

**IMPLEMENTATION PLAN**  
**SEASIDE BASIN MONITORING AND MANAGEMENT**  
**PROGRAM**

**FINAL TO COURT March 13, 2007**

**Presented to:**

**Seaside Basin Watermaster Board**

Prepared by:

Seaside Basin Watermaster Technical Advisory Committee, with support from:

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The purpose of the Seaside Basin Monitoring and Management Program Implementation Plan is to establish a logical, efficient and cost-effective work plan to meet the requirements of the Seaside Basin Adjudication. This Implementation Plan contains a description of the phases identified for the MMP work effort, a detailed scope, budget and schedule of tasks planned for 2007, as well as a summary of other projects underway that, in addition to implementation of the MMP, will develop solutions to the threat of seawater intrusion and establish a maximum perennial yield for the producers who rely on the Seaside Basin for their water supply.

## 1. Background

The Seaside Basin Monitoring and Management Program (MMP) was developed by the Seaside Basin Watermaster Technical Advisory Committee (TAC) and adopted on May 17, 2006, and revised on September 5, 2006, to comply with the decision entered in the Seaside Groundwater Basin Adjudication (California American Water v. City of Seaside, Monterey County Superior Court, Case Number M66343) (hereinafter referred to as Decision). The MMP contains several primary tasks: 1) Basin Monitoring Well Construction Program; 2) Comprehensive Basin Production, Water Level and Water Quality Program; 3) Basin Management Program; and 4) Seawater Intrusion Program.

This Implementation Plan for the MMP recommends a phased approach to executing the MMP based on a logical order of tasks as well as the availability of funding. The first phase tasks will provide the prerequisite data for subsequent activities, as well as determining the necessity for them. As specified in the Decision, the budget for Phase 1 tasks is based on the not-to-exceed one time cost of \$1,000,000 as well as the carry-over 2006 and 2007 Monitoring & Management Operations Fund (\$200,000/year). Using these available funds, the Watermaster has entered into a contract with Martin Feeney for the Seaside Groundwater Basin Watermaster Seawater Sentinel Monitoring Wells Workplan. The Implementation Plan also recommends two additional contracts. As shown in Table 1 of Appendix A, the Phase 1 Budget Summary, a contract of \$93,296 with the MPWMD/MCWRA and a contract of \$390,071 with RBF Consulting are recommended. Phase 1 work for all consultants would total \$1,331,007, with \$518,167 for labor costs and \$812,840 for direct costs, as shown in Appendix A, Table 1 - Phase 1 Budget Summary.

In addition to the MMP scope of work, this Implementation Plan identifies several other concurrent projects that are underway to develop supplemental water supplies in addition to the Watermaster's efforts. In particular, California American Water and the Monterey Peninsula Water Management District have been working on aquifer storage and recovery of Carmel River winter excess flows that can be captured and stored in the Seaside Basin for use in the summer months. These projects are described in section four below, as well as in Appendices C-F. In addition, other agency projects that may impact the Seaside Basin will be evaluated and considered during the Phase 1 MMP implementation.

## 2. Phase 1 - Management and Monitoring Program Implementation

The first phase of the MMP Implementation includes both the Coastal Sentinel Work Plan authorized by the Watermaster Board on January 31, 2007, as well as additional tasks in the MMP that have been identified as priorities and prerequisite activities to subsequent phases. A summary of these tasks is described below, and a detailed scope of work, budget and schedule is included as Appendix A.

## 2.1 Monitoring Well Program Recommended Modifications

The Seawater Sentinel Work Plan has been reviewed in combination with the additional MMP Phase 1 tasks as well as with the Coastal Water Project (CWP) Aquifer Storage and Recovery (ASR) program to evaluate the coverage of existing and proposed monitoring well network. MPWMD, California American Water, and RBF Consulting (with ASR Systems and GEOSCIENCE) met with Martin Feeney on February 28, 2007. As a result of this discussion, it is recommended that the Seawater Sentinel Work Plan be modified slightly. As shown in Figure 1, the Seawater Sentinel Work Plan identified sites one through four with one well on each site. It is recommended that the Seaside Basin Watermaster monitoring well plan be modified to sites one, three and four. Site four is recommended to have two wells, one deeper well into the Santa Margarita aquifer in a borehole drilled to the top of the Monterey Formation, and one shallower well into the Paso Robles aquifer. The Watermaster will construct four wells total.

Site two identified in the work plan will be held in abeyance and will be considered under the CWP ASR Program in early 2008. However, permitting of this site will proceed through Mr. Feeney's scope of work. A fifth monitoring well site will be constructed in 2007 by California American Water as part of the aquifer storage and recovery program in the Coastal Water Project. This inland site is located at the northern boundary of the Seaside Basin where the conditions are less well understood.

It should be noted that the proposed new sentinel well locations are constrained by the present and proposed future land uses in the coastal bluffs area where the new monitor well sites have been identified. The new coastal sites shown on the monitor well location map (Figure 1) have been sited in areas of past disturbance and where future access will be available. Should the planned monitor well construction work identify the need for additional locations to improve spatial coverage, other alternative sites slightly farther from the coastline can be recommended as a future enhancement of the coastal sentinel monitor well network.

