



Jones & Stokes

EXHIBIT 1-C

Memorandum

Date: March 17, 2003

To: Henrietta Stern, Monterey Peninsula Water Management District

cc: Gregg Roy, Polly Boissevain

From: Mike Rushton

Subject: **Water Supply EIR Phase 2 Scope of Work**

Dear Henrietta:

Jones & Stokes and its subcontractors Camp Dresser and McKee (CDM) and Mussetter Engineering are pleased to submit a scope of work, cost estimate and schedule to complete Phase 2 of the Monterey Peninsula Water Management District (MPWMD) Water Supply Project California Environmental Quality Act (CEQA) compliance. This scope and cost reflect guidance provided by your Board of Directors and staff regarding the projects to be analyzed in an Environmental Impact Report (EIR), and the decisions the Board would like to be able to consider at the end of the CEQA process. This scope and cost modifies an earlier scope and cost submitted for Phase 2 work on August 12, 2002. The schedule reflects our best professional judgement on the time necessary to complete the CEQA process for a locally controversial project, with full public involvement and least risk of legal challenge.

Our scope and cost reflect MPWMD guidance to evaluate a local desalination project as the principal project for Board consideration. This project would include a desalination facility in the Sand City/Fort Ord coastal area, with associated small aquifer storage and recovery (ASR), wastewater reclamation and stormwater detention water supply elements to provide the full range of production levels MPWMD wishes to evaluate. A range of alternatives will be evaluated in lesser detail, including a large ASR project with associated other supply components, a desalination facility at Moss Landing, a new dam on the Carmel River, and off-stream storage in the Carmel River Valley.

There are several important points to note regarding this scope and cost. Some of these points relate to the range of actions the EIR will support; others relate to the feasibility and cost of the local desalination option being pursued as the principal project. These points are as follows:

- With the selection of the local desalination option as the preferred project and the review of other options at a lesser level of detail, the Board may still be able to determine that enough environmental documentation exists to make a decision on other alternatives without further

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engineering and CEQA work.

- The range of options being analyzed does not include a project that specifically relates to increased water rights on the Carmel River. The no-project alternative will be equivalent to the California State Water Resources Control Board not issuing new water rights for the 7,909 acre feet requested by MPWMD. There is no comparable project that analyzes some smaller increment of additional water rights on the river.
- The proposed project and range of options does not include analysis of water production levels capable of supplying General Plan build-out of the communities within Cal-Am's service area.
- To achieve the large production levels desired from a local desalination project (11,000 acre feet annually), CDM has proposed consideration of a relatively new technology for water supply development - horizontal directionally-drilled wells. While the drilling technology is proven for many applications, CDM is currently researching to identify similar applications to that proposed for the Sand City/Fort Ord coastline. They are looking for applications that demonstrate the technology for water production. Depending on the findings of the research, a demonstration project may be needed to show the feasibility of the technology for this application. Additionally, CDM believes that greater characterization of the off-shore environment is necessary to better define yields and potential impacts to other local projects, such as the Sand City desalination project and local groundwater pumpers, and is proposing geophysical surveys and groundwater modeling. The cost for this work is provided as part of the Phase 2 budget estimates. With potential permitting and access issues, field work may not be completed within the proposed EIR schedule.

If horizontal directionally-drilled well technology proves to be infeasible at the proposed location, water collection would occur using radial or vertical wells, with a significantly lower maximum production potential (possibly up to 6,000 acre feet annually).

- Our use of Mussetter Engineering to complete sediment modeling on the Carmel River is contingent on approval of Cal-Am, as Mussetter is currently working for Cal-Am on its San Clemente Dam project.
- To meet the proposed schedule, it will be necessary to achieve a high level of cooperation between our staff, MPWMD's staff, and key staff of other entities involved with water supply development in the Monterey Peninsula area. There will be minimal time periods available to review draft documents. It may be necessary to schedule Board meetings at times other than the regularly scheduled dates. Finally, it will be essential that the project and its alternatives will remain fixed from the outset of the process; changes in project description or range of alternatives may require extension of the completion date.

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- Because of the some of the uncertainties regarding the feasibility of some of the project elements (i.e. seawater collection systems, brine disposal options, etc.) we have added a contingency item to the cost estimate.
- We have added Optional Task 2-D “Detailed Hydrologic Investigations” and Optional Task 2-E “Cost Estimates for Program-Level Carmel River Dam and Moss Landing Desalination Projects” to the CDM scope and the cost estimate. These were included to address the feasibility of HDD wells and to update the capital and operating costs a Carmel River Dam and desalination plant located at Moss Landing.

If you have questions about our scope, cost or schedule, please call at your convenience. We look forward to discussing the Phase 2 effort with you and your Board at the March 27, 2003 meeting.

