those with dedicated meters. (**Ref. 1-5**, p. G-2).
- Feasibility: The feasibility of providing water budgets has been demonstrated by a favorable cost benefit analysis for a study in Orange County (**Ref. 1-6**, p. 50). The feasibility of offering water budgets in the region has also been demonstrated by the City of San Diego which has implemented a similar (non web-driven) program that used infrared satellite imagery and a landscape measurement tool to measure landscapes.
- Technical Methods: Program builds upon a widely accepted and established landscape water budgeting methodology, originally introduced by state (CA) legislation (AB 325) in 1992. The method for conducting water budgets is described in **Ref. 1-7** (Chapter 2). Part of developing a water budget involves being able to determine vegetation type. **Ref. 1-8** validated the use of infrared imagery for classifying vegetation. The Water Authority's Geographic Information Systems (GIS) staff and imagery classification consultant documented the methods used to classify imagery for the water budget landscape measurement tool in **Ref. 1-9**.
- Benefits: Based on a program in Orange County that targeted large landscapes with dedicated meters, potential savings for water budgets may be as high as 765 gallons per day (gpd) per dedicated irrigation meter (**Ref. 1-6**, p. 30). **Ref. 1-10 (**p. ES-6) demonstrated that irrigation water conservation also produces runoff reduction benefits. Energy savings benefits from reduction of imported water to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**. To determine the estimated water conservation savings for the water budget program for this project, it was assumed that 3,000 dedicated irrigation meters would be enrolled in the program over 5 years. Assuming that the water savings were 765 gpd per meter, this would yield a savings of 2,571 AFY for this project or a total of 12,854 AF.

Irrigation Retrofits

- Location: Irrigation hardware retrofits will be conducted based on voluntary participation throughout the Service Area at large landscape sites. Landscape conservation has been identified in the Water Authority's 2005 Urban Water Management Plan (UWMP) as a method to achieve additional savings (**Ref. 1-11**, pp. 3-3 thru 3-4). It is the largest sector of remaining conservation and is projected to produce additional savings between 2005 and 2010.
- Feasibility: The feasibility of implementing irrigation retrofits is illustrated by the estimate that most landscape sites in the San Diego Region (Region) use 50% more water than they need (**Ref. 1-5,** p. G-1). Project proponents have extensive experience implementing voluntary, incentive-based water conservation initiatives.
- Methods: The individual types of programs that comprise the retrofit program are described in **Ref. 1-5** (pp. G-2 thru G-7).
- Benefits: The benefits for implementation of irrigation retrofits and a comprehensive water conservation program are based on calculations of targeted customers achieving the Maximum Applied Water Allowance (MAWA) as described in **Ref. 1-12**. A calculation of the water conservation rate of 2.1 AFY per acre for commercial, industrial, public and multi-family residential sites and 0.06 AFY per average single family residential site (1,200 square feet) for irrigation retrofits is presented in **Ref. 1-13**. To calculate estimated conservation for commercial, industrial, public and multi-family residential irrigation retrofits for this project, an assumption of 250 1-acre sites was used with the 2.1 AFY per acre rate yielding a total savings of 525 AFY. To calculate water conservation benefits for residential irrigation retrofits, an assumption of 85 average sites (1,200 square feet) was used, yielding a savings of 5.1 AFY. A runoff reduction study (**Ref. 1-10,** p. ES-6) demonstrated that irrigation retrofits, and in particular Weather Based Irrigation Controllers (WBICs or Smart Controllers) reduce irrigation-induced runoff. The benefits of water savings and runoff reduction offered by irrigation retrofits showed an average savings of 41 gpd for residential customers, 545 gpd savings for dedicated irrigation meters, and a 50% reduction in runoff. Energy savings benefits from reduction of imported water to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**.

Data Gaps Filled by Project

Data gaps include insufficient knowledge of agricultural practices and crop makeup. This will be addressed by the Workplan through an agricultural assessment that is included in Subtask 1D.1.

Work Item #2: Irrigation Hardware Giveaway and Dry Weather Runoff Reduction Demonstration

This project is based on the City of San Diego Water Department's experience on implementing WUE projects and focuses on landscape conservation. Feasibility is established through prior similar programs.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
2-1	City of San Diego 2005 UWMP (2005)
2-2	Guidebook to Assist Water Suppliers in the Preparation of a 2005 UWMP (2005)
2-3	Revised BMP Forms (2007)
2-4	Strategic Plan for Watershed Activity Implementation (2007)
2-5	Los Angeles Department of Water and Power (LADWP) Weather-Based Irrigation Controller Pilot Study (2004)

Location, Feasibility, Technical Methods and Benefits

- Location: The location of the hardware giveaway program will be at landscaped sites throughout the City of San Diego. The rationale for focus on landscaped sites is based on projections found in the City of San Diego 2005 UWMP which call for an additional savings of 3,794 AFY to be generated from landscape conservation from 2005 to 2010 (**Ref. 2-1**, p. 2-18), which is the highest of any of the nine conservation categories listed.
- Feasibility: Commercial/residential surveys and large landscape incentive programs (such as irrigation hardware giveaways) are proven Demand Management Measures (DMMs) recognized by DWR (**Ref. 2-2**, pp. 24-29) and by the California Urban Water Conservation Council (CUWCC) (**Ref. 2-3)**. Surveys have proven feasible and effective through the existing Commercial Landscape Survey Program (CLSP), which was able to obtain the following average reductions in water use in 2005: homeowner's associations, 21%; commercial sites, 9%; and City facilities, 31% (**Ref. 2-1**, p. 2-12). Irrigation runoff reduction has been identified by the City of San Diego's Storm Water Pollution Prevention Division's implementation strategy for meeting the requirements of the Municipal Storm Water Permit (**Ref. 2-4**, p. 1-2 and Table 4-1 on p. 4-9). The ability of WBICs to produce water savings is shown in **Ref. 2-5** (pp. 17-18).
- Technical Methods: The survey portion of the irrigation hardware giveaway program will be based on the existing CLSP and on the exterior portion of the Residential Interior/Exterior Water Surveys program, both of which are described in **Ref. 2-1** (pp. 2-12 thru 2-13). A description of the information gathered and questions posed during the surveys is found in **Ref. 2-1** (Appendix G, BMP 3 and BMP 5) and **Ref. 2-3**. The hardware giveaway program is partially based on the Commercial Landscape Incentive Program (CLIP) described in **Ref. 2-1** (p. 2-16).
- Benefits: A runoff reduction study (**Ref. 1-10,** p. ES-6) demonstrated that irrigation retrofits, and in particular WBICs, reduce runoff. The benefits of water savings and runoff reduction offered by irrigation retrofits showed an average savings of 41 gpd for residential customers, 545 gpd savings for dedicated irrigation meters, and a 50% reduction in runoff. Energy savings benefits from reduction of imported water to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**.

Data Gaps Filled by Project

This project will fill an important knowledge gap, which is an understanding the relationship between the installation of smart controllers and dry weather runoff flow reductions to adjacent storm drains. This will be resolved in Task 2D of the Workplan.

Work Item #3: Over-Irrigation/Bacteria Runoff Reduction

This project is based on implementing proven methods for landscape water conservation while studying the effects of such conservation on reductions to over-irrigation and pollutant loading. The feasibility of the project is assured as the project complements existing dry weather monitoring efforts.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
3-1	San Diego Coastal Lagoons Total Maximum Daily Load (TMDL) Monitoring Workplan (2007)
3-2	City of Encinitas Dry Weather Monitoring Assessment (2006)
3-3	Carlsbad Watershed Urban Runoff Management Program (2002)
3-4	Carlsbad Watershed Urban Runoff Management Program – Annual Report (2005-06)
3-5	Carlsbad Watershed Management Plan (2002)

Location, Feasibility, Technical Methods and Benefits

- Location: The location of the project consists of eight sites that have been selected throughout the Carlsbad Watershed. These have been selected based on criteria of over watering. Six of the sites are located adjacent to the San Elijo Lagoon, which has been identified as impacted by urban runoff in **Ref. 3-1** (p. 5). The sites have also been guided by their proximity to storm drains and dry weather analytical monitoring stations (**Ref. 3-2**, p. 1)
- Feasibility: The components of the water conservation program, such as surveys and large landscape incentive programs (i.e. installation of upgraded irrigation hardware, WBISc and replacement of high water use landscaping) are proven DMMs recognized by DWR (**Ref. 2-2**, pp. 24-29) and by the CUWCC (**Ref. 2-3)**.The feasibility for this project implementation in the Carlsbad Watershed has been established in **Ref. 3-3** (p. 5-2).
- Technical Methods: The individual types of programs that comprise the irrigation retrofit program are described in **Ref. 1-5**, pp. G-2 thru G-7. A description of the information gathered and questions posed during surveys is found in **Ref. 2-1** (Appendix G, BMP 3 and BMP 5) and **Ref. 2-3**.
- Benefits: The water conservation benefits for implementation of a comprehensive water conservation program are based on calculations of targeted sites achieving the Maximum Applied Water Allowance (MAWA) as described in **Ref. 1-12**. A calculation of the water conservation rate of 2.1 AFY per acre for commercial, industrial, public and multi-family residential sites is presented in **Ref. 1-13**. The project sites total 168 irrigated acres which leads to a calculated savings of 353 AFY. WBICs have demonstrated the ability to achieve an average savings of 545 gpd (0.61 AFY) savings for dedicated irrigation meters, and a 50% reduction in runoff (**Ref. 1-10**, p. ES-6). By reducing constituents of concern that are commonly found in dry weather runoff such as bacteria, sediment, pesticides, nutrients, and trash, the project will meet high priority water quality improvement needs identified for the Carlsbad Watershed (**Ref. 3-4**, p. ES-1). Energy savings benefits from reduction of imported water to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**. Dry weather runoff reduction to storm drains will help meet TMDL requirements for San Elijo Lagoon (**Ref. 3-1**, p. 6), and will help to meet beneficial uses identified for the Lagoon (**Ref. 3-5,** p. 4-113).

Data Gaps Filled by Project

There is a data gap related to the actual load reductions that can be experienced through a reduction in over-irrigation. This project will quantify those loads in Subtask 3D.6 in the Workplan.

WATER RECYCLING PROGRAM

Work Item #4: Santee Water Reclamation Facility Expansion Project

In 2005, Padre Dam studied the feasibility of expanding the Santee Water Reclamation Facility (WRF) to meet future demand from customers and assure the long term sustainability of Santee Lakes. Padre Dam

is now studying the feasibility of expanding the WRF in two stages, from 2 mgd to 4 mgd and from 4 mgd to 10 mgd, to meet the combined demands of customers - Santee Lakes and the El Monte Valley Groundwater Recharge and River Restoration Project (Work Item # 14). Two studies have been completed to determine project feasibility.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
4-1	Final Feasibility Study for High Rating the Santee Water Reclamation Facility (2006)
4-2	Final Feasibility Study of the El Monte Valley Recharge Project (2006)
4-3	Local Investigations and Study Assistance (LISA) Study
4-4	Santee Lakes History

Location, Feasibility, Technical Methods and Benefits

- Location: Facilities will be constructed on the site of the WRF. Expansion at the WRF will relieve future wastewater capacity issues and create the opportunity to expand recycled water usage (**Ref. 4-1**, p. 3-4).
- Feasibility: The feasibility of the project has been well documented. **Ref. 4-1** examined the feasibility of expanding the Santee Water Reclamation Facility from 2 mgd to either 2.7 or 4.0 mgd. The report showed that a 4.0 mgd expansion would be financially feasible (**Ref. 4-1**, pp. 5-1 thru 5-13) with a pay back on investment as early as 9 years depending on the assumptions made for growth of the recycled water demand market along with other project variables. The study did not consider the demand from the El Monte Valley Groundwater Recharge and River Restoration Project (Work Item #14), but sale of water to that project will only increase the feasibility of WRF expansion. **Ref. 4-2** examined the feasibility of recharging the El Monte Valley ground water basin utilizing advance treated recycled water. The WRF was identified as the most plausible facility to provide the 5,000 ac-ft/yr (4.5 mgd) of recycled water for the project (**Ref. 4-2**, p. 7-1).
- Methods: The modifications and additions necessary to expand the WRF to 4.0 mgd are summarized in **Ref. 4-1** (p. ES-4). Detailed discussion of the necessary components is found in **Ref. 4-1** (pp. 4-52 thru 4-61). A membrane bioreactor alternative is being explored as a part of a LISA study (**Ref. 4-3**).
- Benefits: By implementing the expansion described in **Ref. 4-1**, the full benefits of 4 mgd tertiary treatment capacity will be realized. Energy savings benefits from reduction of imported water (by replacement with recycled water) to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**. The potential benefit of reduced flows to the City of San Diego's wastewater treatment system and subsequent ocean discharge is shown in **Ref. 4-1** (p. 2-2). **Ref 4-4** provides information on the value of the Santee Lakes as a recreational resource dependent on recycled water.