The CWP ASR Program plans to construct a monitoring well at an inland site, on Bayonet Drive and General Jim Moore Boulevard, and an ASR test well is also planned (see Appendices D and E). A second CWP monitoring site will be planned for early 2008, with the most appropriate site yet to be determined but planned to be in the vicinity of the Coastal Sentinel Well Work Plan's fourth site. The key objective in determining the fourth coastal site will be better understanding of the results of the sentinel wells and the impacts of the ASR Phase 1 well and the CWP Phase 2 ASR test well. It may be determined that a site inland from the coast would provide more valuable data. This can be better determined once the existing databases are consolidated and initial data from the new coastal sentinel wells are analyzed.

## 2.2 Comprehensive Basin Production, Water Level and Water Quality Monitoring Program

All tasks described under this portion of the MMP are recommended to be performed at this time, as the development of a consolidated database of both existing and new data related to water production, water levels and water quality will be critical to Basin management. This effort will also provide the data and analysis necessary to identify the need, if any, for additional monitoring wells as identified in the MMP.

During the development of this MMP Implementation Plan, the TAC acknowledged the concerns expressed by the Laguna Seca property-owners and the City of Del Rey Oaks. This work effort will

include the investigation of existing production wells or new wells that can be added to the Watermaster's monitoring network at key locations to provide more effective monitoring in the Laguna Seca and Southern Coastal Sub areas of the basin. This work will include recommendations for improved ground water level and ground water quality monitoring, as a means to provide data to enhance the current understanding of hydrogeologic conditions in these areas, and to support planned future water resources evaluation and simulation modeling efforts.

### **2.3 Basin Management**

The Basin Management Program in the MMP calls for an action plan to optimize the Natural Safe Yield (also referred to as Maximum Perennial Yield) within the Coastal and Laguna Seca sub areas of the basin. Supplemental water supply projects such as those discussed in Section 4 below are critical to achieving this goal. In Phase 1, other supplemental supply projects will be also analyzed and the review of the existing water production, level and quality data will be instrumental in identifying the action plan strategy for Basin Management that will be further developed in Phase 2.

Under Phase 1, the decision was made by the Watermaster Committee to proceed with documentation of the "Durbin" model, in conjunction with Martin Feeney and Derrik Williams of Hydrometrics, the groundwater modeler on the RBF team. This model will provide an agreed upon model analysis for the Watermaster. Additional modeling needs will be determined during Phase 2 of the MMP Implementation Plan if key questions for Basin Management are identified that could be furthered through additional modeling.

### **2.4 Seawater Intrusion Contingency Program/ Establishing Baseline Seawater Intrusion**

In addition to the monitoring planned for the proposed new sentinel wells, the Watermaster will continue to collect quarterly water quality data from the MPWMD existing coastal monitor wells under Phase 1 of the MMP. These data from the MPWMD coastal monitor wells will be instrumental in confirming baseline conditions and historical trends. Should seawater intrusion be detected at a coastal monitor or production well, steps will be implemented, following the protocols outlined in the MMP, to initiate the appropriate responsive actions

Based on the outcome of the Monitoring Well Construction Program and the Comprehensive Basin Production, Water Level and Water Quality Monitoring Program, the Seawater Intrusion Contingency Plan would be logically influenced by the Phase 1 data collection and analysis efforts. It is recommended that baseline water level contour mapping be prepared utilizing all available water level data, as well as developing baseline production data. Analyzing historical water quality data during Phase 1 serves two purposes: 1) it establishes baseline water quality; and 2) it identifies historical water quality trends.

## **3. Phase 2 - Management and Monitoring Program Implementation**

Based on the results of the Phase 1 Monitoring Well Construction Program and the Comprehensive Basin Production, Water Level and Water Quality Monitoring Program, specific tasks for Phase 2 will be determined in the fourth quarter of 2007. Appendix B identifies the MMP tasks and anticipated budget for tasks that are recommended to be included in Phase 2 or subsequent phases.

While a preliminary budget is included at this time for informational purposes a schedule for these tasks is not identified at this time.

Phase 2 tasks will be re-evaluated based on the outcomes of Phase 1, key activities for management of the basin and other water supply projects in the basin. Over time the new monitoring well data, the consolidated database, and development of water supply projects may provide an improved basis for development of a refined and updated groundwater model that may be included in Phase 2 MMP Implementation if determined to be appropriate for evaluating basin management activities.

#### **4. Supplemental Supply and Other Related Projects**

Several projects are underway which focus on development of supplemental supplies into the Seaside Basin. These projects are briefly identified here to recognize these efforts as important and significant steps towards achieving the goals of the Seaside Basin adjudication, in particular to be able to reduce pumping in the basin to achieve the maximum perennial yield (safe yield) in the basin.