Mike Rushton

Attachments: Phase 2 Scope of Work; Cost Estimates

JSA email 3/21/03

Monterey Peninsula Water Management District Water Supply Project EIR Phase 2 Scope of Work

The following scope of work summarizes the tasks and assumptions that the project team will use to conduct Phase 2 of the Water Supply Project (WSP). Phase 2 consists of preparing a draft environmental impact report (EIR) in compliance with the California Environmental Quality Act (CEQA). It does not include preparation of a draft environmental impact statement (EIS) in compliance with the National Environmental Policy Act (NEPA). It is assumed that any NEPA compliance for the WSP would be conducted at a later date. The document will contain as many elements of a NEPA document as possible, but will not contain an analysis of project alternatives at an equal level of detail. The Phase 2 scope assumes that the project evaluation in the EIR will be a local desalination plant, a small aquifer storage and recovery (ASR) system, local wastewater reclamation and stormwater detention will be included in the EIR. Alternatives evaluated in the EIR will include a large ASR system, a desalination plant located at Moss Landing, a new dam on the Carmel River, off-stream storage in the Carmel River Valley, and no action. The scope also indicates the milestones that will help the project team meet an expedited release date of a draft EIR. The Phase 2 tasks are:

- Task 2-1. Finalize Project Alternatives
- Task 2-2. Prepare Administrative Draft EIR
- Task 2-3. Prepare Draft EIR
- Task 2-4. Conduct Hearings on Draft EIR
- Task 2-5. Attend Board Meetings/Workshops
- Task 2-6. Attend Quarterly Update Meetings

The scope is based on input from the Monterey Peninsula Water Management District (MPWMD) staff and Board of Directors and comments received from federal, state, and local agencies; interest groups; and the public during scoping for the WSP EIR. The cost to conduct each task under Phase 2 is shown in Table 1. A schedule of the tasks is also attached.

Scopes of work for engineering support tasks are included as attachments. Engineering support for description of the alternatives and cost analysis will be provided by Camp, Dresser, and

McKee. Sediment transport modeling of the Carmel River will be conducted by Mussetter Engineering.

TASK 2-1. FINALIZE PROJECT ALTERNATIVES

Based on input from MPWMD staff and information gathered during the scoping process, one principal project and four project alternatives will be evaluated in the EIR. The principal project will include construction of a local desalination plant in the City of Sand City, a small ASR project on former Fort Ord, wastewater reclamation and stormwater detention through use of cisterns. In addition to the no project alternative, the alternatives will include a large ASR system in combination with a smaller local desalination facility, a new dam on the Carmel River, and a large desalination plant at Moss Landing. These alternatives will be evaluated in less detail than the principal project, consistent with the requirements of CEQA. Off-stream storage in the Carmel River watershed will be evaluated as an additional potential water source. Under this task, the final alternatives will be developed and carried forward to the EIR for evaluation. The current configuration of alternatives is as follows:

- No Project (including two potential outcomes: no change from the water supply sources being utilized at the time of issuing the EIR Notice of Preparation; and eventual elimination of the illegal pumping of sub-surface flows of the Carmel River, with no replacement supply for Cal-Am customers);
- Large ASR system and a medium-sized desalination plant at Sand City, with smaller supplies coming from wastewater reclamation and stormwater detention;
- Carmel River Dam; and
- Moss Landing Desalination Plant

Schedule Assumptions

- MPWMD will approve the alternatives to be evaluated in the EIR at its March 27, 2003 Board meeting.
- MPWMD will approve a contract amendment to authorize the Phase 2 work at its March 27, 2003 Board meeting.
- MPWMD and Jones & Stokes will develop and agree on a detailed internal schedule for deliverables and review of deliverables by the end of the second week in April.

TASK 2-2. PREPARE ADMINISTRATIVE DRAFT EIR

Jones & Stokes will prepare the administrative draft EIR. This will include an outline of the EIR, a project purpose and need, a description of the project and project alternatives, a description of existing conditions, and an impact assessment. Jones & Stokes will provide MPWMD a detailed outline of the EIR, a project purpose and need and a description of the project and alternatives for review and approval prior to initiating the impact assessment and description of the setting. Once all of these elements are completed, Jones & Stokes will provide a completed administrative draft EIR to MPWMD for review and comment. The project team will meet with the MPWMD staff to receive comments and discuss issues. Jones & Stokes will then revise the administrative draft EIR as described in Task 2-3 below.