Data Gaps Filled by Project

There are no data gaps existing in this project.

Work Item #5: Recycled Water Retrofit Assistance Program

The need for recycled water retrofits is well documented in numerous recycled water master plans in the Region. The Water Authority has conducted outreach to member agencies to identify potential sites for retrofits in proximity to existing distribution lines. This project is feasible as many customers have already indicated the willingness to retrofit if some financial assistance is made possible, and member agencies are experienced in installation of retrofits to meet Department of Public Health standards.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
5-1	City of San Diego Water Reuse Study (2006)

5-2	Santa Fe Irrigation District Recycled Water Master Plan (2005)
5-3	City of San Diego Water Reclamation Master Plan (2000)
5-4	San Elijo JPA Water Reclamation Retrofit Loan Program
5-5	Rincon del Diablo MWD Reclaimed Water Retrofit Study (1993)
5-6	Carlsbad MWD Recycled Water Retrofit New Retrofit Site Procedures and Checklist
5-7	Potential Recycled Water Customer Retrofit Analysis (2007)
5-8	Evaluation of Agricultural Irrigation Projects Using Reclaimed Water (1981)

Location, Feasibility, Technical Methods and Benefits

- Location: Many of the potential sites for the project are contained in the member agency recycled water master plans. **Ref. 5-1** (p. 5-3) describes a list of 300 potential retrofit sites in the City of San Diego located within a quarter mile of existing recycled water lines and **Ref. 5-2** (pp. 4-9 thru 4-13) shows potential sites in the Santa Fe Irrigation District service area.
- Feasibility: A discussion of the feasibility of recycled water retrofits is discussed in **Ref. 5-3** (p. 1-18). The feasibility of providing grant funds for retrofits is documented in **Ref. 5-4** and **Ref. 5-5**. A list of retrofit customers in the City of San Diego and their status is provided in **Ref. 5-3** (pp. 1-15 thru 1-17).
- Technical Methods: The methods for implementing retrofits are discussed in **Ref. 5-2** (pp. 4-7 thru 4-8**)** and **Ref. 5-3** (p. 1-19). A representative checklist of required procedures and actions for implementing recycled water retrofits and subsequent delivery is found in **Ref. 5-6.**
- Benefits: The benefits of the project are 2,000 AFY of additional recycled water use. This was determined on an average of 40 sites at 50 AFY. The actual amount of recycled water delivered per retrofitted site will vary. A listing of verified potential customers that have retrofit needs is provided in **Ref. 5-7**. Energy savings benefits from reduction of imported water (by replacement with recycled water) to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**. The potential benefit of reduced flows to the City of San Diego's wastewater treatment system and subsequent ocean discharge is shown in **Ref. 5-3** (pp. 1-4 thru 1-5). Benefits from the reduced need for fertilizer application are documented in **Ref. 5-8**.

Data Gaps Filled by Project

Additional market analysis is needed to expand the potential customer base for the program. This will be conducted as part of Workplan Subtask 5C.1.

Work Item #6: City of San Diego Recycled Water Distribution System Expansion, Parklands Retrofit and Indirect Potable Reuse / Reservoir Augmentation Project

The feasibility for these projects is documented in the City of San Diego recycled water master plans from 2000 and 2005 and the Water Reuse Study from March, 2006. These documents show different alternatives the City could implement to maximize the use of recycled water. The City of San Diego's recycled water expansion and parklands retrofit projects are the most cost effective projects to proceed with at this time. To date, 13,000 miles of recycled water pipelines have been laid in the ground as recommended in the Recycled Water Updated Master Plan 2000.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
6-1	City of San Diego Water Reuse Study Master Plan Update (2005)
6-2	Book 2 Facility Design Guidelines (1999)
6-3	Book 7 Recycled Water Systems Guidance (2002)

Location, Feasibility, Technical Methods

- Location: The location of the area for recycled water use is shown in **Ref. 5-3** (pp 1-1 thru 1-3). Expansion of the recycled water system in the Northern Service Area that will occur in this project is

discussed in **Ref. 6-1** (pp. 1-4 thru 1-7). The locations of the customer sites to be served by this project are listed in **Ref. 6-1** (pp. 3-24 thru 3-54).

- Feasibility: The feasibility of recycled water retrofits is described in **Ref. 5-3** (p. 1-18). The feasibility of constructing the expanded distribution system is shown in **Ref. 5-3** (pp. 3-21 thru 3-23) and in **Ref. 6-1** (pp. 4-3 thru 4-5). A list of retrofit customers in the City of San Diego and their status is provided in **Ref. 5-3** (pp. 1-15 thru 1-17). The feasibility of the IPR / RA project is shown in **Ref. 5-1** (Section 6).
- Technical Methods: The methods that will be utilized to construct the distribution expansion and recycled water retrofits are discussed in **Ref. 6-2** (pp. 3-27 thru 3-28) and **Ref. 6-3** (pp. 5-1 thru 5-10). The methods for implementing retrofits are discussed in **Ref. 5-2** (pp. 4-7 thru 4-8) and **Ref. 5-3** (p. 1-19). A representative checklist of required procedures and actions for implementing recycled water retrofits and subsequent delivery is found in **Ref. 5-6.**
- Benefits: The recycled demands served by this project are discussed in **Ref. 5-3** (p. 3-7) and **Ref. 5-1**. The potential benefit of reduced flows to the City of San Diego's wastewater treatment system and subsequent ocean discharge is shown in **Ref. 5-3** (pp. 1-4 thru 1-5). Benefits from the reduced need for fertilizer application are documented in **Ref. 5-8**. Energy savings benefits from reduction of imported water (by replacement with recycled water) to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**.

Data Gaps Filled by Project

There are no data gaps existing in this project.

LOCAL SUPPLY PROTECTION AND DEVELOPMENT

Work Item #7: San Vicente Reservoir Source Water Protection through Watershed Property Acquisition and Restoration

This project is feasible as the City of San Diego has a history of acquiring land to provide important buffers from development to preserve the quality of its drinking water sources. In two projects similar to this one, the San Diego Water Department (SDWD) has acted to acquire land adjacent to its reservoirs for the purpose of source water protection and to protect other natural resource values. In 1999 the SDWD acquired Eichenlaub Ranch, a 1340 acre cattle ranch adjacent to Barrett Reservoir. The ranch property had been slated for development as a golf course and resort; the acquisition by the SDWD permanently protected the property. In 2006 the SDWD worked cooperatively with the San Dieguito River Valley Conservancy to acquire the Sutherland East property adjacent to Sutherland Reservoir.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
7-1	2005 Watershed Sanitary Survey Update (2006)
7-2	Drinking Water Source Assessment and Protection (DWSAP) Program (1999)
7-3	Protecting the Source: Land Conservation and the Future of America's Drinking Water (2004)
7-4	San Diego River Watershed Management Plan (2005)
7-5	The Multiple Species Conservation Program (MSCP)
7-6	City of San Diego MSCP Sub Area Plan (1997)

Location, Feasibility, Technical Methods and Benefits

- Location: **Ref. 7-1** (Volume 2, pp. 26-29) identified the threats to drinking water at the San Vicente Reservoir. The location of the parcels that will be purchased will be guided by the objective to complete a 1,000 foot buffer zone around the reservoir. This buffer zone was determined in consultation with **Ref. 7-2** (pp. 43-44), which provides a discussion on how source water protection zones around surface reservoirs can be determined. **Reference 7-4** (pp. 39-42, 44-45)**,** specifically identified protection of surface water reservoirs in the San Diego Watershed as an important priority.

- Feasibility: This project is feasible as **Ref. 7-1** (Volume 1, p. 12) identifies "non-point source pollution from residential and commercial development" as a significant potential source of contaminants to the reservoirs. **Ref. 7-3** (pp. 21-25) describes land conservation as a feasible method to protect drinking water sources and discusses the concept of a multi-barrier approach (pp. 25-57). A number of successful case studies are also presented.
- Technical Methods: **Ref. 7-1** (p. 15) provides recommendations for specific watershed management and control practices, including the recommendation to "formulate a watershed land strategy to acquire parcels, conservation easements, or development rights for lands proximal to the source waters that, if preserved, would protect water quality". **Ref. 7-3** explores scientific, economic, and public health rationales for using land conservation for drinking water protection. It also presents best practices for successful implementation locally (pp. 30-44).
- Benefits: **Ref. 7.4** (p. 59-61) discusses the benefits of maintaining pervious surfaces. **Ref. 7-5** and **Ref. 7-6** (pp. 41-42) discuss the critical habitat and species that would be protected by acquisition and preservation of the land.

Data Gaps Filled by Project

The main piece of information missing is an appraisal, which will be the first activity that will be conducted as part of Workplan Subtask 7B.4. This appraisal will be the basis of the offer to the seller.

Work Item #8: El Capitan Reservoir Watershed Acquisition and Restoration Program

This project is feasible because the San Diego River Park Foundation (Foundation) is active in land acquisition activities. Project targets have been selected based upon an existing land acquisition strategy. The Foundation is currently involved directly with land transactions of more than 300 acres and has in the past year completed transactions of over 200 acres within the El Capitan Reservoir watershed.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
8-1	San Diego River Conservancy Five Year Strategic and Infrastructure Plan 2006-2011

Location, Feasibility, Technical Methods

- Location: **Ref. 7-1** (Volume 2, pp. 22-25) identified the threats to drinking water at the El Capitan Reservoir. The location of the parcels that will be purchased will be guided by the objective to complete a 1,000 foot buffer zone around the reservoir. This buffer zone was determined in consultation with **Ref. 7-2** (pp. 43-44), which provides a discussion on how source water protection zones around surface reservoirs can be determined. **Ref. 7-4** (pp. 39-42, 44-45)**,** specifically identified protection of surface water reservoirs in the San Diego Watershed as an important priority.
- Feasibility: **Ref. 7-1** (Volume 1, p. 12) identifies "non-point source pollution from residential and commercial development" as a significant potential source of contaminants to the reservoirs. **Ref. 7-3** (pp. 21-25) describes land conservation as a feasible method to protect drinking water sources and discusses the concept of a multi-barrier approach (pp. 25-57). A number of successful case studies are presented.
- Technical Methods: **Ref. 7-1** (p. 15) provides recommendations for specific watershed management and control practices, including the recommendation to "formulate a watershed land strategy to acquire parcels, conservation easements, or development rights for lands proximal to the source waters that, if preserved, would protect water quality." **Ref. 7-3** explores scientific, economic, and public health rationales for using land conservation for drinking water protection. It also presents best practices for successful implementation locally (pp. 30-44), including the use of maps and models.
- Benefits: **Ref. 7.4** (p. 59-61) discusses the benefits of maintaining pervious surfaces. **Ref. 7-5** and **Ref. 7-6** (pp. 41-42) discuss the critical habitat and species that would be protected by acquisition and preservation of the land. The recreational benefits that would be preserved include potential trail opportunities described in **Ref. 8-1** (pp. 18-19).

Data Gaps Filled by Project

Currently, an appraisal is needed to establish the fair market value of the property. This will be accomplished in the Workplan as Subtask 8B.2.