##### **4.1 California American Water - Coastal Water Project**

California American Water submitted an application for the Coastal Water Project (CWP) to the California Public Utilities Commission (CPUC) in July 2005. At this time, the CPUC is preparing the Environmental Impact Report. The CWP includes Aquifer Storage and Recovery program for storage of excess Carmel River winter flows into the Seaside Basin, and is a critical supplemental supply project for meeting the requirements of the Decision in the Seaside Basin Adjudication. In light of the Decision, it is likely that the water to be made available by the CWP will be adjusted to achieve California American Water's additional supplement supply requirements for the Seaside Basin.

Appendix C is the Scope of Work for the CWP ASR Program currently underway. Appendix D is a Technical Memorandum that reviews all existing data and studies pertinent to the ASR Program. Appendix E is a Technical Memorandum, which describes the site development plan for an ASR test well, and a monitoring well at the Bayonet Drive site. The ASR monitoring well, as identified above under the Phase 1 Monitoring Well Program, is recommended to be incorporated into the Seaside Basin Monitoring Well Network to provide additional data to the Watermaster.

##### **4.2 Monterey Peninsula Water Management District Phase 1 ASR Project**

The MPWMD Phase 1 ASR Project, when completed, will consist of an existing full-scale test injection well installed in 2001, and a second full-scale injection well that is currently under construction at the same site on former Fort Ord property immediately east of General Jim Moore Boulevard in the city of Seaside. During 2006, the MPWMD prepared its draft and final Environmental Impact Report (EIR) and obtained permits for the project. Construction of a second ASR well, in addition to the existing test well, was started in early 2007. Until such time as the CWP conveyance facilities are constructed, 6,700 linear feet of 16-inch temporary aboveground pipeline has already been constructed for conveyance to the ASR wells through the California American Water system,

Appendix F is the Executive Summary and Project Description from the EIR and provides additional detail on this project.

### 4.3 California American Water - Seaside Basin Adjudication Compliance Project

As a result of the Seaside Basin Adjudication, California American Water has analyzed capital improvement requirements to the Monterey system that are required to support the ASR on an expedited schedule. In addition to MPWMD's project, California American Water is proceeding with the proposed ASR Extension Pipeline Project. The ASR Extension Pipeline Project consists of the installation and operation of approximately 4,670 linear feet (LF) of underground pipeline (4,430 LF of 24-inch pipe, and 240 LF of 36-inch pipe). The pipeline alignment would follow General Jim Moore Boulevard (GJM Blvd.), on the former grounds of Fort Ord, in Monterey County, California. In locations where the roadway is being realigned, the pipeline will be constructed within the new alignment. The pipeline would begin at Canyon Del Rey Boulevard (State Route 218), connecting to the California American Water Company's water system upstream of the Del Rey Oaks pressure regulating valve station. A 24-inch pipeline would then extend northward, within the roadway of existing GJM Blvd., for approximately 1,400 LF. At this location, the alignment would then follow the proposed realigned GJM Blvd. northward approximately 3,030 LF to a point east of the intersection of Hilby Avenue and Mescal Street. From this location, a 36-inch pipeline would be constructed west for approximately 240 LF and connect to the existing 36-inch tee near the intersection of Hilby Avenue and Mescal Street. The Segunda Pump Station is also planned to be upgraded to support the ASR in 2008.

The MPWMD Phase 1 ASR Project includes a number of related actions, including installing a new injection/extraction well, ancillary facilities, and a pipeline connecting the well to the existing California American Water supply system; and replacing an underground pipeline connecting the existing Santa Margarita Test Injection Well to the water supply system with a larger, temporary aboveground pipeline. The ASR Extension Pipeline would link the supply system between the Del Rey Oaks Regulating Station to the existing temporary pipeline, which begins near the intersection of Hilby Avenue and Mescal Street and conveys water north to the new injection/extraction wells

## Appendices

- A. MMP Phase 1 Scope of Work, Budget and Schedule
- B. MMP Phase 2 Scope of Work and Budget
- C. Scope of Work for the CWP ASR Program
- D. CWP ASR Task 1 Technical Memorandum – Existing Data Review
- E. CWP ASR Task 2 Technical Memorandum – Test Well Site Development Plan
- F. MPWMD Phase 1 ASR Environmental Impact Report – Executive Summary and Project Description

**Appendix A**

**Seaside Groundwater Basin Management and Monitoring Program**

**Phase 1**

**Scope of Work, Schedule and Budget**

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**MANAGEMENT**


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**M.1****Program Administration**