Assumptions

- Ten copies of the Administrative Draft EIR will be provided to MPWMD for internal review.
- The impact analyses of all project alternatives will be at a program-level of detail; only the elements of the principal project will be analyzed at a project-level of detail.
- Updated cost estimates will be developed for the Moss Landing desalination and the Carmel River Dam alternatives for comparison with the principal project.
- The analysis of the principal project will include 2 alternative pipeline routes as identified in the Phase 1 technical report, and 2 alternatives for brine disposal (disposal through beach wells along the coast at Sand City/former Fort Ord, and disposal through an existing wastewater outfall to Monterey Bay).
- The analysis of the principal project will consider 3 potential levels of water supply development.
- No new benthic floral or faunal surveys in Monterey Bay will be required to support the desalination project analyses.
- Monterey Bay water quality dispersion modeling will be conducted to analyze effects of the principal project, but not the Moss Landing desalination alternative or any of the other alternatives.
- Monterey Bay and groundwater quality effects of brine discharge to strata below the sea floor off of Sand City and the former Fort Ord, or to the floor of Monterey Bay through an existing wastewater outfall, can be determined without developing and

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manipulating new dispersion models. Existing models will be used to estimate effects.

- Seaside groundwater basin condition and water quality information will be obtained from existing basin reports; no new monitoring or sampling will be performed for the EIR.
- Model runs of CVSIM will be provided by MPWMD. CVSIM will be used only for the analysis of baseline conditions and the principal project. Hydraulic modeling will not be performed for the project alternatives; the analyses will be qualitative.
- Sediment modeling will be conducted for the baseline condition, the principal project and the cumulative condition. Modeling will not be conducted for the project alternatives. Qualitative discussions of sediment movement will be included for the alternatives.
- The fisheries setting section and impact assessment will be prepared by MPWMD
- Stand-alone technical reports for the resource topics will not be produced.
- For the planning topics (i.e., land use, agricultural production, public services, recreation, visual resources, utilities, economics, population and housing, environmental justice) existing information will be supplemented as necessary.
- For the traffic analysis, no modeling will be conducted.
- The air and noise analysis assumes that air emission and noise generation information for the Sand City desalination facility will be available from past environmental and engineering evaluations. These evaluations will be reviewed and modified as necessary, but additional development and manipulation of models or monitoring of existing noise levels will not be necessary. Existing noise levels at the ASR extraction and injection site will be recorded to support this impact analysis.
- Population growth effects associated with providing the highest level of water production (18,941 AFA) will be compiled by reviewing and referencing the growth analyses in CEQA compliance documents prepared for local jurisdiction general plans. No new population projections or modeling of growth-related effects on traffic, air quality, noise or water quality will be undertaken.
- Major sections of the administrative draft EIR will be provided to MPWMD for review as they are completed (e.g. project description, existing conditions, impact evaluation)
- MPWMD will consolidate all staff comments on the administrative draft EIR.

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- The EIR will not include an evaluation of effects on water rates associated with the project.
- The analysis does not include securing easements, right-of-ways or properties for project facilities.

Schedule Assumptions

- MPWMD review of draft sections will be completed within 2 weeks of receiving the sections from Jones & Stokes.
- Outline of the administrative draft EIR, the purpose and need statement, and the initial description of the project and alternatives will be reviewed and approved by MPWMD by May 23, 2003.
- The full administrative draft EIR will be complete by August 22, 2003.

TASK 2-3. DEVELOP DRAFT EIR

Jones & Stokes will incorporate comments received from MPWMD on the administrative draft EIR. Once the comments have been incorporated, Jones & Stokes will provide MPWMD with a "screen check" draft EIR for final review and approval before reproduction of the document begins.

Commensurate with producing the draft EIR, Jones & Stokes will draft the notice of completion (NOC) and a notice of availability (NOA) for MPWMD. Jones & Stokes will revise the NOC and NOA based on comments from the MPWMD. Upon approval by MPWMD, Jones & Stokes will ensure the NOA is published in two local newspapers and delivered to the Monterey County Clerk and the State Clearinghouse. The NOC will be forwarded to the State Clearinghouse with 15 copies of the draft EIR.

Assumptions

- Jones & Stokes will provide MPWMD with 2 copies of the "screen check" draft EIR
- Jones & Stokes will reproduce 200 copies of the draft EIR and provide 185 copies to MPWMD; 1 CD copy of the draft EIR to MPWMD; 15 copies of the draft EIR and one copy of the NOC will be delivered to the State Clearinghouse.

- MPWMD will be responsible for developing the distribution list and distributing the NOA and the draft EIR.

Schedule Assumptions

- MPWMD review of the "screen check" draft EIR, the NOC and NOA will be completed within 1 week of delivery by Jones & Stokes.
- The draft EIR will be released to the public and submitted to the State Clearinghouse on October 3, 2003.
- The State Clearinghouse will forward the draft EIR to the appropriate agencies within 1 week of receipt, starting the 45-day review period.