Work Item #9: Northern San Diego County Invasive Non-Native Species Control Program

The project is feasible as Mission Resources Conservation District (MRCD) has extensive experience implementing invasives removal projects in the hydrologic units that are the focus of this project. Extensive research has been conducted to verify the benefits of exotics removal which include riparian habitat preservation; minimization of erosion, sedimentation and hydromodification; flood protection; and improvements in stormwater management and water quality.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
9-1	Draft San Pasqual Groundwater Management Plan (2007)
9-2	San Dieguito Watershed Management Plan (2006)
9-3	San Luis Rey Watershed Management Guide (2000)
9-4	Three County (San Diego, Riverside, & Orange County) Mapping and Education Brochure Project (2007)
9-5	Hydrogeologic Feasibility Certification (2005)
9-6	Project Feasibility Certifications (2005)
9-7	Upper San Luis Rey Watershed Arundo Control and Riparian Habitat Restoration (2006)
9-8	The Impact of Arundo Donax on Water Resources (1994)
9-9	Fire Threat from Arundo Donax (1994)
9-10	Other Invasive Non-Native Plants in California's Wildlands and Natural Areas (1994)
9-11	The impact of Arundo donax on flood control and endangered species (1994)

Location, Feasibility, Technical Methods

- Location: Invasives removal is listed as a primary goal in management of the San Pasqual Groundwater Basin, potential locations within the basin are discussed and shown in **Ref. 9-1** (p. 2-42 & Appendix F). Invasives removal is also listed in the action plan for the San Dieguito Watershed (**Ref. 9-2**, pp. 4-153 thru 4-159), and is discussed as an important issue for the San Luis Rey Watershed (**Ref. 9-3**, pp. 24-27). Extensive mapping of the invasives in the North County has been conducted as documented in **Ref. 9-4** (pp. 1-6, maps on pp. 14-20). **Ref. 9-4** (p. 5) also identified the San Luis Rey and Santa Margarita watersheds as ones with the most Arundo donax (Arundo) acreage and the largest most developed stands (> 30 acres) and thus of high priorities for removal.
- Feasibility: **Ref. 9-5** provides certification that the hydrogeological and geological properties adequately support the project. **Ref. 9-6** provides certification that the project can be implemented and operated to accomplish the purpose for which it is planned. This included a review by biologists with extensive wetlands restoration, invasive plant control and project management.
- Technical Methods: The technical methods that will be used to implement the project are well established. **Ref. 9-7** (pp. 4-5) provides a detailed description of Arundo removal methods and native plant restoration. Confirmation of the efficacy of the Arundo removal process and survival rates of replanted natives is found in **Ref. 9-7** (p. 6).
- Benefits: The benefits of invasives removal are well established. The high water uptake of Arundo is documented in **Ref. 9-8** (pg. 19-20) which establishes the uptake at 5.62 acre-feet per acre (AF/acre) of Arundo. When compared to a water uptake estimation for riparian habitat (assumes a mixture of woodland, scrub, herbaceous and open substrate) of 0.975 AF/acre, this translates to a water savings of 4.645 AF/acre if the Arundo removed and replaced (**Ref. 9-7**, p. 7). The benefit of decreased fire

risk from Arundo removal is discussed in **Ref. 9-9** (pp. 17-18). Removal of other non-native species by this project will provide documented benefits. Tamarisk is ahigh water consumption invasive targeted in this project that can reach deep into the groundwater table (**Ref. 9-10,** p. 62). Removal of Pampas Grass (Cortaderia Selloana), will prevent from significant changes in the native habitat (**Ref. 9-10**, p. 63). Energy savings benefits from reduction of imported water demand are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**.

Data Gaps Filled by Project

There are no data gaps existing in this project.

Work Item #10: Santa Margarita Conjunctive Use Project

The Santa Margarita Conjunctive Use project has been in development for a number of years. An initial conjunctive use feasibility study was completed in 1994. The feasibility of the proposed conjunctive use operations have been supported by detailed groundwater modeling studies which have explored a number of system variables and have considered a 50 year hydrologic planning scenario. A United States Bureau of Reclamation (USBR) pre-feasibility study has been completed.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
10-1	Permit 15000 – Fallbrook Public Utilities District Feasibility Assessment (2002)
10-2	USBR Pre-Feasibility Formulation Study (2005)
10-3	Conjunctive Use Study – Lower Santa Margarita River Basin (1994)
10-4	Santa Margarita River Conjunctive Use Project Technical Memorandum (TM) No. 1 (2007)
10-5	Santa Margarita River Conjunctive Use Project TM No. 2.2 (2007)
10-6	Santa Margarita River Conjunctive Use Project TM No. 3.0 (2007)
10-7	Obermeyer Gate Diversion Structure Information Packet (2003)

Location, Feasibility, Technical Methods

- Location: The project involves replacement of an existing sheet-pile diversion weir on the Santa Margarita River with an Obermeyer dam. The location for the existing weir was selected due to its proximity to a suitable recharge area that currently hosts five percoloation ponds. The project components of Obermeyer dam construction, widening of O'Neill Ditch and construction of new recharge ponds were developed in **Ref. 10-1** (pp. 2-9 thru 2-16). Other locations and facilities were considered as other project alternatives but were dropped from consideration due to economic or environmental constraints (**Ref. 10-1**, p. 2-12). Advanced treatment improvements will occur at the current Haybarn Water Treatment Plant (**Ref. 10-2**, p. 95). The locations of other proposed project facilities are found in **Ref. 10-2** (bi-directional product transmission conveyance pipelines and associated pump stations, p. 27; brineline, pp. 33-35).

- Feasibility: An initial study in 1994 (**Ref. 10-3**) investigated the feasibility of conjunctive use and laid the groundwork for future project development. Obtaining optimal conjunctive use of the groundwater basin was a primary driver of selection and design of the project components. A series of technical memorandums (**Refs. 10-4, 10-5, and 10-6**) were prepared that documented extensive studies, groundwater modeling and water quality evaluation to determine the project alternatives that offer the best potential conjunctive use yields. **Ref. 10-4** described the hydrology and hydrogeology of the Santa Margarita River and addressed historical flow variation in terms of total water supply and availability for diversion. Four hydrologic conditions (**Ref. 10-4**, p. 23) were established to statistically describe both the annual surface water flow at the point of diversion and the maximum potential diversion. Nine recommendations were made (**Ref. 10-4**, p. 24) to guide subsequent modeling work and determine the optimal yield available from conjunctive use. To refine previous estimates of groundwater yield, extensive hydrologic and hydrogeologic field investigations were initiated and completed in 2005. Following development of a projected future 50-year hydrologic cycle, surface and

groundwater withdrawals were optimized using a groundwater model. **Ref. 10-5** presents the conclusions of this model, which includes estimates of project yield, maximum potential diversion, and exceedence interval for each hydrologic condition. Twelve model runs were completed. **Ref. 10-2** is a pre-feasibility study that utilized the modeling results to develop a set of conceptual alternatives that form the basis of the current project. The project will be developed further in the pending Engineering Feasibility Study described in Work Plan item Subtask 10C.1.

- Technical Methods: The proposed Obermeyer dam is described in **Ref. 10-7**. The recharge capacity of the percolation ponds is described in **Ref. 10-1** (pp. 2-8 thru 2-9) and a description of the Lower Santa Margarita River groundwater basins, hydrogeologic characteristics and storage capacities is found in **Ref. 10-3** (pp 2-23 thru 2-29). The proposed facilities and processes for advanced treatment at Haybarn Water Treatment Plant are detailed in **Ref. 10-1** (pp. 95-101). The proposed operational methods of the project components are described in **Ref. 10-2**: Obermeyer diversion structure, O'Neill ditch and headgate improvements, and recharge pond improvements (p. 25); advanced water treatment (p. 26); product conveyance pipeline (p. 27); and brineline to ocean (p. 33).
- Benefits: The conceptual alternative (Concept 1) that forms the basis for this project will provide a median year yield of 14,100 AFY (**Ref. 10-2,** p. xviii) which represents an additional 6,800 AFY of supply available over the 7,300 AFY of average groundwater pumping that occurs in the Baseline scenario for the 50 year simulated period (**Ref. 10-5,** Volume 1, Table 2, p. 10). The open space management zone that will be set aside to provide 1,383 acres of open space is described in **Ref. 10-2** (p. 105). Energy savings benefits from reduction of imported water to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**.

Data Gaps Filled by Project

There are gaps in the information about the sensitive habitat and species within the 1,380 acres of habitat that will be preserved as part of the project. This data gap will be addressed as part of the Environmental Impact Studies / Environmental Impact Review (EIS/EIR) which is included in Workplan Subtask 10C.1.

Work Item #11: Carlsbad Desalination Project Local Conveyance Project

To determine feasibility of the desalination plant, a comprehensive 5-year pilot testing program was implemented at the Carlsbad seawater desalination demonstration plant. This pilot plant allowed the confirmation of feasibility of all treatment technologies proposed for the full-scale project, including micro-screens, ultrafiltration membranes for seawater pretreatment, and reverses osmosis. Feasibility for this project was confirmed by testing of post-treatment and disinfection chemicals and technologies for protection of the pipeline and water distribution system from corrosion, nitrification and water quality deterioration. A corrosion control study confirmed the feasibility of distributing desalinated water in the proposed pipeline conveyance system and the existing water supply system and compliance with applicable water quality regulations.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
11-1	Delivery System Technical Studies a. Recommended Route for Off-Site Desalination Water Delivery (2005) b. Alternative Pipeline Alignment Aerial Survey, Underground Utility Survey and Mapping **(**Note: This document is located on Disc 2 in Appendix 3-11) c. Transient Analysis of Alternative Alignments for the Carlsbad Desalination Project (2004) d. Structural Analysis of Marcarlo Bridge Crossing Alternatives
11-2	City of Carlsbad Environmental Impact Report for the Precise Development Plan and Desalination Plant EIR 03-05 and Technical Appendices (2005)
11-3	Carlsbad Desalination Project (2001)
11-4	Water Purchase Agreement between the Carlsbad Municipal Water District and Poseidon Resources (2004)
11-5	Public Opinion Survey Results Letter to Coastal Commission (2007)

#	Document
11-6	Restoration and Enhancement Plans a. Carlsbad Desalination Project Climate Action Plan (2007) b. Carlsbad Desalination Project Coastal Habitat Restoration and Enhancement Plan
11-7	Poseiden Resources Corporation Corrosion Pilot Study (2006)
11-8	State Lands Commission Calendar Item 48 -- Amendment of Lease (2007)
11-9	Salinity Tolerance Investigations: A Supplemental Report for the Carlsbad, CA. Desalination Project (2005)

Location, Feasibility, Technical Methods

- Location: The recommended route for the conveyance infrastructure was developed in **Ref. 11-1a**. The report described three potential alignments (**Ref. 11-1a**, pp. 3-4) which are combinations of the two main alignments and sub-alignments described in **Ref. 11-2** (pp. 3-27 thru 3-28) and depicted in **Ref. 11-2** (Figure 3-5).

- Feasibility: **Ref. 11-3** is a feasibility study that summarizes the studies and efforts undertaken to assess the viability of locating a desalination project in the City of Carlsbad and the public acceptance of desalination. It discusses the need and potential markets for a local/regional seawater desalination project and associated water delivery system (pp. 2-1 thru 2-6); identifies the costs and benefits of the project (pp. 7-18 thru 7-29); presents the commercial and institutional framework for design (pp. 8-1 thru 8-5), construction and operation of the project (pp. 5-1 thru 5-19); and outlines an implementation plan (pp. 1-20 thru 1-23). **Ref. 11-4** is an example of one of nine purchase agreements between Poseidon and the public agency purchasers of the plant output that establishes the fiscal feasibility of the project. This agreement establishes the rights and obligations of the parties, including the Carlsbad Municipal Water District's right to purchase water from the project and the understanding that the District's contract capacity (**Ref. 11-4,** p. 1) will be appropriated to public use. The project has also been identified as a critical component of the Water Authority's supply mix that is needed beginning in the year 2011 (**Ref. 1-11**, p. 4-6). The environmental feasibility of the project is confirmed in **Ref. 11-2**. The project is also feasible from a public support standpoint as 82% of residents were found to support seawater desalination in a recent poll (**Ref. 11-5**). The desalination plant is also progressive from a global warming standpoint as it is the first major infrastructure project in the state to voluntarily commit to carbon neutrality by a wide range of efforts that are documented in **Ref. 11-6a**. A corrosion pilot study was conducted and concluded that proposed introduction of conditioned desalinated seawater supply is not likely to trigger new corrosion problems in the Carlsbad distribution system (**Ref. 11-7**, p. 10). To allow the continued use and maintenance of existing intake and outfall structures for desalination purposes, the State Lands Commission recommended amendment of existing lease (**Ref. 11-8**) for the Encina Power Station. **Ref. 11-9** evaluated the effect of the concentrated seawater generated during the desalination process on the aquatic life inhabiting the area of the discharge and showed that the proposed discharge configuration is feasible and would not have adverse effects.

- Technical Methods: **Ref. 11-1 a - d** discuss the methods that will be used to construct the pipeline infrastructure, which will include trenchless construction techniques such as micro-tunneling and auger-bore, surge control facilities, structural engineering of bridge crossing, utilities survey and construction cost estimates. The desalination plant facilities and treatment processes are discussed in **Ref. 11-3** (pp. 4-1 thru 4-22).