<b>M. 1. a. Program Management Plan</b>	Preparation of a Project Management Plan to establish project goals and objectives, project description, scope of work, work breakdown structures, project organization, roles and responsibilities, contract and construction budgets, communications plan, quality plan, document control and data transfer plan, project controls, and billing procedures.
<b>M. 1. b. Project Budget and Controls</b>	Monthly invoicing, maintenance of internal budgets and schedules, management of subconsultants
<b>M. 1. c. Assist with Board and TAC Agendas</b>	The MPWMD team will closely coordinate with the RBF team, Watermaster staff and Technical Advisory Committee (TAC) representatives to ensure that needed Board and TAC agendas and report items are provided in a timely matter for meeting presentations.
<b>M. 1. d. Preparation and Attendance of Meetings</b>	The Project will require numerous meetings both internally and with outside governmental agencies and with the public. Appropriate members of the Team will attend the necessary meetings and prepare agendas and meeting minutes to facilitate the meetings. Planning and review meetings are assumed with the Watermaster's technical staff and consultants for a budgeted period of 12 months. High-level meetings to present updates to the Watermaster Board are budgeted for 12 months. At key milestones, additional meetings will be held that are focused on technical issues and key findings.
<b>M. 1. e. Prepare Board/ TAC Status Updates and Reports</b>	Provide Watermaster with monthly status reports indicating project progress, costs incurred, contract and construction cost trends, and problem identification and resolution. Provide assistance to the TAC in preparing technical summary reports and technical memoranda for the Watermaster Board.
<b>M. 1. f. Peer Review of Documents and Reports</b>	Assist TAC and Watermaster with peer reviews of documents and reports prepared by various Watermaster entities, as requested.
<b>M. 1. g. QA/QC</b>	The MPWMD team will provide quality control and assurance for all program administration materials generated under the program.
Deliverables	<input type="checkbox"/> Project Management Plan <input type="checkbox"/> Monthly Status Reports <input type="checkbox"/> Technical Data as required for Meetings

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**IMPLEMENTATION**


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**I. 1.  
Monitor Well  
Construction**

**I. 1. a.  
Coordination with Monitor Well  
Implementation Program**

Maintain coordination and consultation with Martin Feeney on development of Monitoring Well Construction Program.

**I. 2  
Comprehensive Basin  
Production, Water Level  
and Water Quality  
Monitoring Program**

Consolidated Seaside Basin Groundwater Resources Database

Groundwater resource monitoring within the Seaside Basin is currently being conducted by numerous entities. The programs consist of:

- Groundwater Production Monitoring;
- Groundwater Level Monitoring;
- Groundwater Quality Monitoring;
- Surface Water Monitoring; and
- Precipitation Monitoring;

For successful implementation of the Seaside Basin Monitoring Program, pertinent historical basic groundwater resource data obtained from the above-mentioned programs needs to be consolidated into a database to allow more efficient organization and data retrieval. The consolidated database will allow for simple identification of differences and discrepancies of datasets compiled by the numerous entities. Data gaps will become evident as well. In addition, the consolidated database needs to allow pertinent groundwater data to be efficiently organized, managed and housed in a single location to facilitate:

- Ongoing data collection;
- Data storage and retrieval;
- Distribution of basic data to Watermaster members and interested parties; and,
- Preparation of annual and periodic reports to the Watermaster.

Characteristics of both existing wells and wells proposed as part of the Seaside Basin Monitoring Program will be notated in the database, including type, location, construction details and other pertinent information. MPWMD already maintains a groundwater database that contains some of the features described above. Determine if the MPWMD database should be expanded or if a new database should be created. Assist the Watermaster in the review of the existing MPWMD groundwater database to help determine whether it is feasible and economical to incorporate both the historical data and the ongoing data to be collected as part of the Seaside Basin Monitoring Program.

Coordination with the Watermaster is required in order to verify the adequacy of the existing database and ensure data requirements are met. Completion of the enhancement or development of a consolidated database will allow the review of the available groundwater resource data to determine discrepancies,

differences, or data gaps.

#### Monitoring of Production Wells

As defined in Section D-5, Monitoring of Production Wells, of the RFP, the data to be collected by each owner and/or operator of inactive and active wells in the Basin shall be forwarded to the Watermaster for inclusion into the consolidated database.

### **I. 2. a. Basin Management Database Development**

#### **I. 2. a. 1. Coordination with Watermaster to Review Database**

##### **I. 2. a. 1. 1 Review of MPWMD Database to Catalog Historical Data**

Coordination with Watermaster to review adequacy of existing MPWMD database to consolidate, organize and manage historical groundwater resource data and existing well characteristics. Identify whether the existing database is sufficient to catalog the data to be reviewed as part of this Scope of Work. After review, additional Scope will be identified.

##### **I. 2. a. 1. 2 Review of MPWMD Database to Catalog Ongoing Data Collection**

Coordinate with Watermaster to review adequacy of MPWMD database to organize and manage ongoing groundwater data collection efforts and proposed well characteristics, as identified for Tasks 1 and 2. Identify whether the existing database is sufficient to catalog the ongoing data collection efforts and to archive proposed well characteristics. After review, additional Scope will be identified.

#### **I. 2. a. 2. Develop Scope of Work to Enhance or Develop New Groundwater Resource Database**

Upon the Watermaster's review of the existing groundwater resource database, draft and submit a Scope to either enhance the existing database, or develop a new consolidated database.

#### **I. 2. a. 3. Create Basin Management Database**

Under general direction and guidance from the MPWMD team, the Watermaster database will be formatted and generated to complement the features of the MPWMD's existing water resources database.