TASK 2-4. ATTEND HEARINGS ON DRAFT EIR

Jones & Stokes will assist MPWMD staff in preparing informational and presentation materials for the meetings, including fact sheets, presentation boards, and a PowerPoint presentation. We will prepare talking points for the meeting presenters (project spokespersons), and will work with MPWMD staff and consultants to strategize the hearing approach and format.

Assumptions

- There will be a total of two public hearings for the draft EIR; each hearing will be attended by 2 Jones & Stokes representatives.
- MPWMD staff will facilitate each meeting.
- MPWMD will supply and manage the mailing list and will be responsible for printing and mailing the public meeting notices.
- MPWMD will pay all advertising costs directly to news outlets for meeting publicity purposes.
- Informational material at the meetings will include 1 project fact sheet, 8 presentation boards, a meeting agenda, and a planning process flow chart.

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- Media relations beyond the activities described above will be negotiated as needed (including writing letters-to-the-editor, op-eds, and news releases and preparing for editorial board briefings).
- Jones & Stokes will attend two in-person preparation/strategy meetings.
- MPWMD will pay meeting facility fees directly.
- The public review period for the draft EIR will be 45 days; the public hearings will be held within that 45-day period.

TASK 2-5. ATTEND BOARD MEETINGS/WORKSHOPS

Jones & Stokes will attend up to 12 MPWMD Board meetings/workshops and will coordinate with MPWMD staff to develop topics to be discussed at the meetings and support materials. The objective of the meetings is to ensure that the MPWMD Board is apprised of the status of the environmental analysis.

Assumptions

- Two staff members from Jones & Stokes will attend each meeting/workshop.
- Jones & Stokes will prepare a power point presentation for each meeting/workshop.

TASK 2-6. ATTEND QUARTERLY UPDATE MEETINGS

Jones & Stokes will attend 4 quarterly update meetings during Phase 2 of the WSP. The quarterly update meetings will be open to the public and will provide for public interaction with Jones & Stokes and MPWMD staff.

Assumptions

- One Jones & Stokes staff person will attend each quarterly update.
- Jones & Stokes will provide a power point presentation for each quarterly update.

Optional Task 2-A. Update and Incorporate Carmel River Dam and Reservoir Project Information into the EIR

Under optional Task 2-A, Jones & Stokes will include a project level evaluation of constructing and operating the Carmel River Dam and Reservoir. The analysis will update and incorporate into the WSP EIR information from previous environmental documentation.

Schedule Assumptions

- Evaluating the Carmel River Dam and Reservoir project at the project level and incorporating information into the draft EIR/EIS is expected to delay the certification date of the EIR by 4-6 months.

Optional Task 2-B. Analyze the Moss Landing Desalination Plant at the Project Level

Under this option, Jones & Stokes will provide a project level evaluation of a desalination plant located at Moss Landing. This analysis will use the existing body of information to help determine the location of the desalination plant and pipelines. The location of these facilities may be modified as a result of updated information from siting evaluations and field surveys associated with conducting a project level study. Major issues associated with the desalination plant include discharge of brine and short-term construction related effects on vegetation and wildlife.

Schedule Assumptions

- Evaluating construction and operation of a desalination plant at Moss Landing at the project level and incorporating information into the draft EIR is expected to delay the certification date of the EIR by 4-6 months.

Optional Task 2-C. Analyze a Local Desalination Facility at Sand City (with no supporting water supply elements) as the Principal Project

This optional task assumes that the principal project to be analyzed in the EIR includes only a local desalination facility in the Sand City/Fort Ord area. The principal project will not include a small ASR, wastewater reclamation and stormwater detention to achieve the highest level of production (18,941 AFA) sought by MPWMD. All water supply elements beyond the local desalination facility will be analyzed in less detail. All other elements of this approach to CEQA

compliance will be similar to those proposed in Tasks 2-3 through 2-6. Optional Tasks 2-A and 2-B could be added to this optional task if desired by MPWMD.

Assumptions

- The principal project will include an 11,000 AFA local desalination facility in the Sand City/Fort Ord area. This level of production could supply enough water to meet the first and second levels of production requested by MPWMD (15,285 and 17,641 AFA).
- Project alternatives considered in less detail will include a large ASR supported by other supply elements, a new Carmel River Dam, a desalination facility at Moss Landing and off-stream storage in the Carmel River Valley.
- The level of effort needed to complete engineering descriptions and costs for the project alternatives will be the same as described in Task 2-2 above.

JSA email 3/21/03

Monterey Peninsula Water Management District
**CDM Scope of Work - Engineering Support for
Monterey Water Supply Project EIR - Phase 2**

Date: March 20, 2003

CDM's Phase 2 work includes engineering analysis to finalize the project alternatives and provide support for the development of the EIR. Phase 2 concludes with the submission of the draft EIR to the Monterey Peninsula Water Management District (District), for subsequent publishing. The scope of work for Phase 3 to address comments on the draft EIR and finalize the EIR for certification will be submitted to the District at the conclusion of Phase 2.