- Benefits: The project water supply benefits of 56,000 AFY for a 50 mgd plant are summarized in **Ref. 11-3** (p. 7-4). Other benefits that are also discussed are improved water supply reliability of 90%, water quality improvements of a 21% reduction in TDS, avoided infrastructure costs, and price stability. **Ref. 11-6a** describes energy efficiency and carbon emission reductions actions in the form of the seven elements of Poseidon's Climate Action Plan that will reduce the Project's net carbon emissions to zero over the life of the project. Poseidon's Coastal Habitat Restoration and Enhancement Plan contains provisions for the restoration of 37 acres of wetlands (**Ref. 11-6b**, pp. 4-8). The project would have a beneficial impact on the sedimentation problem in Agua Hedionda Lagoon by ensuring the lagoon inlet remains open and tidal exchange is unobstructed. The impact of

restricted lagoon inlets is discussed in **Ref. 3-1** (p. 5). Energy savings benefits from reduction of imported water to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**.

Data Gaps Filled by Project

In order to proceed with design and construction, additional information is needed on topography, soil and groundwater conditions, underground utilities, and the presence of endangered species along the potential pipeline routes. Each of these data gaps will be addressed by subtasks in the Workplan, which include aerial survey and mapping (subtask 11C.1), geotechnical survey (subtask 11C.2), underground utility survey (subtask 11C.3) and a preconstruction biological survey (subtask 11E.1).

Work Item #12: San Diego Region Four Reservoir Intertie Project Conceptual Design

The feasibility of this project is supported by studies of a potential San Diego Region – Four Reservoir Intertie system that go back to the early 1990s. A reconnaissance study in 2004 reviewed and updated the description of facilities identified in a 1993 report and defined a project integrated with Water Authority and South County water agencies' planning efforts. This project will advance the studies through a conceptual design of the San Diego Region Four Reservoir Intertie project.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
12-1	San Diego County Water Supply Study, Reconnaissance Report (1993)
12-2	Sweetwater Authority, South County Pumped Storage Regional Reconnaissance Study Update (2004)
12-3	Fact Sheet #1: San Diego Region – Four Reservoir Intertie Project (2007)

Location, Feasibility, Technical Methods

- Location: The four reservoirs were originally identified for improved storage planning by the Sweetwater Authority, Helix Water District, Otay Water District, Padre Dam Municipal Water District and the City of San Diego in consultation with the United States Army Corps of Engineers as described in **Ref. 12-1** (p. C-5).
- Feasibility: **Ref. 12-1** determined that an earlier version of the Four Reservoir Intertie system was the most cost-effective means of producing water in excess of 10,000 acre-feet annually and best met other evaluation criteria. **Ref. 12-2** reviewed and updated the description of facilities (**Ref. 12-2**, Section 2) identified in the **Ref. 12-1** and defined a project integrated with the current Water Authority and South County water agencies' planning efforts. The emphasis was on identifying realistic alignments for pipelines and providing preliminary sizing and construction cost estimates (**Ref. 12-2**, Appendices).
- Technical Methods: The methods that will be used in this conceptual design will consist of evaluation of facilities, obtaining supply and demand estimates, and alternatives and cost benefit analysis (**Ref. 12-3,** p. 1).
- Benefits: The benefits that this project would lay the groundwork for achieving are described in **Ref. 12-3** (pp. 2-3). Potential benefits include 100,000 AFY of additional storage capacity.

Data Gaps Filled by Project

There are no data gaps existing in this project.

Work Item #13: South San Diego County Water Supply Strategy

Long-term studies of the San Diego Formation (SDF) began in 2001, and completed component studies have provided important information regarding depth-dependent flow rate and water quality data. The information also includes water quality sampling, development of a GIS database, presentation of data on

a website, literature review, analysis of satellite imaging data, aquifer tests, and completion of three multi-depth monitoring wells.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
13-1	Hydrogeology of the San Diego Area, proposed extension FY07-10 (2007)
13-2	Sweetwater Authority Interim Groundwater Management Plan (2001)
13-3	Determining Age and Vertical Contribution of Ground Water Pumped from Wells in a Small Coastal River Basin (2005)
13-4	California Well Standards: Bulletin 74-90 (1991)

Location, Feasibility, Technical Methods

- Location: **Ref. 13-1** describes the Implementation Study, initiated in 2001, of the coastal groundwater resources in the San Diego area. The objectives of the study are to develop an integrated, comprehensive understanding of the geology and hydrology of the San Diego area, focusing on the SDF. A specific description of the SDF is given in **Ref. 13-1** (p. 1). This project will address the paucity of data that has been cited for the SDF (**Ref. 13-1**, p. 4).
- Feasibility: Sweetwater Authority is committed to working together with the United States Geologic Survey (USGS) on the Implementation Study (**Ref. 13-2**, p. 2). **Ref. 13-2** also directs staff to continue performing groundwater management activities so that static groundwater levels do not decline over the long term. The feasibility of the groundwater sampling methods to determine the source of groundwater is discussed in **Ref. 13-3**.
- Technical Methods: The approach for Phase III of the hydrogeologic study that comprises this project is shown in **Ref. 13-1** (pp. 6-7). **Ref. 13-3** (p. 2) discusses the methods of were used in Phase I to determine the vertical distribution of water extracted from supply wells are presented (**Ref. 13-3**, p. 4). Well standards that will be followed are found in Ref. **13-4**.
- Benefits: The actual yield of the SDF is not yet known. Reliable assessments estimate that the SDF holds upward of 1,000,000 AF of water, but a more precise measurement is needed. The benefit of implementing Phase III of the USGS SDF Implementation Study through this project is to provide further understanding of how to expand use of the SDF for sustainable water extraction and potential in-lieu conjunctive use (**Ref. 13-1**, p. 2). Continued assessment of the SDF through appropriate placement of groundwater monitoring wells is necessary to determine sustainable production quantities. Energy savings benefits from reduction of imported water (by increase in available yield from the SDF) to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**.

Data Gaps Filled by Project

This project will fill important gaps in hydrogeologic information and understanding about the SDF that prevent a full understanding of the potential of this local resource. Workplan items listed under Task 15C will involve collecting groundwater samples, conducting an aquifer test, installing two monitoring wells and developing a groundwater flow model that will make significant contributions to closing the data gap.

Work Item #14: El Monte Valley Groundwater Recharge and River Restoration Project, Phases 1 and 2

Two feasibility studies have been prepared to determine that this project is feasible. In addition, the El Capitan Golf Club has proposed to convert its Golf Course Project into the El Monte Valley Recharge and River Restoration Project, and has submitted an application for a Major Use Permit from the County of San Diego. A second phase feasibility study is in progress and includes additional groundwater modeling, a pilot study, geotechnical investigation, and preparation of a Draft Groundwater Management Plan.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
14-1	Final Feasibility Study of the El Monte Valley Recharge Project (2006)
14-2	Final TM – Investigation of Use of Raw Water for Habitat Restoration (2006)
14-3	Restoration Plan for El Monte Valley Nature Park Restoration Park (2007)
14-4	San Diego River Restoration and Recharge Project Fact Sheet

Location, Feasibility, Technical Methods

- Location: The locations of the groundwater spreading basins and extraction wells were established through extensive groundwater modeling as documented in **Ref. 14-1** (pp. 4-1 thru 4-14). The location of potential pipeline alignments is determined in **Ref. 14-1** (pp. 6-1 thru 6-9).
- Feasibility: The feasibility of recharging the El Monte Basin was established in **Ref. 14-1** (4-1 thru 4-14 and 6-1 thru 6-8)**. Ref. 14-2** confirmed the feasibility of recharging raw water for habitat restoration, should that become necessary as an interim measure.
- Technical Methods: Methods for pipeline construction are discussed in **Ref. 14-1** (pp. 6-6 thru 6-8). This includes dealing with difficult construction issues such as utility crossings, road crossings, river crossings, drainage canal crossings, bridge crossings, and areas with steep slope/cross-slope. The implementation plan for habitat restoration and monitoring is contained in **Ref. 14-3** (pp. 26-35).
- Benefits: The water supply yield available from groundwater recharge is discussed in **Ref. 14-1** (4-1 thru 4-14). The habitat restoration benefits are discussed in **Ref. 14-3** (p. 11-25). The potential benefit of reduced flows to the City of San Diego's wastewater treatment system and subsequent ocean discharge is shown in **Ref. 4-1** (p. 2-2). A summary of project benefits is found in **Ref. 14-4**. Energy savings benefits from reduction of imported water (by replacement with recycled water) to the Region are described in **Ref. 1-3** (pp. 28-36) and **Appendix B of Ref. 1-4**. The recreational benefits that would be preserved include potential trail opportunities described in **Ref. 8-1** (pp. 19-25).

Data Gaps Filled by Project

Helix Water District is currently completing the second phase of the Feasibility Study that includes additional groundwater modeling, a pilot study, geotechnical work, and a Groundwater Management Plan. This work is scheduled to be completed by June 2008 with a final report in October 2008.

EDUCATION AND OUTREACH PROGRAM

Work Item #15: San Diego Regional Pollution Prevention

This project is feasible given that Coastkeeper has extensive debris cleanup and water quality monitoring experience in the Region and has successfully conducted a citizen monitoring program for the past 6 years.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
15-1	Coastkeeper Monitoring Sites List (2007)
15-2	Water Quality Control Plan for the San Diego Basin (9) (1994)
15-3	San Diego Bay Watershed Urban Runoff Management Program Document (2003)
15-4	Citizen Watershed Monitoring Program: Six Years of Volunteer Engagement and Scientifically Sound Data Collection (2007)
15-5	The La Jolla Shores Coastal Watershed Monitoring Plan Draft Report (2007)

Location, Feasibility, Technical Methods

- Location: A list of the monitoring sites in the project is shown in **Ref. 15-1.** Cleanup sites have not yet been scheduled for the July 2008 – June 2010 period. The monitoring sites for the project will be guided by the monitoring needs expressed in **Ref. 15-2** (pp. 6-1 thru 6-11). Future monitoring

recommendations that guide the monitoring location in this project for the San Diego Bay Watershed are found in **Ref. 15-3** (pp. 43-45). Other references that support the selection of monitoring locations for this project include **Ref. 3-5** and **Ref. 7-4**.

- Feasibility: The citizen monitoring program is well established and the feasibility of this project is documented in **Ref. 15-4**.
- Technical Methods: The monitoring methods used in this project are described in **Ref. 15-2** (pp. 6-1 thru 6-11).
- Benefits: The benefits of this project are listed in **Ref. 15-4.** The project will also help to reduce impacts to the La Jolla Shores Area of Special Biological Significance (**Ref. 15-5**, p. 14-16).

Data Gaps Filled by Project

This project will serve to fill data gaps in water quality in Subtask 15C.1 activities.

Work Item #16: Biofiltration Wetland Creation and Education Program

Feasibility of this project was determined in the Wild Animal Park's Water Master Plan. This planning document projects future water demands, identifies potential water sources, identifies alternative water sources, identifies methods to decrease water consumption, incorporates water features into proposed park attractions, and offers solutions to improve water quality of existing water features.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
16-1	San Diego Wild Animal Park's Draft Water Master Plan (2006)
16-2	San Diego Wild Animal Park Water Treatment Options Using Natural Systems (2006)
16-3	Alternative Approaches to Stormwater Control (2004)

Location, Feasibility, Technical Methods

- Location: The project was selected according to a set of criteria established in **Ref. 16-1** (p. 5-1). A description of the feasibility of the project location is found in **Ref. 16-1** (pp. 5-16 thru 5-19).
- Feasibility: The feasibility of constructed wetlands in improving water quality through natural treatment is well established (**Ref. 16-2**, pp. 11-12).
- Technical Methods: The use of constructed wetlands to improve water quality and the specific configurations that could be employed for this project is discussed in **Ref. 16-2** (pp. 9-13).
- Benefits: **Ref. 16-1** (p. 5-16) describes the water quality benefits, which are based on the ability of the constructed wetlands to act as biological filters effective in removing biochemical oxygen demand (BOD), total suspended solids, organic nitrogen; and nitrates. Approximately 60,000 pounds of nitrogen and 166,000 pounds of BOD could be removed annually with 11.5 acres of wetlands. The project also offers educational opportunities to the 1.5M annual visitors to the park as the proposed tram system will encircle the Reclamation Pond, providing opportunities for a captive audience to learn more about wetlands and how they work. The project will promote similar efforts in the Region. **Ref. 16-3** (pp. 30-31) discusses how treatment wetlands can be used as alternate stormwater treatment systems.