#### **I. 2. a. 4. Populate Database with Data from all sources**

Under general direction and guidance from the MPWMD team, the Watermaster database will be populated with the existing data from all available sources, including the MPWMD's existing database, and all applicable data from Watermaster pumper entities, as well as other data available from miscellaneous sources.

#### **I. 2. a. 5. Conduct ongoing data entry/ database maintenance**

Under general direction and guidance from the MPWMD team, all newly-acquired data will be added to the Watermaster database as it becomes available, and any appropriate database structure modifications will be made as

needed.

**I. 2. b.  
Data Exchange and Collection**

Incorporate ongoing groundwater monitoring data into the consolidated groundwater resource database. This will include the following subtasks:

**I. 2. b. 1.  
Establish Agreements and  
Schedule**

The MPWMD and RBF teams will closely coordinate to establish agreements and schedules for ensuring that all materials for Watermaster database development and ongoing maintenance are provided in an organized and timely manner for use by the Watermaster.

**I. 2. b. 2.  
Establish Data Types, Formats**

The MPWMD and RBF teams will closely coordinate to establish mutually acceptable data types and formats, which will provide the optimal benefit to the Watermaster for its recordkeeping and reporting purposes.

**I. 2. c.  
Develop Data Archiving  
Procedures**

Identify procedures for archiving collected field and electronic data.

**I. 2. d.  
Develop Data QA/QC  
Procedures**

Identify procedures for routine Quality Assurance/Quality Control of data collection program.

**I. 2. g.  
Enhanced Monitoring Well  
Network Evaluation**

Evaluate existing inactive production wells for possible inclusion with the existing and new monitoring well network. This will include the following subtasks:

**I. 2. g. 2  
Key Laguna Seca Sub basin  
Locations**

Existing and potential new monitor well locations at identified key locations within and near the Laguna Seca Sub area of the basin will be evaluated through consultation with the MPWMD team, report and file research, contacts with existing Watermaster member entities, and field inspections.

**I. 2. g. 3  
Key Southern Coastal Sub basin  
Locations**

Existing and potential new monitor well locations at identified key locations within and near the Southern Coastal Sub area of the basin will be evaluated through consultation with the MPWMD team, report and file research, contacts with existing Watermaster member entities, and field inspections.

**I. 2. g. 4  
Summary Technical  
Memorandum with  
Recommendations**

Upon completion of the research and evaluation efforts, a summary technical memorandum with recommendations will be prepared and distributed for review and input by all Watermaster member entities.

**I. 2. h.  
Laguna Seca Water Quality  
Investigation**

As an additional component to the enhanced monitor well network evaluation, all available historical groundwater quality data sources in and near the Laguna Seca Sub area will be located in coordination with the MPWMD team, in order to evaluate and provide recommendations on enhancement of water quality monitoring that will facilitate future updated groundwater resources assessment of the Laguna Seca Sub area.

<b>I. 3</b> <b>Basin Management</b>	<p>Brief review of supplemental water supplies will be conducted as warranted throughout the initial phase of the program. The effort devoted to this task is anticipated to increase once the consolidated database is developed and existing data is analyzed.</p>
<b>I. 3. a.</b> <b>Supplemental Water Supplies</b>	
<b>I. 4</b> <b>Seawater Intrusion Contingency Plan/Establish Seawater Intrusion Baseline</b>	<p>Thorough, systematic, and appropriate analyses of groundwater data will allow us to identify, track, and mitigate seawater intrusion in the Basin. Seawater intrusion is a slow process, which can be impacted by ground water pumping that impacts ground water levels, and, in turn, affects ground water quality general mineral concentrations. Analyses that help identify seawater intrusion include: graphs of ground water levels, pumping and water quality trends; and maps representing these data using differentiated symbology. The final step is to evaluate the relationship that the pumping and water levels have on water quality.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Time series of chloride concentrations. Chloride concentrations are the most dependable and recognizable indicator of seawater intrusion. Time series graphs from a single well can show steady increases in chloride concentrations that indicate seawater intrusion.</li> <li><input type="checkbox"/> Time series of ionic ratios. Typically, the molar ratio of sodium to chloride will often drop to near or below 0.85 in front of an advancing seawater wedge. Similarly, the molar ratio of calcium to sodium will rise in front of an advancing seawater wedge. These trends are due to the ionic exchange of sodium and calcium.</li> <li><input type="checkbox"/> Trilinear plots. Plotting major anions and cations on trilinear plots can show if water quality data from a single well is migrating towards seawater quality. Water quality plotted on does not migrate along a simple mixing line on trilinear plots if intrusion is due to an advancing seawater front. Data from Salinas Valley, however, suggests that water quality often does plot along a simple mixing line if intrusion is due to flow through abandoned or non-operating wells. This can help identify the intrusion mechanism in various places.</li> <li><input type="checkbox"/> Time series of Stiff diagrams. Plotting major anions and cations on stiff diagrams allows qualitative indication of seawater intrusion. Stiff diagrams are identified by their general shapes, each water type having a unique shape. A change in the shape of stiff diagrams may indicate seawater intrusion.</li> <li><input type="checkbox"/> Time series of Chloride concentration maps. Maps of chloride concentrations show the movement of a seawater intrusion front into a basin. Individual maps must be produced for each aquifer. Of importance is that all maps be developed with a consistent approach, ensuring that changes in the maps represent changes in data, not changes in contouring algorithms. The data will be presented in a Geographic Information System (GIS).</li> </ul> <p>For purposes of the Seawater Intrusion Contingency Program, until additional</p>