In Phase 1, CDM prepared the engineering assessment of the alternatives to develop and finalize project alternatives. Task 2.1 of the Phase 2 scope of work addresses changes to the Phase 1 budget and scope to address changes that have occurred since the project inception.

Task 2.1 Finalize Project Alternatives

This task will focus on further developing information for the desalination project at Sand City at a production level to be determined prior to evaluation. Desalination was originally scoped as a program-level evaluation but is now planned as a project-level evaluation. Project-level evaluations were incorporated into the Phase 1 budget where possible and facilities layouts and costs were prepared for a concept using horizontal directional wells. Phase 1 work focused on horizontal directional drilling (HDD) as a promising technology for local desalination seawater collection and brine disposal. However, technical issues remain to determine feasibility and refine potential project yields.

Jones & Stokes has confirmed that the CDM Phase 1 report has a sufficient level of detail for evaluation of a small aquifer storage and recovery project, recycled water or stormwater re-use project in the EIR. Therefore, CDM's budgeting for this task includes no further work for these elements.

This task assumes that local desalination projects will be formulated for the EIR using combinations of radial wells, HDD wells and brine disposal at the Monterey Regional Wastewater Pollution Control Agency (MRWPCA) facility, based on available information collected to date, with focused investigations for HDD wells, to meet the current EIR schedule, which requires an administrative draft EIR by August 2003.

Phase 1 identified the need for additional field investigations to confirm feasibility of HDD technology and to refine project yields. These investigations could be conducted in parallel with the EIR effort and included under the optional services task. The risk if these evaluations are not performed is that some alternative

identified in the EIR may later be determined to be infeasible, or could require changes that would require issuance of a supplemental EIR.

Task 2.1a Finalize Desalination Project Description

Budgeting for Phase 2 work assumes that information developed in Phase 1 will be further developed and/or supplemented to provide facilities layouts and cost estimates for project alternatives that meet a production level to be determined prior to analysis, from a local desalination project with different collector well and brine disposal options. These options may include:

<ul style="list-style-type: none"> • Horizontal directionally-drilled wells (HDD) in Sand City and Fort Ord, with HDD wells for brine disposal at Fort Ord
<ul style="list-style-type: none"> • Radial collector wells at Sand City with HDD wells at Fort Ord for brine disposal
<ul style="list-style-type: none"> • HDD wells at Fort Ord with brine disposal at Monterey Regional Water Pollution Control Agency (MRWPCA) outfall
<ul style="list-style-type: none"> • Radial collector wells at Sand City with brine disposal at MRWPCA outfall

The following work is included in this task:

- Develop preliminary list of alternative options to be included in the EIR. Review and refine with Jones & Stokes and MPWMD input.
- Update project facilities layouts for wells and pipelines for alternatives based on available information from Plan B, Phase 1 and/or hydrogeologic investigations.
- Identify extent of beach and dune area required and potential areas of disturbance for project wells (radial and/or collector wells) in Sand City and at Fort Ord. Task includes a two-day field trip to review proposed well sites.
- Update cost estimates based on revised project layouts.
- Evaluate impacts to RO treatment process, facility size and costs for radial wells that would draw a mixture of fresh water and seawater with a lower salinity.
- Prepare preliminary layouts and descriptions for Jones & Stokes for environmental assessments. Descriptions will not identify general footprint requirements and pipeline corridors, but will not include specific facility sizes or costs.
- Prepare summary memorandum including revised project description with updated facilities layouts and costs. This summary would be prepared as a supplement or Appendix for the Phase 1 report, and would have a similar level of detail on facilities.

Task 2-1b Focused Hydrogeology Research

The purpose of this task is to conduct a focused evaluation to identify previous studies that would assist in refining project yields and confirm project feasibility.

This task will include:

- Data review to identify, collect and evaluate data from previous investigations to characterize the on-shore and off-shore hydrogeology.
- Further research to identify HDD seawater well applications in operation and to refine construction methods and cost estimates for HDD wells.

Moss Landing Marine Laboratories, NOAA and the Naval Postgraduate School will be contacted as part of the data collection effort to characterize local hydrogeology. Information from this review will be documented in the summary memorandum.

Task 2-1c Investigation of Brine Disposal at Regional Outfall

The Phase 1 local desalination project investigated use of vertical wells, radial wells and directionally-drilled wells for seawater collection and brine disposal, and developed a project using directionally-drilled wells for seawater collection and disposal. This task would develop information for the EIR evaluation for the Monterey Regional Pollution Control Agency outfall. The task would include the following work:

- Obtain information on outfall from Monterey Regional Water Pollution Control Agency. Task includes one meeting with MRWPCA.
- Review available design and capacity information on outfalls to assess available capacity of outfall, and construction considerations for connection to outfall.
- Assess potential pipeline alignments and sizing for brine disposal line.
- Develop planning-level capital and operational cost estimates.
- Incorporate findings into desalination project technical memorandum.