Data Gaps Filled by Project

More specific data is needed on wetland filtration effectiveness and exact pond water quality. Currently, staff at the Wild Animal Park measure water quality in all of the water bodies. With the demonstration wetland, measurements will be more site specific by allowing for measurements of the quality at both the inlet and outlet of the wetland, which will be performed in Workplan Subtask 16G.3.

Work Item #17: San Dieguito Watershed Management Plan Implementation Project

This project is feasible because it will provide support to the San Dieguito Watershed Council (Council), which will allow it to proceed with implementation of the San Dieguito Watershed Management Plan.

All documents that support this project's scientific and technical feasibility for this project have been listed previously and are listed below, where applicable. **A full citation and description of each document is found in Appendix 6**.

Location, Feasibility, Technical Methods

- Location: This project will facilitate implementation of projects throughout the San Dieguito River Watershed, which is described in **Ref. 9-2** (pp. 1-4 thru 1-9).
- Feasibility: The feasibility of the Council and this project is established by the recommendation to create a Watershed Council as an action in the San Dieguito Watershed Management Plan (**Ref. 9-2**, pp. 4-222 thru 4-223).
- Technical Methods: The functions of the Council and are described in **Ref. 9-2** (pp. 4-222 thru 4-223).
- Benefits: The benefits of this project will be to coordinate watershed policies, increase personal stewardship and involvement in watershed protection (**Ref. 9-2**, p. 4-223). In addition, this project will implement actions and projects contained in the San Dieguito Watershed Management Plan. Through implementation the benefits for each project will be achieved. The benefits of implemented actions are described under each action in **Ref. 9-2**.

Data Gaps Filled by Project

There are no data gaps existing in this project.

Work Item #18: San Diego River Watershed Management Plan Implementation Project

As the only nonprofit organization with a river-long focus, the San Diego River Park Foundation (Foundation) plays a unique role in organizing community groups and engaging the general public in stewardship activities along the river. The feasibility of this project is based on the Foundation's past experience and success in coordinating efforts with multiple stakeholders to advance the San Diego River Park Conceptual Plan. This project will continue to coordinate similar efforts with stakeholders to identify and advance projects through the assistance of an experienced coordinator.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
18-1	Task Deliverable 14.1: Implementation Schedule and Methods (2005)

Location, Feasibility, Technical Methods

- Location: This project will facilitate implementation of projects throughout the San Diego River Watershed, which is described in **Ref. 7-4** (pp. 9-38).
- Feasibility: The feasibility of the project is established in the discussion of the action to create a watershed forum as described in **Ref. 7-4** (pp. 71-72).
- Technical Methods: The specific tasks and methods that will be performed by or coordinated by this project are described in detail in **Ref. 7-4** and **Ref. 18-1**.
- Benefits: This project will facilitate implementation of the San Diego River Watershed Management Plan. By accomplishing this, the benefits of this project will be to resolve the issues that are described in **Ref. 7-4** (pp. 51-67). The project will provide benefits to Disadvantaged Communities (DACs) by developing targeted community outreach efforts (**Ref. 7-4**, p. 73)

Data Gaps Filled by Project

There are no data gaps existing in this project.

Work Item #19: City of San Diego Green Mall Porous Paving and Infiltration, Phase 1

The City of San Diego's draft Strategic Plan for Watershed Activity Implementation includes draft interim guidelines for site selection and sizing of infiltration planters and pervious concrete or porous asphalt paving. The guidelines were developed as part of its investigation of the technical feasibility of this project and others similar in scope. In addition, geotechnical investigations will be conducted for this project and the others to confirm the feasibility of the sites for infiltration.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
19-1	Technical Report for TMDL for Diazinon in Chollas Creek Watershed (2002)
19-2	Sediment Assessment Study for the Mouths of Chollas and Paleta Creek, San Diego Phase 1 Final Report (2005)
19-3	TMDLs for Indicator Bacteria: Project I – Beaches and Creeks in the San Diego Region (2007)
19-4	TMDLs for Dissolved Copper, Lead and Zinc in Chollas Creek, Tributary to San Diego Bay (2007)
19-5	Chollas Creek TMDL Source Loading, BMPs, and Monitoring Strategy Assessment (2006)
19-6	Final County of San Diego Low Impact Development Handbook, Stormwater Management Strategies (2007)
19-7	Porous Pavement and Model Municipal Operations Center Demonstration Project Final Report – SWRCB Agreement No. 03-264-559-2 (2007)
19-8	An Economic Impact Evaluation of Proposed Storm Water Treatment for Los Angeles County (2002)

Location, Feasibility, Technical Methods

- Location: The demonstration site was selected because of its proximity to Chollas Creek, and was guided by the location prioritization process described in **Ref. 2-4** (pp. 2-1 thru 2-4 and illustrated in Table 3-5). The project is listed in **Ref 2-4** (p. 4-21) as a project for immediate implementation. Chollas Creek is a high priority location as it is impaired for a number of constituents and has number of TMDLs established or under development (**References 19-1, 19-2, 19-3 and 19-4**)
- Feasibility: The "Green Mall" concept involves replacing sidewalks and asphalt paving with porous concrete sidewalks and porous asphalt paving and installing planter boxes along commercial/industrial right of ways in high pollutant loading areas. This concept allows urban runoff to infiltrate into the ground, thereby reducing runoff volume and removing pollutants from the "first flush" of urban runoff. It is listed as a Tier II Watershed Activity in **Ref. 2-4** (p. 3-13 and Figure 3-4). Porous pavement has been demonstrated to be a feasible alternative for stormwater capture and removal of bacteria, metals and pesticides as documented in **Ref. 19-5** (p. 68).
- Technical Methods: Methods for porous concrete that will be utilized are described in **Ref. 19-6** (pp. 46-51).
- Benefits: A porous pavement demonstration project that was conducted by the County of San Diego, Department of General Services showed that porous paving BMPs were successful in removing 100% of metals and other contaminants from discharging into storm drains (**Ref 19-7**, p. 9). The potential cost savings for implementing similar projects throughout the watershed versus centralized treatment is documented in **Ref. 19-8** (pp. 4 to 22).

Data Gaps Filled by Project

This project will obtain performance data in Workplan Subtask 19G.3 of actual implementation of porous pavement that will facilitate and improve similar projects in the City of San Diego.

Work Item #20: County of San Diego Chollas Creek Runoff Reduction and Groundwater Recharge

The feasibility of this project is supported by the successful completion of Phase I of the Porous Pavement and Model Municipal Operations Center Project which demonstrated the feasibility of using porous pavements to reduce runoff in areas with poor soil infiltration rates. This has been followed by a Phase II study that is testing additional porous asphalt mixes and modified installation specifications.

The documents below, and those listed previously where referenced, support this project's scientific and technical feasibility. **A full citation and description of each document is found in Appendix 6**.

#	Document
20-1	RWQCB Order No. R9-2007-0001 NPDES No. CAS0108758 (2007)
20-2	City of San Diego Weather Aerial Deposition Study Final Report (2007)

Location, Feasibility, Technical Methods

- Location: The locations of the three sites in this project were selected because of their proximity to Chollas Creek. Chollas Creek is a high priority location as it is impaired for a number of constituents and has number of TMDLs established or under development (**References 19-1, 19-2, 19-3 and 19-4**). **Ref. 19-5** also confirmed that the three sites are well positioned to reduce pollutant loading to the Chollas Creek watershed. The sites were also selected on the basis of their large degree of impervious surfaces, which make them ideal sites to address the emphasis in the latest Municipal Separate Storm Sewer System (MS4) permit on reduction of impervious surfaces (**Ref. 20-1**), which states that "Numerous studies have demonstrated a direct correlation between the degree of imperviousness of an area and the degradation of its receiving water quality."
- Feasibility: **Ref. 19-5** demonstrated the feasibility of reducing the discharge of metals into receiving waters through runoff reduction and infiltration. This report provides an assessment of available water quality and potential pollutant source data relative to the constituents that have been listed in adopted and anticipated future TMDLs for Chollas Creek. The feasibility of the three types of BMPs (porous pavement, concrete detention/infiltration vaults and bioswales) that will be employed by the project is described in **Ref. 19-5** (pp. 68-69). **Ref. 20-2,** together with work done by the Brake Pad Partnership in the San Francisco Bay area and studies performed by the Southern California Coastal Water Research Project and UCLA in the Los Angeles area, has demonstrated the importance of addressing the deposition of copper, lead, zinc, and other water pollutants on impervious surfaces and the subsequent transport of these pollutants to receiving waters by urban runoff.
- Technical Methods: The methods for porous concrete that will be utilized are described in **Ref. 19-6** (pp. 46-51). The methods employed for vegetated systems such as bioswales are described in **Ref. 19-6** (pp. 43-45). The method for below-grade infiltration chambers, such as the commercially available unit that will be implemented in this project is described in **Ref. 19-5** (p. 68).
- Benefits: **Ref. 19-7** (p. 9) demonstrated that porous paving BMPs were successful in removing 100% of metals and other contaminants from discharging into storm drains (**Ref 19-7**, p. 9). Bioswales and below-grade infiltration chambers have proven to achieve high removals of bacteria, metals and pesticides (**Ref. 19-5**, pp. 68-69). **Ref. 20-2** will assist in estimating the amount of metals reduction achievable through runoff reduction, infiltration, and low impact development (LID) measures. The project will demonstrate to other property owners how to reduce urban runoff and increase groundwater recharge. These benefits will assist dischargers within the watershed to implement TMDLs for Chollas Creek (**References 19-1, 19-2, 19-3 and 19-4**) and comply with the new San Diego MS4 Permit (**Ref. 20-1**). The potential cost savings for implementing similar projects throughout the watershed versus centralized treatment is documented in **Ref. 19-8** (pp. 4 to 22).

Data Gaps Filled by Project

More data is needed on the effectiveness of stormwater capture and infiltration using temporary storage in buried vaults, and on the costs and effectiveness of bioswales at County facilities to reduce and filter stormwater discharges from existing facilities. This study will help to fill these data gaps in Workplan Subtask 20G.3 which will allow implementation of these techniques on a widespread watershed scale.

Appendix 6: Reference Documents

APPENDIX 6 TABLE OF CONTENTS

(FULL DOCUMENTS PROVIDED ON DISC 4 [DVD])

Appendix #	Citation	Description
WORK ITEM #1 DOCUMENTS		
6-1-1	**Agricultural Water Management Plan.** San Diego County Water Authority. 2001.	This document is an agricultural audit report, which summarizes activity and improved irrigation efficiency at participating sites. It is intended to show compliance with efficient water management practices.
6-1-2	**Agricultural Water Management Program Annual Report 2006-2007.** Mission Resource Conservation District. 2007. Submitted to the San Diego County Water Authority.	This document is an annual agricultural audit report, which summarizes activity and improved irrigation efficiency at participating sites.
6-1-3	**Energy Down the Drain.** Cohen, Ronnie, Barry Nelson, and Gary Wolff. 2004. Oakland: Natural Resources Defense Council.	This document discusses three case studies in which the connections between energy and water are examined, finding that including energy considerations in water management decisions can lead to significant energy savings.
6-1-4	**Refining Estimates of Water-Related Use in California.** Navigant Consulting, Inc. 2006. Prepared for the California Energy Commission.	This study establishes the link between water usage and the associated energy costs of that usage, and was used to establish the link between water conservation and energy savings.
6-1-5	**Blueprint for Water Conservation.** San Diego County Water Authority. 2007.	This document is a Five-Year Blueprint which refocuses the region's water-savings efforts from the historic emphasis on indoor residential to outdoor and commercial, institutional, and industrial water use.
6-1-6	**Evaluation of the Landscape Performance Certification Program.** Chesnutt, Thomas W., David M. Pekelney, and Maureen Erbeznik. 2004. Prepared for the Municipal Water District of Orange County, the Metropolitan Water District of Southern California, and the U.S. Bureau of Reclamation, Southern California Area Office.	This report documents an evaluation of a water conservation program in Orange County, California that targeted large landscape water use through dedicated landscape meters – seeking to close the gap between effort (water management) and result (efficient water use.) This study assesses the efficacy and water savings potential of water budgets.
6-1-7	**Best Management Practices (BMP) 5 Handbook.** Whitcomb, John B., Gary F. Kah, and Warren C. Willig. 1999. Prepared for the California Urban Water Conservation Council.	This document is a guide to implement water budgets and landscape surveys. The guide includes information on successful efforts/pilots.
6-1-8	**Irrigated Vegetation Assessment in an Urban Environment.** Agricast. 2005.	This was a study performed in conjunction with USBR, SDSU, City of San Diego and Agricast that validated the use of infrared imagery for vegetation classification purposes.
6-1-9	**Classification of Irrigated Vegetation In the SDCWA Service Area.** Shaari, David, and Lloyd Coulter. 2005.	The Water Authority's GIS staff and imagery classification consultant documented the methods used to classify imagery for the Water Authority's water budget landscape measurement tool.
6-1-10	**The Residential Runoff Reduction Study.** Municipal Water District of Orange County, and Irvine Ranch Water District. 2004.	This study determined the effect of smart controllers on water conservation savings, dry season runoff changes, and changes in the quality of the dry season runoff water. Results showed the following: 1) Average savings of 41 gallons per days for residential customers. 2) Average savings of 545 gallons per day for dedicated irrigation meters. 3) Reduction of 50% in runoff. 4) No changes to water quality constituents. The Runoff Reduction Study shows that irrigation retrofits in particular smart controllers reduce runoff. The Water Authority would like to quantify the runoff reduction benefits of other landscape conservation efforts such as comprehensive overhauls of irrigation systems and landscape audits and