empirical data are developed and analyzed, the Seaside groundwater basin aquifers will be defined as seawater intruded when the chloride concentration in a coastal monitor well reaches approximately 100 mg/l and 250 mg/l for the Paso Robles and Santa Margarita aquifers, respectively. For a coastal production well, the standard will be 250 mg/l, given that some wells contain multiple aquifer formations that reflects a blend of these sources. These standards will be utilized until more comprehensive standards based on historical water quality data at individual monitor and production wells can be developed. The Watermaster will institute interim standards for notice of potential seawater intrusion so that appropriate preventive actions may be taken. Interim notice will be defined as 50 percent increase above ambient chloride concentrations for any specific monitoring well location.

In addition to establishing baseline chloride concentrations and monitoring chloride concentrations, other complimentary water quality parameters will be established and monitored to provide supplemental data for water quality trend analysis and characterization. Appropriate water quality parameters, data formats and data transfer procedures will need to be identified and coordinated.

<p><b>I. 4. a.</b>  <b>Oversight of Seawater Intrusion Detection and Tracking</b></p>	<p>MCWRA will provide general oversight over the Seawater Intrusion detection program.</p>
<p><b>I. 4. b.</b>  <b>Develop Seawater Intrusion Analysis Protocol</b></p>	<p>The RBF team will coordinate with MCWRA to adapt the existing seawater intrusion analysis protocol utilized in the Salinas Valley Groundwater Basin for use in the Seaside Groundwater Basin.</p>
<p><b>I. 4. c.</b>  <b>Prepare Baseline Water Level Contour Mapping</b></p>	<p>Under general direction and guidance from MCWRA, up-to-date baseline water level contour mapping will be prepared utilizing all available water level data from existing production and monitor wells, and proposed new dedicated coastal sentinel monitor wells.</p>
<p><b>I. 4. d.</b>  <b>Prepare Mapped Representation of Baseline Basin Pumping</b></p>	<p>Under general direction and guidance from MCWRA, mapped representation of recent (i.e., baseline) groundwater production will be prepared utilizing symbology adapted from the Salinas Valley Groundwater Basin.</p>
<p><b>I. 4. e.</b>  <b>Graph and Map Historical Data/Establish Baseline Water Quality</b></p>	<p>Analyzing historical water quality data serves two purposes: 1) It establishes baseline water quality; and 2) It identifies historical water quality trends. By relying on wells that are completed over short lengths, and in discrete aquifers to determine background water quality for various aquifers. Wells completed over many aquifers may show a hybrid water quality signature Use multiple approaches to identify water quality trends. Produce chloride time series graphs, ionic ratio time series graphs, stiff diagrams, trilinear plots (with standard seawater identified), and chloride contour maps for the time periods identified in Task 5.2. Arcview GIS 3.3 will be utilized to generate chloride contour maps per the procedures outlined in the RFP. A preliminary analysis of the graphs and maps will be conducted to establish baseline water quality and identify trends. In particular, compare water quality trends with water levels, pumping data, and recharge data to interpret both the aerial and vertical</p>

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distribution of seawater intrusion. The graphs, maps, and analyses will be submitted for review by the entire Watermaster Board. Modifications to these graphs and maps will be incorporated based on input from Board members.

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**I. 4. f.  
Analyze and Map Water Quality  
from Coastal Monitoring Wells**

Immediately after the coastal monitoring wells are installed and sampled, update data analyses with the data from these wells. New chloride concentration maps will be produced incorporating the data from the coastal wells. Because these new maps are the first maps with all data points included, they will serve as the baseline for future comparison. Water quality data from the new coastal wells precludes developing time series graphs during Phase 1, however the water quality data will be compared to water quality from similar, nearby wells to identify potential seawater intrusion until new data becomes available from the Phase 1 Coastal Sentinel Well Work Plan.

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**I. 4. g.  
Annual Report- Seawater  
Intrusion Analysis**

At the end of each water year, all water quality data will be re-analyzed. Semi-annual chloride concentration maps will be produced for each aquifer in the basin. Time series graphs, trilinear graphs, and stiff diagram comparisons will be updated with new data. The annual EM logs will be analyzed to identify changes in seawater wedge locations. All analyses will be incorporated into an annual report that follows the format of the initial, historical data report. Potential seawater intrusion will be highlighted in the report, and if necessary, recommendations will be included. The annual report will be submitted for review to the Technical Advisory Committee (TAC) and then to the entire Watermaster Board. Modifications to the report will be incorporated based on input, first from the TAC, then from Board members.

After the first annual report, analysis and reporting can be transferred to Watermaster Board or be extended, depending on the needs of the Watermaster Board.