Task 2-1d Numerical Modeling to Assess Potential Impacts to Groundwater Pumpers

The purpose of this task is to evaluate the potential for seawater collector wells to impact the Sand City Water Supply Project and existing groundwater pumpers in the Seaside basin. As part of the Phase 1 effort, a numerical model was developed for HDD wells at Sand City. This model will be refined to include more detail on local pumping in the Seaside basin. Modeling will specifically address the potential to move the seawater/freshwater interface inland and affect local pumpers. Two to three alternative configurations for seawater collector wells identified in Task 2-1a will be assessed.

Task 2-2 Prepare Administrative Draft EIR

Engineering support during preparation of administrative draft EIR, including:

- Address questions and provide additional information for project descriptions.
- Review of administrative draft EIR.
- Address District comments on engineering aspects of administrative draft EIR.

Task 2-3 Prepare Draft EIR

Engineering support during preparation of draft EIR, including:

- Input on project descriptions, as required, for draft EIR.

Task 2-4 Conduct Draft EIR Hearings

- Attendance at two public hearings on draft EIR. Public hearings assumed to be scheduled on same day.

Task 2-5 Board Meetings/Workshops

- Attendance at three Board workshops.

Task 2-6 Quarterly Update Meetings

- Attendance at one quarterly update meeting.

Project Contingency Fund

- This task is a contingency fund for work items not currently anticipated but identified during the course of the work.

Optional Tasks

The following four optional tasks have been identified:

- Optional Task 2-A Analyze Carmel River Dam at a Project Level
- Optional Task 2-B Analyze Moss Landing Desalination Plant at Project Level
- Optional Task 2-C Analyze a Local Desalination Facility at Sand City (with no supporting water supply elements) as the Principal Project.
- Optional Task 2-D Detailed Hydrogeologic Investigations for HDD Wells. This investigation would include:
 - Geophysical investigations to characterize the on-shore and near off-shore submarine conditions over the extent of the shoreline being considered for production and disposal wells. This work would be needed to assess project feasibility, to confirm Phase 1 estimates of well yields and number of wells needed.

- Geotechnical Investigation to characterize the on-shore conditions including collection and analysis of soil samples. Investigation will be coupled to the geophysical investigation to ground truth on-shore and off-shore investigation components and expand needed data set for project feasibility evaluation and design of the horizontal test well.
- Horizontal test well installation to evaluate the applicability and capability of this technology for feedwater supply and brine disposal. This work is needed if similar groundwater pumping applications for directionally-drilled wells cannot be identified in Task 2-1c. This work would also provide information that could be used to further refine radial well design and projected yields.
- Numerical modeling to refine project yields and potential impacts using information from the field investigations.
- Optional Task 2-E Cost Estimates for Program-Level Carmel River Dam and Moss Landing Desalination Projects.

Ballpark budget estimates have been developed for tasks 2-A, 2-B and 2-D. Should these tasks be included, detailed budgets would need to be developed.

Task 2-C would have the same budget as CDM's proposed scope of work for Phase 2, since no further engineering is required for elements other than desalination. A detailed scope and budget estimate for Optional Task 2-D was prepared in January 2003. This document is incorporated by reference.

Budgeting Assumptions

- District staff will provide any CVSIM evaluation required for alternatives.
- Budgeting does not include additional hearings/meetings for NEPA activities.
- No additional engineering analysis is required for the following options evaluated in Phase 1:
 - Aquifer Storage and Recovery Project
 - Recycled Water Projects (CAWD Extension and Regional Urban Recycled Water Project)
 - Stormwater Re-use using individual collection systems.
- No engineering analysis is required for the following program-level options:
 - Carmel River Dam project
 - Moss Landing Desalination project

- Technical memoranda will be stand-alone documents that could be incorporated into the Phase 1 report as new appendix material. Budgeting assumes CDM will submit a draft technical memorandum to J&S and the District for review and comments (8 copies) and a final technical memorandum to J&S and the District incorporating comments from the draft (17 copies and CD with document in PDF format).
- Jones & Stokes is conducting numerical modeling to assess subsurface or surface brine disposal dilution.
- No additional work is required for desalination plant sites for local desalination project.
- Geotechnical and beach and dune erosion issues will not be addressed.

CDM email 3/21/03

Mussetter Engineering, Inc. Scope of Services

Carmel River/San Clemente Dam Sediment Transport Modeling

Background

The reservoir impounded by San Clemente Dam, which is located on the Carmel River approximately 18 miles upstream from the mouth, has been substantially filled with sediment. Due to seismic considerations, actions must be taken to insure the safety of the dam.