Appendix #	Citation	Description
		surveys.
6-1-11	**Updated 2005 Urban Water Management Plan.** San Diego County Water Authority Water Resources Department. 2007.	This urban water management plan provides the framework for the Water Authority to manage its water supply resources.
6-1-12	**Model Water Efficient Landscape Ordinance.** Department of Water Resources. Section 492.	This ordinance requires certain owners of landscaped property to submit estimates of water to be used for irrigation. It contains the Maximum Applied Water Allowance (MAWA) formula and describes the use of the MAWA method.
6-1-13	**Water Conservation Maximum Applied Water Allowance Calculations.** Water Authority, 2007.	This is a set of calculations to illustrate how potential water conservation savings were estimated using the MAWA method.
WORK ITEM #2 DOCUMENTS		
6-2-1	**City of San Diego Urban Water Management Plan.** City of San Diego Water Department. 2005.	This urban water management plan provides the framework for the City of San Diego to manage its water supply resources.
6-2-2	**Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan.** California Department of Water Resources. 2005.	This document provides guidance to water utilities in the creation of a 2005 Urban Water Management Plan.
6-2-3	**Best Management Practices Report Filing. Revised BMP Forms.** California Urban Water Conservation Council. 2007.	This document provides an example of the BMP report filing forms to be used by water utilities.
6-2-4	**Strategic Plan for Watershed Activity Implementation.** City of San Diego Storm Water Pollution Prevention Division. 2007.	This strategic plan represents the City of San Diego (City) Storm Water Pollution Prevention Division's implementation strategy for watershed activities within the City's jurisdictional boundaries. This strategy covers the five year period of the current San Diego County Municipal Storm Water Permit (Final Order R9-2007-0001, January 24, 2007).
2-5	**LADWP Weather-Based Irrigation Controller Pilot Study.** Bamezai, Anil. 2004. A report submitted to the Los Angeles Department of Water and Power.	This report documents water savings achieved by Los Angeles Department of Water and Power's weather-based irrigation pilot study targeted at large multi-family residential (homeowner associations) and small commercial sites (parks, schools, office buildings).
WORK ITEM #3 DOCUMENTS		
6-3-1	**San Diego Coastal Lagoons Total Maximum Daily Load (TMDL) Monitoring Workplan.** Mclaughlin, Karen, and Martha Sutula, and Ken Schiff. 2007.	The objective of this workplan is to support the development of watershed loading and lagoon water quality models, particularly through monitoring and sampling plans.
6-3-2	**City of Encinitas Dry Weather Monitoring Assessment May 1, 2006 – September 30, 2006.** City of Encinitas Clean Water Program. 2006.	This report contains the results of dry weather monitoring of sites throughout the City of Encinitas storm drain system from May 1, 2006 to September 30, 2006.
6-3-3	**Carlsbad Watershed Urban Runoff Management Program.** Cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, Vista and the County of San Diego. 2002.	This program describes the Carlsbad Watershed Copermittees' intended approach to meeting their watershed-related obligations. The goal of the program is to positively impact the water quality in the receiving waters of the Carlsbad Watershed through meeting the following objectives: 1) develop and expand methods to assess and improve water quality in the Carlsbad Watershed (Hydrologic Unit), 2) integrate watershed principles into land use planning among jurisdictions within the watershed, 3) Increase and enhance public understanding of watershed issues and pollution prevention through a watershed-based education program and 4) Increase opportunities for public and stakeholder involvement within the watershed.
6-3-4	**Carlsbad Watershed Urban Runoff Management Program FY 2005-06 Annual Report.** Cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana	This Annual Report represents the Carlsbad Watershed Copermittees' efforts during the Fiscal Year (FY) 2005-06 reporting period to develop and implement the Carlsbad Watershed Urban Runoff Management Program.

Appendix #	Citation	Description
	Beach, Vista and the County of San Diego. 2006.	
6-3-5	**Carlsbad Watershed Management Plan.** Carlsbad Watershed Network. 2002.	This document provides the basis for evaluation of beneficial uses of water, habitats and natural resources in the Carlsbad Hydrological Unit.
WORK ITEM #4 DOCUMENTS		
6-4-1	**Final Feasibility Study for High Rating the Santee Water Reclamation Facility.** Black & Veatch. 2006. Prepared for Padre Dam Municipal Water District.	This document contains a feasibility report for High Rating or Expanding the Santee Water Reclamation Facility (WRF).
6-4-2	**El Monte Valley Recharge Project Final Feasibility Study.** Black & Veatch. 2006. Prepared for Helix Water District.	This study will examine the overall feasibility of the El Monte Valley Recharge Project including 1.) the potential yield of the groundwater basin; 2.) strategies for raising the groundwater table; 3.) potential treatment processes needed to purify water prior to entering the groundwater basin; 4.) pipeline alignments from purified water sources to the El Monte Valley; and 5.) funding opportunities for the project.
6-4-3	**Local Investigations and Study Assistance (LISA) Study.** Padre Dam Municipal Water District. 2007.	This is a follow up investigation to the El Monte Valley Recharge Project Final Feasibility Study to further refine and develop the project. It will include the investigation of feasibility of a membrane reactor process at the Santee WRF
6-4-4	**Santee Lakes History.** Author and date unknown.	This document discusses the history of Santee Lakes.
WORK ITEM #5 DOCUMENTS		
6-5-1	**City of San Diego Water Reuse Study.** City of San Diego Water Department. 2006.	This document describes the potential opportunities for expanding the use of recycled water in the City of San Diego area. Page 5-3 identifies 300 sites within a quarter mile of existing Phase I and II recycled water pipelines.
6-5-2	**Santa Fe Irrigation District Recycled Water Master Plan.** Dudek & Associates, Inc. 2005. Submitted to Santa Fe irrigation District.	Recycled Water Master Plan for the Santa Fe Irrigation District.
6-5-3	**City of San Diego Water Reclamation Master Plan.** John Powell & Associates, Inc. 2000. Prepared for the City of San Diego.	This report combines three Technical Memoranda written in review of the City's existing recycled water program and plans for its expansion: the Existing Recycled Water System, the Recycled Market Assessment, and the 2003-2010 Conceptual Recycled Water System.
6-5-4	**San Elijo JPA Water Reclamation Retrofit Loan Program.** San Elijo JPA. 2000.	Copy of an Agreement for Reimbursement of costs of Reclaimed Water Facilities which outlines the responsibilities of both parties as it relates to the reimbursement of costs incurred for retrofit work.
6-5-5	**Rincon del Diablo MWD Reclaimed Water Retrofit Study.** Rincon del Diablo Municipal Water District. 1993.	Includes an Engineer's Summary and Recommendation including estimated construction costs, a listing of Potential Reclaimed Water Users, and customer's Letters of Intent for Use of Reclaimed Water.
6-5-6	**Carlsbad MWD Recycled Water Retrofit New Retrofit Site Procedures and Checklist.** Carlsbad MWD.	This document provides a description of the procedures used by Carlsbad MWD to implement recycled water at new sites.
6-5-7	**Potential Recycled Water Customer Retrofit Analysis** San Diego County Water Authority. 2007.	This spreadsheet provides an analysis of potential recycled water customers within the City of San Diego.
6-5-8	**Evaluation of Agricultural Irrigation Projects Using Reclaimed Water** (1981)	This includes an analysis of the fertilizer savings available from the use of recycled water
WORK ITEM #6 DOCUMENTS		
6-6-1	**City of San Diego Recycled Water Master Plan Update.** PBS&J. 2005. Prepared for City	This Master Plan Update documents the Reuse Study's evaluation of opportunities to expand the City's existing

Appendix #	Citation	Description
	of San Diego.	recycled water distribution system of additional non-potable uses. Previous drafts of this document have been reviewed by the City of San Diego and the Reuse Study's Independent Advisory Panel. This final Master Plan Update includes revisions made in response to their review comments.
6-6-2	**Facility Design Guidelines. Book 2.** City of San Diego Water Department Capital Improvements Program. 1999	This document contains information to assist planners and engineers with the design and construction of water facilities.
6-6-3	**Recycled Water Systems Guidance. Book 7.** City of San Diego Water Department Capital Improvements Program. 2002.	This document contains information to assist planners and engineers with the design and construction of recycled water systems.
WORK ITEM #7 DOCUMENTS		
6-7-1	**2005 Watershed Sanitary Survey.** Volumes 1 and 2. City of San Diego Water Department. 2006.	This Watershed Sanitary Survey (WSS) covers eight watersheds and nine surface water reservoirs, and identifies actual or potential sources of contamination or any other watershed-related factor which might adversely affect the quality of water used for domestic drinking water.
6-7-2	**Drinking Water Source Assessment and Protection (DWSAP) Program.** California Department of Health Services Division of Drinking Water and Environmental Management. 1999.	The drinking water source assessment is the first step in the development of a complete drinking water source protection program. The assessment includes a delineation of the area around a drinking water source through which contaminants might move and reach that drinking water supply. In addition, it includes an inventory of activities that might lead to the release of microbiological or chemical contaminants within the delineated area. This enables a determination to be made as to whether the drinking water source might be vulnerable to contamination.
6-7-3	**Protecting the Source: Land Conservation and the Future of America's Drinking Water.** Ernst, Caryn. 2004. The Trust for Public Land and American Water Works Association.	This report presents a series of best practices to guide communities' source protection efforts and to showcase those communities that are already linking land and water protection effectively.
6-7-4	**San Diego River Watershed Management Plan.** Anchor Environmental CA, L.P., et al. 2005. Prepared for San Diego River Watershed Work Group.	This document provides the basis for the characterizes and evaluates the San Diego River Watershed in order to create action recommendations for the ongoing management of the watershed.
6-7-5	**The Multiple Species Conservation Program, MSCP Plan.** City of San Diego Community and Economic Development Department. 1998.	The MSCP Plan is the planning frame for the Multiple Species Conservation Program. This plan guides the preparation of individual sub-area plans for each jurisdiction within the MSCP planning area.
6-7-6	**City of San Diego MSCP Subarea Plan.** City of San Diego Community and Economic Development Department. 1997.	The City of San Diego Subarea Plan guides the establishment of the City of San Diego Multi-Habitat Planning Area (MHPA) preserve system.
WORK ITEM #8 DOCUMENTS		
6-8-1	**San Diego River Conservancy Five Year Strategic and Infrastructure Plan 2006-2011.** San Diego River Conservancy. 2006.	This Five Year Strategic and Infrastructure Plan (Plan) describes current resource allocations to the Conservancy, public needs served by the Conservancy, policies and principles guiding the Conservancy and the intended and recommended future course of the Conservancy's efforts.
WORK ITEM #9 DOCUMENTS		
6-9-1	**Draft San Pasqual Groundwater Management Plan.** MWH Americas, Inc. 2007. Prepared for City of San Diego Water Department.	Invasives removal is listed as a primary goal in management of the San Pasqual Groundwater Basin.
6-9-2	**San Dieguito Watershed Management Plan.** Weston Solutions, Inc. 2006. Prepared for City of San Diego.	The San Dieguito Watershed Management Plan (WMP) discusses how to maintain and enhance the long-term health of the watershed's resources while balancing the effects of urbanization and changes in land use. This