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## Seaside Basin Monitoring and Management Program

### PHASE 1 BUDGET SUMMARY

Item	Martin Feeney	MPWMD/ RBF			Phase 1 Total
		MPWMD	RBF	MPWMD/ RBF Subtotal	
<b>Labor Costs*</b>					
M.1 Program Administration		\$27,720	\$80,900	\$108,620	\$108,620
I.1 Monitor Well Construction	\$97,600	\$9,504	\$14,471	\$23,975	\$121,575
I.2 Production, Water Level and Quality Monitoring		\$21,280	\$144,600	\$165,880	\$165,880
I.3 Basin Management		\$3,280	\$6,300	\$9,580	\$9,580
I.4 Seawater Intrusion Contingency Plan		\$23,712	\$88,800	\$112,512	\$112,512
<i>Subtotal</i>	\$97,600	\$85,496	\$335,071	\$420,567	\$518,167
<b>Direct Costs (Martin Feeney)</b>					
		<b>Direct Costs (RBF/MPWMD)</b>			
Permitting	\$34,040		Database Server Purchases	\$4,200	
Drilling- Bradley	\$690,000		Data Archiving Software Purchase	\$3,600	
E-Logs	\$6,000		Reproduction, Mileage and Miscellaneous	\$15,000	
Well Permits	\$6,000		Durbin Model Documentation (RBF)	\$40,000	
Induction Logs	\$4,000				
Laboratory Services	\$1,600				
Per Diem	\$8,400				
<i>Subtotal</i>	\$750,040			\$62,800	\$812,840
<b>TOTAL</b>	<b>\$847,640</b>	<b>\$93,296</b>	<b>\$390,071</b>	<b>\$483,367</b>	<b>\$1,331,007</b>





**Appendix B**  
**Seaside Groundwater Basin Management and Monitoring Program**  
**Phase 2**  
**Anticipated Scope of Work**

The tasks outlined below are those that are not anticipated to be completed as apart of Phase 1 of the Seaside Basin Monitoring and Management Program. It has been determined that the Tasks listed below are either dependent on results of the initial phase of the Program (and therefore subject to scope refinement); or, they are recommended for Phase 2 because Tasks in the initial phase must be completed before the tasks below can commence. By phasing implementation of the MMP, the Watermaster can better understand the Basin's baseline condition through the Phase 1 work effort before determining the exact scope and budget for Phase 2.

Some Tasks listed below are also depicted in the Initial Phase Scope of Work. This is because some Tasks recur throughout the program. For instance, data collection and database entry are continuous activities that will occur throughout the program. Program Administration Tasks will also occur on a day-to-day, as needed basis throughout the program.

## M.1

### Program Administration

<b>M. 1. a.</b> <b>Project Budget and Controls</b>	Monthly invoicing, maintenance of internal budgets and schedules, management of subconsultants
<b>M. 1. b.</b> <b>Assist with Board and TAC Agendas</b>	
<b>M. 1. c.</b> <b>Preparation and Attendance of Meetings</b>	The Project will require numerous meetings both internally and with outside governmental agencies and with the public. Appropriate members of the Team will attend the necessary meetings and prepare agendas and meeting minutes to facilitate the meetings. Planning and review meetings are assumed with the Watermaster's technical staff and consultants for a budgeted period of 12 months. High-level meetings to present updates to the Watermaster Board are budgeted for 12 months. At key milestones, additional meetings will be held that are focused on technical issues and key findings.
<b>M. 1. d.</b> <b>Prepare Board/ TAC Status Updates and Reports</b>	Provide Watermaster with monthly status reports indicating project progress, costs incurred, contract and construction cost trends, and problem identification and resolution. Provide assistance to the TAC in preparing technical summary reports and technical memoranda for the Watermaster Board.
<b>M. 1. e.</b> <b>Peer Review of Documents and Reports</b>	Assist TAC and Watermaster with peer reviews of documents and reports prepared by various Watermaster entities, as requested.
<b>M. 1. f.</b> <b>QA/QC</b>	MPWMD will provide general QA/QC support over the Seaside Basin Monitoring and Management Program.
Deliverables	<input type="checkbox"/> Monthly Status Reports <input type="checkbox"/> Technical Data as required for Meetings

## I. 2 Comprehensive Basin Production, Water Level and Water Quality Monitoring Program

**I. 2. a.  
Conduct ongoing data entry/  
database maintenance**

New data will be imported into the consolidated database, per submittal schedules previously established.

**I. 2. b.  
Data Collection Program  
Enhancements**

**I. 2. b. 1.  
Site Representation and  
Selection.**

If warranted, identify addition monitoring well sites to fill data gaps in existing program or to develop additional data that would be beneficial to the program.

**I. 2. b. 2.  
Collect Monthly Manual Water  
Levels.**

Each of the wells will be visited on a monthly basis, manual water levels will be measured via electric sounder, and dataloggers will be downloaded (if determined that dataloggers are required).

**I. 2. b. 3.  
Collect Quarterly Water Quality  
Samples.**

MPWMD may incorporate additional monitoring wells into their existing monitoring program. Samples collected will be submitted to a State Certified analytic laboratory for general mineral and physical suite of analyses.