To assist various agencies and stakeholders in understanding the potential impacts of various dam retrofit alternatives, Mussetter Engineering, Inc. (MEI) performed computer simulations of the hydraulic and sediment transport conditions in the river downstream from the dam under a contract with the California Department of Water Resources (CDWR). The simulations were performed using topography in the river between the dam and the coast that was developed in April and May 2001, and a 41-year period of mean daily flows that were developed using the CVSIM model. To provide a means of evaluating the effects of different hydrologic sequences on the model results, two different start-dates were used for the model runs: (1) a 1978 start-date was used to represent the response to a series of wet years immediately after the dam modifications, and (2) a 1985 start-date was used to represent a series of dry years immediately after dam removal. The model results provide estimates of the amount of aggradation that would occur in the downstream river under each scenario, and provide a basis for evaluating the effect of the aggradation on water-surface elevations during a large flood.

The purpose of the work proposed here is to evaluate the potential sediment transport and flooding impacts of various non-dam alternatives for water supply in the Carmel Valley. The original modeling that was performed for CDWR considered the downstream impacts of various hypothetical sediment releases, but did not evaluate the expected sediment transport behavior of the reservoir under these scenarios. For example, under baseline conditions, it was assumed that the reservoir would be full of sediment and would have negligible trap efficiency. Since the reservoir is not yet full, and the existing sediment delta is wide and flat compared to the upstream river, a significant amount of sediment will likely be trapped in the reservoir for a considerable period of time if the existing dam remains in place. As a result, the "baseline" sediment loading to the river in the simulation performed for CDWR is likely higher than would actually occur. In addition, the hypothetical sediment releases for the various dam notching and removal scenarios assumed sediment input at the capacity of the upstream approximately 1 mile of the river immediately below the dam over the entire time-period of the sediment releases. In reality, a headcut will develop in the existing sediment deposits with the channel in the incision resulting from the headcut

progressively widening and flattening over time. The assumption that sediment will be delivered to the downstream reach at the initial capacity may, therefore, be unrealistic. As a result, it is recommended that models of the existing reservoir be developed to simulate the delivery of the upstream sediment supply through the reservoir and over the dam under existing conditions, and that simulates the development of the headcut for the various dam notching scenarios to reduce the uncertainty associated with the predicted impacts of the sediment release.

In addition, it is MEI's understanding that the Monterey Peninsula Water Management District (MPWMD) is interested in evaluating the potential impacts of changes in the pumping along the reach. These impacts can be evaluated using the existing model of the river, and the new models of the reservoir, along with a modified flow record that reflects the proposed changes.

Proposed Scope of Work

MEI proposes to perform the following tasks to provide information with which to evaluate the potential impacts of the modified flows regime on the behavior of the river:

1. Baseline Conditions

A baseline conditions scenario will be developed to quantify the response of the river to water and sediment inflows with the dam remaining in place using the 41-year flow record that was used in the modeling performed for CDWR. Even with the reservoir nearly full of sediment, San Clemente Dam is currently trapping most of the inflowing sediment from the upstream watershed, and sediment trapping will continue into the future. As the reservoir fills with sediment, the quantity and character of sediment that will spill over the dam into the downstream channel will depend on the dynamics of sediment transport through the reservoir area. The primary effort in this task will involve the development of an HEC-6T model of the reservoir area to model this process. The output from the model will then be used as the supply to the existing HEC-6T model of the river downstream from the dam. Model results for this scenario will provide a baseline with which to compare results obtained for other sediment release and hydrologic scenarios.

The following specific subtasks will be performed as part of this task:

1. Develop an HEC-6T model of the reservoir area with the dam in place. Cross sections will be constructed using bathymetric data of the reservoir supplied by Ayres Associates, Inc. Sediment size gradations and the sediment transport function will be chosen to be consistent with the model of the river downstream of the dam. The upstream sediment supply that was used for the baseline condition runs that were made for CDWR will be used as the sediment inflow to the reservoir. This supply rate was developed based on the estimated amount of sediment that has deposited in the reservoir since its construction under chronic sediment loading conditions, and averages 16.5 ac-ft per year. To insure a realistic simulation of sediment transport through the reservoir as it continues to

fill with sediment, it may be necessary to make adjustments during the simulation to ensure a reasonable channel shape is maintained.