Appendix #	Citation	Description
		includes the issue of invasive species.
6-9-3	**San Luis Rey Watershed Management Guide.** San Luis Rey Watershed Council. 2000.	This document identifies general considerations for the San Luis Rey Watershed, as well as some land-use issues and educational recommendations.
6-9-4	**Three County (San Diego, Riverside, & Orange County) Mapping and Educational Brochure Projects.** Final Report Agreement, 2007.	This report is written to describe the goals and objectives of several mapping and educational brochure projects.
6-9-5	**Hydrogeologic Feasibility Certification**, Northern San Diego County Invasive Non-native Species Control Program. Davis, Charles K. 2005.	This document provides certification that the hydrogeological and geological properties adequately support the project.
6-9-6	**Project Feasibility Certifications.** Gibson, Doug, Jason Giessow, and Craig Olson. 2005.	These documents provide certification that the project can be implemented and operated to accomplish the purpose for which it is planned. This is includes review by biologists with extensive wetlands restoration, invasive plant control and project management.
6-9-7	**Upper San Luis Rey Watershed Arundo Control and Riparian Habitat Restoration.** Mission Resource Conservation District. 2006. Draft Final Report.	This document discusses the methodology and results of a project initiated to control a minimum of 40 acres of Arundo donax (Arundo) and re-vegetate with natives to restore the natural ecological processes that shape the watershed.
6-9-8	**The Impact of Arundo Donax on Water Resources.** November 1993 Arundo donax workshop proceeding. Ontario California. (1994) Iverson, M. E. 1994. Pages 19-25 in N. E. Jackson, P. Frandsen, and S. Douthit, editors.	Evaluated the effect of removing Arundo along the Santa Ana River on water resources. Included quantitative estimates of AFY of water saved per acre of Arundo removed.
6-9-9	**Fire Threat from Arundo Donax.** November 1993 Arundo donax Workshop Proceedings, Ontario, California. (1994). Scott, G. 1994. Pages 17-18 in N. E. Jackson, P. Frandsen, and S. Douthit, editors.	Discusses the impact of fire threats from Arundo along the Santa Ana River.
6-9-10	**Other Invasive Non-Native Plants in California's Wildlands and Natural Areas.** November 1993 Arundo donax Workshop Proceedings, Ontario, California. (1994). Randall, J. 1994. Pages 61-67 in N. E. Jackson, P. Frandsen, and S. Douthit, editors. (1994)	This document describes an overview of other non-native plants other than Arundo that can threaten habitat in California. The specific impacts that are attributed to certain species such as water consumption, displacement of native vegetation are described.
6-9-11	**The Impact of Arundo donax on Flood Control and Endangered Species.** November 1993 Arundo donax workshop proceeding. Ontario California. (1994). Frandsen, P. and N. Jackson. 1994. Pages 13-16 in N. E. Jackson, P. Frandsen, and S. Douthit, editors.	This document discussed the impact of Arundo on flood control in the Santa Ana River Basin. It describes the effects such as the tendency to form debris dams that can cause hydromodification and threaten structures. This can increase river or flood channel maintenance costs by causing the need for constant removal.
WORK ITEM #10 DOCUMENTS		
6-10-1	**Conjunctive Use Project for the Lower Santa Margarita River Basin, Supplemental Study to the Santa Margarita River Recharge and Recovery Enhancement Program: Permit 15000 Feasibility Study for Marine Corps Base Pendleton.** Stetson Engineers, Inc. 2002. Prepared for Fallbrook Public Utility District.	This study presents the analysis and results of a feasibility level study that investigates the implementation of a conjunctive use project between the Fallbrook Public Utility District (Fallbrook PUD) and the U. S. Marine Corps Base Camp Pendleton (Base). It investigates two sources of supply to be applied for beneficial use: naturally occurring streamflow and tertiary treated wastewater.
6-10-2	**Santa Margarita River Conjunctive Use Project Pre-Feasibility Plan Formulation Study.** U.S. Bureau of Reclamation, and Stetson Engineers Inc. 2005.	This report is an appraisal level comparison of conceptual alternatives to provide additional and/or replacement water supplies to FPUD and CPEN by putting to beneficial use natural streamflow, groundwater, and tertiary treated wastewater.
6-10-3	**Conjunctive Use Study – Lower Santa Margarita River Basin.** NBS/LOWRY Engineers and Planners, Inc. 2004	This study developed and evaluated joint alternatives between Camp Pendleton and Foothill Public Utilities District to explore conjunctive use of the lower Santa

Appendix #	Citation	Description
		Margarita River Basin.
6-10-4	**Santa Margarita River Conjunctive Use Project Technical Memorandum No. 1.** Stetson Engineers. 2007. Prepared for Bureau of Reclamation Southern California Area Office.	TM 1.0 describes the hydrology and hydrogeology of the Santa Margarita River. The report addresses historical flow variation in terms of total water supply and availability for diversion.
6-10-5	**Santa Margarita River Conjunctive Use Project Final Technical Memorandum No. 2.2.** Stetson Engineers. 2007. Prepared for Bureau of Reclamation Southern California Area Office.	TM 2.2 reports on surface water and groundwater modeling analyses in support of the Pre-Feasibility study. Twelve model runs were completed. Runs 1-10 varied a single operational parameter and runs 11-12 changed multiple operational parameters. The model runs analyzed the conjunctive use basin yield.
6-10-6	**Santa Margarita River Conjunctive Use Project TM 3.0** Stetson Engineers. 2007. Prepared for Bureau of Reclamation Southern California Area Office.	TM 3.0 is the summary report on 8 months of water quality monitoring at the diversion structure, in Lake O'Neill and at the lake's outlet.
6-10-7	**Obermeyer Gate Diversion Structure Information Packet.** Obermeyer Hydro, Inc. 2003.	This document describes the economic and technological benefits of Obermeyer Spillway Gates.
WORK ITEM #11 DOCUMENTS		
6-11-1a	**Recommended Route for Off-Site Desalination Water Delivery.** Poseidon Resources. 2005.	This report describes the recommended route for supplying desalinated water to the Cities of Carlsbad and Oceanside as well as other regional agencies using several criteria.
6-11-1b	**Alternative Pipeline Alignment Aerial Survey, Underground Utility Survey and Mapping.** (Note: This set of documents is located on Disk 2 in Appendix 3-11).	A set of maps and drawings that show potential pipeline alignments.
6-11-1c	**Transient Analysis of Alternative Alignments for the Carlsbad Desalination Project**. Komex. 2004.	A report that contains a preliminary hydraulic (transient) analysis that confirms the hydraulic requirements of the desalination plant. It defined the susceptibility of the system to hydraulic failure due to surge and provided preliminary selection and sizing estimates for mitigation measures (surge protection) needed to ensure safe operation of the pumping and pipeline systems.
6-11-1d	**Structural Analysis of Marcario Bridge Crossing Alternatives.** T.Y. Lin International. 2004.	Feasibility study conducted for supporting two large water pipelines from the Cannon Road Bridge over Macario Canyon.
6-11-2	**City of Carlsbad Environmental Impact Report for the Precise Development Plan and Desalination Plant EIR 03-05 and Technical Appendices.** Poseidon Resources Corp. 2005.	The EIR analyzes all components of the project, including the water conveyance facilities located outside Carlsbad in the cities of Oceanside and Vista. The technical appendices analyze various aspects of the project including impacts to marine resources. The City of Carlsbad voted unanimously to certify the EIR and approve the local land use permits and development agreement for the project June 13, 2006. The City Council concluded the project could be constructed and operated in an environmentally responsible manner and did not identify any significant, unavoidable impacts after mitigation.
6-11-3	**Carlsbad Desalination Project.** Carlsbad Municipal Water District, and Poseidon Resources Corporation. 2001.	This report summarizes the studies and efforts undertaken to assess the viability of locating a desalination project in the City of Carlsbad and the public acceptance of desalination. It discusses the need and potential markets for a local/regional seawater desalination project; identifies the costs and benefits of the project; presents the commercial and institutional framework for design, construction and operation of the project; and outlines an implementation plan.
6-11-4	**Water Purchase Agreement Between The Carlsbad Municipal Water District, And Poseidon Resources** (Channelside) LLC. 2004. San Diego County Recorders Office.	One of eight water purchase agreements between Poseidon and the public agency purchasers of the plant output. This agreement establishes the rights and obligations of the parties, including the Carlsbad

Appendix #	Citation	Description
		Municipal Water District's right to purchase water from the project and the understanding that the District's contract capacity will be appropriated to public use.
6-11-5	**Public Opinion Survey Results Letter to Coastal Commission.** Lewis, Claude A., et al. 2007. Results submitted to the California Coastal Commission and the State Lands Commission.	These letters report the results of a public opinion survey regarding the San Diego region's view on water availability and desalination.
6-11-6a	**Carlsbad Desalination Project Climate Action Plan.** Poseidon Resources. 2007.	Poseidon Resources is committed to rendering the Carlsbad Desalination Plant carbon neutral. This is the first major infrastructure project in the state to voluntarily commit to carbon neutrality. Poseidon's Climate Action Plan identifies a menu of measures to minimize energy consumption and erase the Carlsbad facility's carbon footprint at an estimated cost of nearly $70 million. Poseidon plans to pursue a mix of measures from the following portfolio: install premium energy efficient equipment; install state-of-the-art energy recovery device; perform a LEED-type process for the facility, secure rooftop and/or locally produced solar energy, develop a 37 acre wetlands mitigation project, and buy carbon offset projects and/or renewable energy credits.
6-11-6b	**Carlsbad Desalination Project Coastal Habitat Restoration and Enhancement Plan.** Poseiden Resources. 2007.	Plan to establish restoration area to fully mitigate the entrainment losses that would be caused by the Carlsbad Desalination Plant. The objective of the plan is to implement one or more activities which preserve, restore and enhance existing wetlands, lagoons or other high-productivity near-shore coastal areas located in the vicinity of Agua Hedionda Lagoon and/or elsewhere in San Diego County.
6-11-7	**Poseiden Resources Corporation Corrosion Pilot Study.** McGuire/Malcom Pirnie. 2006.	The purpose of this study was to evaluate the corrosively and stability of the fresh water produced by reverse osmosis desalination to that of the existing water supplies. For over a six-month period, mortar-lined steel pipe, which is proposed to be used for this Project, and valves harvested from the existing Carlsbad water distribution system were tested with finished water produced by the desalination pilot plant and with drinking water from the water distribution system in two separate loops to compare the effect of the two water sources on valve and pipeline corrosion and water distribution system nitrification. In addition copper piping and water meters, widely used in water pluming installations in the Project service area, were tested in parallel using desalinated water and tap water from the distribution system to assess the feasibility of the use of desalinated water. The results of the Corrosion Control Study show that the use of desalinated water is feasible and in terms of corrosivity, stability and overall water quality, the desalinated seawater is equal to or better than the existing water supply sources.
6-11-8	**State Lands Commission. Calendar Item 48: Amendment of Lease.** State Lands Commission. 2007.	State Lands Commission recommended amendment of existing lease for the Encina Power Station to allow the continued use and maintenance of existing intake and outfall structures for desalination purposes.
6-11-9	**Salinity Tolerance Investigations: A Supplemental Report for the Carlsbad, CA. Desalination Project.** Le Page, Steven D. 2005.	The purpose of this study was to evaluate the effect of the concentrated seawater generated during the desalination process on the aquatic life inhabiting the area of the discharge. The results of this study indicate that the proposed discharge configuration is feasible.
WORK ITEM #12 DOCUMENTS		
6-12-1	**San Diego County Water Supply Study,**	In the early 1990s, the US Army Corps of Engineers