**I. 2. b. 4.  
Update Program Schedule and  
Standard Operating Procedures.**

Conduct periodic audits and reviews of the data collection program and recommend improvements as warranted.

**I. 2. c.  
Reports**

The groundwater level and quality monitoring will be conducted on monthly, quarterly, and annual basis, as described. Reports summarizing data collected and analyzed will be submitted to the Watermaster on a schedule to be established. Reports would include:

- Water Quality and Water Level Quarterly Reports
- Annual Reports

**I. 3 Basin Management**

**I. 3. b.  
Enhanced Seaside Basin  
Groundwater Model**

Subsequent to the Phase 1 tasks of constructing new coastal sentinel monitoring wells and developing a consolidated database of groundwater production, water levels, and water quality, it is recommended that a new model be developed. This model will build from the work in the "Durbin" model, using a more commonly shared model format. Tasks that may be required to develop the enhanced groundwater model include:

- Oversight of Groundwater Model Development Program
- Identify Questions, Concerns, and Issues for Model- Develop Watermaster Goals
- Develop Scope to and Costs for Model
- Develop an Agreeable Basin Water Budget

- Extract Info from Other Models
- Import All Data into Model Environment
- Calibrate Model to Measured Data
- Run Model to Enhance Basin Management/ Address Questions

**I. 3. c.****Prepare Basin Management and Action Plan****I. 3. c. 1.****Supplemental Water Supplies**

Pending the outcome of work performed under Phase 1, additional supplemental supply analysis may address the following:

- Review Of Monterey Peninsula Water Supply Projects
- Distribution and Delivery System/ End Use Consumer Improvements and Mandatory Conservation Efforts
- Non-Potable Water Resources
- Out-of-Basin Imports
- Develop Technical Memorandum

**I. 3. c. 2.****Pumping Redistribution Strategies**

Pending the outcome of work performed under Phase 1, additional pumping redistribution strategies may address the following:

- Basin overdraft, mandatory GW reduction
- Salinity detection, mandatory GW reduction
- Reduced GW delivery impacts and solutions
- In Lieu, Voluntary pumping reductions
- Water Banking
- Salinity barrier system
- Develop TM on pumping variability

**I. 3. d.****Plan Preparation**

Preparation of detailed Basin Management Plan, summarizing results of Tasks I.3.a through I.3.c

**I. 4 Seawater Intrusion Contingency Plan****I. 4. a.****Oversight of Seawater Intrusion Detection and Tracking**

MCWRA will provide general oversight over the Seawater Intrusion detection program.

**I. 4. b.****Analyze and Map Water Quality**

Annual chloride concentration maps will be produced incorporating the data from the coastal wells. Water quality data from the Phase 1 coastal sentinel

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**from Coastal Monitoring Wells**

wells in Phase 2 can be used to develop time series graphs that are not included in Phase 1.

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**I. 4. c.  
Annual Report- Seawater  
Intrusion Analysis**

At the end of each water year, all water quality data will be re-analyzed. Semi-annual chloride concentration maps will be produced for each aquifer in the basin. Time series graphs, trilinear graphs, and stiff diagram comparisons will be updated with new data. The annual EM logs will be analyzed to identify changes in seawater wedge locations. All analyses will be incorporated into an annual report that follows the format of the initial, historical data report. Potential seawater intrusion will be highlighted in the report, and if necessary, recommendations will be included. The annual report will be submitted for review by the entire Watermaster Board. Modifications to the report will be incorporated based on input from Board members.

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**I. 4. d.  
(Contingency) Develop  
Response Plan**

If seawater intrusion is identified, immediately alert the Watermaster Board and assist the Board with developing a response to ensure adequate water supplies for reasonable beneficial uses. This will include implementing the measures detailed in Exhibit A of the Decision, devising a pumping redistribution plan, and securing alternative water sources if necessary.

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**Table 3**

Seaside Basin Monitoring and Management Program				
Phase 2 Estimated Budget Summary				
Item	Cost Description	MPWMD	RBF	Total
<b>Labor Costs</b>				
M.1 Program Administration		\$ 25,344	\$ 42,080	\$67,424
I.1 Monitor Well Construction		\$ -	\$ -	\$0
I.2 Production, Water Level and Quality Monitoring		\$ 37,260	\$ 58,112	\$95,372
I.3 Basin Management		\$ 4,920	\$ 128,277	\$133,197
I.4 Seawater Intrusion Contingency Plan		\$ 17,328	\$ 83,960	\$101,288
	<i>Subtotal</i>	\$ 84,852	\$ 312,429	\$397,281
<b>Direct Costs</b>				
	GeoSurveys			\$18,000
	Water Quality Lab Analyses			\$16,000
	Maintenance of WL and EC Transducers			\$4,000
	Reproduction, Mileage and Miscellaneous			\$15,000
	<i>Subtotal</i>			\$53,000
<b>TOTAL</b>				<b>\$450,281</b>

March 7, 2007