2. The reservoir model will be run for two 41-year periods (1978 and 1985 start dates) using CVSIM hydrology consistent with the original CDWR modeling to simulate reservoir sedimentation and sediment input to the downstream channel. A 5- to 7- year start period will be included in each of the simulations so that the reservoir configuration is as close as possible to the expected configuration when the downstream project(s) that will change the flow distribution in the downstream river are implemented. Output from the reservoir model will be processed to evaluate sediment trapping and sorting within the reservoir area.
3. The HEC-6T model of the river between the dam and coast will be run for the two 41- year periods (1978 and 1985 start dates) using output from the reservoir model as the upstream sediment supply. Output from the downstream river model will be processed to evaluate the response of the river to sediment trapping in the reservoir.

2. Baseline Conditions with Changed Downstream Hydrology

This scenario will simulate the response of the river to changes in river flows downstream from San Clemente Dam associated with proposed changes in the operation of the Carmel Valley water supply system, assuming that San Clemente Dam remains in place. It is MEI's understanding that changes in river flows will result from a reduction in groundwater pumping in the downstream portion of Carmel Valley, and increased diversion and/or pumping in the upstream part of the valley. It is assumed that the 41-year record of mean daily flows for the modified system will be provided to MEI for use in the analysis. Water and sediment Inflows from San Clemente Dam will remain the same as those used in Task 1, above.

Specific items to be completed as part of this task include:

1. Run the HEC-6T model of the river downstream from San Clemente Dam for the two 41-year periods (1978 and 1985 start dates) using revised flows from the CVSIM model to be provided to MEI, and the upstream sediment supply derived from the reservoir model developed for Task 1.
2. Process the HEC-6T model output to evaluate the response of the river to the changed hydrologic conditions, and compare the results with those obtained for the baseline conditions runs.

3. Dam Notching

A dam notching scenario is being considered in which the top 19 feet of the dam would be removed to meet seismic safety standards. If the notch were constructed, a significant portion of the sediment presently stored in the reservoir would be entrained and delivered to the downstream river. Based on the existing information, it is estimated that about 750 acre-feet of sediment would be released under this scenario.

The impact of the sediment release on the behavior of the downstream river was previously evaluated under the CDWR contract. The rate of supply {e.g., erosion of the

existing reservoir deposits} was estimated by assuming that the sediment would be released from the reservoir at the transport capacity of the approximately one-mile reach of the river immediately downstream from the dam. This approximation may not be realistic because the gradient of the incision into the reservoir deposits will flatten and the incised channel will widen over time. Additionally, at least limited armoring of the surface of the sediment deposits within the incision is likely to occur during the erosion process as the finer-grained sediment are selectively transported and the coarser grained material is left behind. Both of these processes will tend to reduce the rate at which sediment is delivered from the reservoir to the downstream river as the incision develops over time. An HEC-6T model of the existing sediment deposits will be developed to provide a more accurate estimate of the rate and characteristics of the sediment that will be delivered to the river. Because the existing HEC-6T computer code does not provide a mechanism for channel widening, it will be necessary to develop and implement code modifications that will allow simulation of this process.

The following subtasks will be completed to develop a model of the reservoir to simulate the evacuation of sediments in response to the proposed notch in the dam:

1. Modify the HEC-6T computer code model to allow channel widening during the incision process.
2. Develop the input data for the reservoir model.
3. Run the model for the 41-year simulation with 1978 and 1985 start dates, and determine the rate of sediment release from the reservoir for the proposed 19-foot dam notching scenario.
4. Rerun the downstream models with the new inflowing sediment rating curves developed from the reservoir model with the flow distribution used in the original modeling that was performed for CDWR.

Option Task 3.

Since the reservoir erosion model may be developed and implemented through work for California American Waterworks Company prior to authorization of the work proposed here, the results from Task 3. may already be available. If that is the case, no additional model runs will be necessary for this task, and the work will consist of a minor effort to compile and evaluate the previous results for comparison with results from Tasks 1 and 2.

4. Dam Notching with Changed Downstream Hydrology

This scenario will simulate the response of the river to changes in river flows downstream from San Clemente Dam associated with proposed changes in the operation of the Carmel Valley water supply system, assuming that a 19-foot notch is constructed in the dam. The following subtasks will be completed under this task:

1. The HEC-6T model of the river below San Clemente Dam will be run for two 41-year periods (1978 and 1985 start dates) using revised flows from the CVSIM

model provided to MEI and an upstream sediment supply derived from the dam notching scenario developed for Task 3.

2. Output from the model will be compared with results from Tasks 1 through 3 to evaluate the response of the river to the changed hydrologic conditions and notching of the dam.

5. Final Report

A report describing the methods, assumptions and findings of the analysis will be prepared.

Schedule and Budget

The above work can be completed within 90 days of notice to proceed. MEI's estimated cost to perform all of the above work except development of the reservoir erosion model for the dam notching or removal scenarios is \$35, 100. The estimated cost to perform the computer code modifications and develop the reservoir erosion model is \$37,500.

JSA email 3/21/03