Appendix #	Citation	Description
	Reconnaissance Report. U.S. Army Corps of Engineers Los Angeles District. 1993.	collaborated with San Diego County water districts to develop water supply study objectives. The San Diego County Water Supply Study, published in 1993, determined that an earlier version of the Four Reservoir Inertie system was the most cost-effective means of producing water in excess of 10,000 acre-feet annually and best met other evaluation criteria.
6-12-2	**Sweetwater Authority, South County Pumped Storage Regional Reconnaissance Study Update** U.S. Army Corps of Engineers. 2004.	This 2004 report reviewed and updated the description of facilities identified in the San Diego County Water Supply Study, Reconnaissance Report (1993) and defined a project integrated with the current San Diego County Water Authority and South County water agencies planning efforts. The document was not considered to be a feasibility level analysis; its emphasis was on identifying realistic alignments for pipelines and providing preliminary construction cost estimates.
6-12-3	**Fact Sheet #1: San Diego Region – Four Reservoir Intertie Project.** Sweetwater Authority, and City of San Diego. 2007.	Information on the proposed project was summarized by Sweetwater Authority and the City of San Diego as part of a request for authorization of a federal feasibility study, with state matching support, for the purposes of improving water supply reliability and water yield in the San Diego region.
WORK ITEM #13DOCUMENTS		
6-13-1	**Hydrogeology of the San Diego Area, proposed extension.** USGS. 2007.	With Sweetwater Authority and the City of San Diego as cooperating agencies, the USGS initiated a study in 2001. The primary objectives of the study are (1) to develop an integrated, comprehensive understanding of the geology and hydrology of the San Diego Region, focusing on the San Diego Formation (SDF) and the overlying alluvial deposits, and (2) to use this understanding to evaluate expanded use of the alluvial deposits and SDF for recharge and extraction.
6-13-2	**Sweetwater Authority Interim Groundwater Management Plan.** Sweetwater Authority. 2001.	The Sweetwater Authority Interim Groundwater Management Plan was adopted by the Sweetwater Authority Governing Board in November 2001. The Interim Plan directs staff to continue performing groundwater management activities so that static groundwater levels do not decline over the long term.
6-13-3	**Determining Age and Vertical Contribution of Ground Water Pumped from Wells in a Small Coastal River Basin:** A Case Study in the Sweetwater River Valley, San Diego County, California. USGS. 2005. U.S. Government Printing Office: 2005 – 789-110/04310 Region No. 10.	The USGS is assessing regional groundwater resources in the San Diego area. Phase I of that assessment focused on the Sweetwater River drainage basin. This report, *Determining Age and Vertical Contribution of Ground Water Pumped from Wells in a Small Coastal River Basin* (July 2005), describes results from an initial part of that assessment.
6-13-4	**California Well Standards: Bulletin 74-90.** California Department of Water Resources. 1991.	This document provides standards for well drilling as required by the California Department of Water Resources.
WORK ITEM #14 DOCUMENTS		
6-14-1	**El Monte Valley Recharge Project Final Feasibility Study.** Black & Veatch. 2006. Prepared for Helix Water District.	The El Monte Valley Recharge Project Final Feasibility Study evaluated the feasibility of utilizing the land owned by Helix Water District in the El Monte Valley for a groundwater recharge and habitat restoration project. The study evaluated two potential sources of recycled water, the processes required to highly treat the recycled water, percolation into the existing groundwater basin and extraction for ultimate use as a new raw water source. Project facilities were evaluated along with project capital costs and operations and maintenance costs. The feasibility study also evaluated regulations, water rights, and included

Appendix #	Citation	Description
		extensive groundwater modeling.
6-14-2	**Final Technical Memorandum: Investigation of Use of Raw Water for Habitat Restoration.** Black & Veatch. 2006. Prepared for Helix Water District El Monte Recharge Project	The Technical Memorandum – Investigation of Use of Raw Water for Habitat Restoration evaluated the feasibility of using imported raw water for the initial phase of the El Monte Valley Recharge and River Restoration Project. The memorandum determined the El Monte Basin volume in the vicinity of the project, a water balance, additional groundwater modeling, water quality, infrastructure requirements and costs, and a water management scheme.
6-14-3	**Restoration Plan for El Monte Valley Nature Park Restoration Park.** Conservation Biology Institute. 2007. Prepared for Endangered Habitats Conservancy.	This document provides a restoration plan for habitat restoration of an approximately 460-acre site in the El Monte Valley reach of the San Diego River.
6-14-4	**San Diego River Restoration and Recharge Project in El Monte Valley.** Fact Sheet. Helix Water District.	This fact sheet describes the San Diego River Restoration and Recharge Project in El Monte Valley, which will provide additional high-quality water to the Helix Water District service area and ensure a long-term water supply for the entire region. As an added benefit, this new source of water will also support the Endangered Habitats Conservancy's efforts with the San Diego River Restoration Project, which was created to protect and enhance the environment, and provide recreational opportunities for the public
WORK ITEM #15 DOCUMENTS		
6-15-1	**Coastkeeper Monitoring Sites List.** San Diego Coastkeeper. 2007.	This is a document prepared by San Diego Coastkeeper that provides a list of potential monitoring sites and descriptions.
6-15-2	**Water Quality Control Plan for the San Diego Basin (9).** California Regional Water Quality Control Board San Diego Region. 1994.	The San Diego Regional Board's Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of all regional waters. Specifically, the Basin Plan: (1) designates beneficial uses for surface and ground waters; (2) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy; (3) describes implementation programs to protect the beneficial uses of all waters in the Region; and (4) describes surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan [California Water Code sections 13240 thru 13244, and section 13050(j)]. Additionally, the Basin Plan incorporates by reference all applicable State and Regional Board plans and policies.
6-15-3	**San Diego Bay Watershed Urban Runoff Management Program Document.** Gilb, Richard, et al. 2003.	This document identifies four primary objectives to strive towards this goal to positively affect the water resources of the San Diego Bay Watershed while balancing economic, social, and environmental constraints.: (1) develop and expand methods to assess and improve water quality within the watershed; (2) integrate watershed principles into land use planning; (3) enhance public understanding of sources of water pollution within the watershed; and (4) encourage and enhance stakeholder involvement within the watershed. To help reach these goals and objectives, the San Diego Bay Watershed Urban Runoff Management Program document identifies and prioritizes water quality related issues within the watershed that can be potentially attributed to discharges from the municipal storm drain systems. Additionally, activities to abate sources of pollution and restore and protect beneficial uses are also identified.
6-15-4	**Citizen Watershed Monitoring Program: Six**	This document describes the San Diego Coast Keeper

Appendix #	Citation	Description
	Years of Volunteer Engagement and Scientifically Sound Data Collection. San Diego Coast Keeper. 2007.	Citizen Watershed Monitoring Program as well as its accomplishments.
6-15-5	**The La Jolla Shores Coastal Watershed Monitoring Plan Draft Report.** Scripps Institution of Oceanography, et al. 2007.	The La Jolla Shores Integrated Coastal Watershed Management Plan (Plan) is intended to be the blueprint for a management model that will be implemented to protect and improve water quality in two Areas of Special Biological Significance offshore of La Jolla Shores Beach in San Diego California; the San Diego - the La Jolla State Marine Conservation Area, and the San Diego-Scripps State Marine Conservation Area.
WORK ITEM #16 DOCUMENTS		
6-16-1	**San Diego Wild Animal Park Draft Water Master Plan.** PBS&J. 2006. Prepared for San Diego Zoo's Wild Animal Park.	The plan will guide all improvements to the natural and manmade water systems at the Wild Animal Park. The Park's Water Master Plan includes more than 25 projects that were thoughtfully targeted to enable our institution to achieve its goals of enhanced water quality, management, and maintenance. Consultants from Natural System International, Williams Creek and the United States Department of Agriculture, Natural Resources Conservation Science, along with Society staff, identified and prioritized these projects.
6-16-2	**Water Treatment Options Using Natural Systems.** Williams Creek Consulting. 2006. Prepared for San Diego Zoo's Wild Animal Park.	Williams Creek Consulting, Incorporated prepared this attachment for the Wild Animal Park. The document assesses potential modifications to the existing riparian and pond areas to create a network of riparian treatment systems to improve water quality, minimize loss to evapotranspiration, and enhance the guest experience near these water resources.
6-16-3	**Alternative Approaches to Stormwater Quality Control.** Devinny, Joseph S., Sheldon Kamieniecki, and Michael Stenstrom. 2004. Prepared for the Los Angeles Region Water Quality Control Board.	This report reviews present federal and state regulations and regulatory policy to determine whether advanced ultrafiltration treatment of the entire runoff flow is required to meet water quality standards, or whether compliance can be achieved through the widespread adoption of the various "best management practices" (BMPs) more commonly used for runoff quality control. The work identified and analyzed alternative measures that can be employed to meet present federal and state water quality standards. Particular attention was paid to strategies that concern ground water recharge, pollutant source control, and runoff detention, capture, and BMP treatment.
WORK ITEM #18 DOCUMENTS		
6-18-1	**Task Deliverable 14.1: Implementation Schedule and Methods.** San Diego River Watershed Work Group. 2005.	This document was written as a deliverable to seek funding and to continue to develop commitment to implement the Watershed Management Plan.
WORK ITEM #19 DOCUMENTS		
6-19-1	**Technical Report for Total Maximum Daily Load for Diazinon in Chollas Creek Watershed San Diego County.** Pardy, Linda, and Jimmy Smity. 2002. California Regional Water Quality Control Board San Diego Region.	This report details the Total Maximum Daily Load for Diazinon in the Chollas Creek Watershed.
6-19-2	**Sediment Assesment Study for the Mouths of Chollas and Paleta Creek, San Diego Phase 1 Final Report.** Southern California Coastal Water Research, and Space and Naval Warfare Systems Center San Diego, U.S. Navy. 2005.	This report details an investigation of the nature and extent of impaired sediments at the mouths of Chollas and Paleta Creeks where they enter San Diego Bay.
6-19-3	**Total Maximum Daily Loads for Indicator Bacteria: Project I – Beaches and Creeks in the San Diego Region.** California Regional Water Quality Control Board San Diego Region. 2007.	This report details the Total Maximum Daily Load for Indicator Bacteria in San Diego region beaches and creeks.

Appendix #	Citation	Description
6-19-4	**Total Maximum Daily Loads for Dissolved Copper, Lead and Zinc in Chollas Creek, Tributary to San Diego Bay.** California Regional Water Quality Control Board San Diego Region. 2007.	This report details the Total Maximum Daily Load for dissolved copper, lead and zinc in the Chollas Creek Watershed.
6-19-5	**Chollas Creek TMDL Source Loading, Best Management Practices, and Monitoring Strategy Assessment.** Weston Solutions. 2006. Prepared for City of San Diego.	This analysis of the entire Chollas Creek Watershed was conducted for the City of San Diego. It demonstrated the feasibility of reducing the discharge of metals into receiving waters through runoff reduction and infiltration. This report provides an assessment of available water quality and potential pollutant source data relative to the constituents that have been listed in adopted and anticipated future Total Maximum Daily Loads (TMDLs) for Chollas Creek. These data, along with available watershed characteristics and regulatory issues, form the basis of the screening assessment of potential BMPs needed to meet current and future waste load allocations. The City is using the BMPs that remain after the screening to develop a strategy for TMDL implementation. A key recommendation of the Assessment is runoff reduction, using low impact design technology, including collection, storage, and reuse of runoff from roofs, porous pavement, bioretention, and bioswales.
6-19-6	**Draft County of San Diego Low Impact Development Handbook, Stormwater Management Strategies.** County of San Diego, Department of Planning and Land Use. 2007.	As part of the revised Municipal Stormwater Permit, San Diego jurisdictions must initially encourage developments to incorporate minimal Low Impact Development (LID) techniques into Priority Development Projects by January 2008. During this initial phase this LID Handbook will serve as the guidance structure for these LID techniques and the initial LID projects that will be monitored as LID standards and criteria are being developed in the region. The Department was represented on the Technical Advisory Committee for the Handbook and the design of the County's Chollas Creek demonstration project benefited from the discussion among the engineers, landscape architects, geologists, planners, and others on the TAC.
6-19-7	**Porous Pavement and Model Municipal Operations Center Demonstration Project Final Report – SWRCB Agreement No. 03-264-559-2.** County of San Diego Department of General Services. 2007.	This document details the methods and results of a demonstration which replaced approximately 64,000 square feet of existing pavement with porous pavement. Three types of porous pavement were selected and installed in order to compare infiltration and runoff reduction effectiveness. The Demonstration Project also included installation of a "treatment train," comprised of a Continuous Deflective Separation (CDS) stormwater pollution control device and a media filtration system.
6-19-8	**An Economic Impact Evaluation of Proposed Storm Water Treatment for Los Angeles County.** Gordon, Peter, et al. 2002.	This study confirms that advanced treatment of storm flows will likely be required to meet current and anticipated federal and state water quality standards.
WORK ITEM #20 DOCUMENTS		
6-20-1	**Order No. R9-2007-0001 NPDES No. CAS0108758,** Waste Discharge Requirements for Discharges of urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority. California Regional Water Quality Control Board San Diego Region. 2007.	This document details the waste discharge requirements for several cities in the San Diego region, including those in the area of Chollas Creek.

Appendix #	Citation	Description
6-20-2	**City of San Diego Weather Aerial Deposition Study Final Report.** Weston Solutions. 2007. Prepared for the City of San Diego.	This recent study, also conducted for the City of San Diego, verified that atmospheric deposition is a significant source of copper, lead, and zinc in discharges from impervious surfaces in metropolitan San Diego, including the Chollas Creek Watershed. This recently published study will assist us in estimating the amount of metals reduction achievable through runoff reduction, infiltration, and low impact development (LID) measures.