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## **GRANT G. DAVIDS, P.E.**

*President/Principal Engineer*

### ***Education***

B.S., Agricultural Engineering, California Polytechnic State University, San Luis Obispo, CA.

### ***Professional Registrations***

Registered Agricultural Engineer, California (No. AG00431)

Registered Civil Engineer, California (No. C47199)

### ***Summary***

Mr. Davids has more than 35 years of agricultural and irrigation engineering experience in California, several other western states and overseas. For the past 25 years, his work has concentrated on assisting irrigation water suppliers and the irrigators they serve to strengthen their water management capacity through irrigation modernization, water conservation and environmental stewardship initiatives. Technical aspects involved with this work include water conservation planning and verification; facilities design and modernization; review and improvement of operation and maintenance programs; modeling and analysis of agricultural water systems from field scale to basin scale; formulation of conjunctive water management programs; assessing impacts of changing economic and regulatory conditions on agricultural water management; and assessing irrigation efficiency. Mr. Davids is intimately familiar with the wide range of inter-related technical, institutional, legal and economic factors influencing agricultural water availability, use and management, with project experience in the Sacramento, San Joaquin, Shasta and Imperial Valleys of California and elsewhere.

### ***Selected Experience***

#### **Imperial Irrigation District**

##### **Efficiency Conservation Definite Plan and Efficiency Conservation Program**

Mr. Davids served as Project Manager for development of an integrated on-farm and distribution system conservation program for Imperial Irrigation District. The program will enable IID to fulfill its water conservation and transfer obligations under the Colorado River Quantification Settlement Agreement (QSA). The project encompassed irrigation system evaluation, quantification of crop ET by water balance and remote sensing (SEBAL) techniques, analysis of spatial and temporal variability of water use and irrigation efficiency, integrated economic and hydrologic modeling, distribution system modernization, cost estimating, development of economic incentives, public outreach and technical report writing. The final plan maps out how IID will ultimately conserve and transfer 300,000 acre-feet of water annually through an integrated package of on-farm and distribution system improvements.

## **Imperial Irrigation District/Metropolitan Water District IID/MWD Water Conservation Program Verification**

Mr. Davids served as one of three consulting engineers invited to verify 105,000 acre-feet of annual water savings under the IID/MWD Water Conservation Program. The team of engineers worked independently under the general direction of a committee comprised of agency members to design and implement procedures to quantify the actual water conservation savings of a variety of system level and on-farm conservation measures, including: canal lining, regulating reservoirs, system automation, delivery flexibility, drip irrigation, and tailwater recovery. The team developed a conceptual framework to guide water conservation planning and verification, prescribed data collection to enable verification calculations, analyzed data and developed verification algorithms, and institutionalized the data collection and calculation procedures in an automated Water Information System maintained by IID.

## **Biggs-West Gridley Water District**

### **Gray Lodge Wildlife Area Water Conveyance Project**

Mr. Davids serves as the Biggs-West Gridley Water District technical representative on the Gray Lodge Wildlife Area Water Conveyance Project. The project involves planning, design and construction of various facility improvements valued at \$35 million to enable conveyance of additional water supplies to Gray Lodge as required under the Central Valley Project Improvement Act of 1992. Mr. Davids has reviewed of all aspects of the work performed by the Bureau of Reclamation's technical contractor, including: review of the project field data collection program and data quality control, research and establishment of appropriate design criteria, hydraulic (HEC-RAS) modeling of the District distribution system to assess the effects of conveying more water through the system, and evaluating the potential effects of canal and operational modifications on seepage. Mr. Davids introduced technical considerations into project planning and design that more fully and adequately described the project's effects on system operation and maintenance. This revealed the need to make more extensive improvements to the District distribution system than were originally identified. These improvements will ensure that District farmers will continue to receive high-quality, reliable irrigation service while additional water supplies are conveyed to Gray Lodge.

## **Stony Creek Fan Partners**

### **Stony Creek Fan Feasibility Investigation and Groundwater Production Element**

Mr. Davids served as lead consultant and project manager for a group of Sacramento Valley agricultural water suppliers known as the Stony Creek Fan (SCF) Partners, including Orland-Artois Water District, Glenn-Colusa Irrigation District and the Orland Unit Water Users Association. Mr. Davids managed the Conjunctive Water Management Feasibility Investigation and the Groundwater Production investigation. The Feasibility Investigation considered a wide range of facility and management options for enlarging reliable water supplies through coordinated use of surface water and groundwater. Under the Groundwater production element, the Partners are designing and constructing deep groundwater wells for purposes of testing the local deep aquifer. The Groundwater Production investigation involved design, construction and operation of five test-production wells for purposes of characterizing the properties of the deep (more than 750 feet below ground surface) aquifer known as the Lower Tuscan formation. Mr. Davids has handled the complex technical and administrative aspects of both project phases.

## **Deer Creek Irrigation District**

### **Near-Term and Long-Term Facilities Improvements**

Mr. Davids assisted DCID in acquiring grant funds to investigate and implement certain facilities improvements aimed at reducing the District's irrigation diversions from Deer Creek during fish-sensitive periods. Under the near-term improvements project component, the District's main division structure was replaced and flow measurement was added to improve water control. Davids Engineering designed, bid and provided construction management of this modest project. Under the long-term improvements component, Davids Engineering has conducted field investigations to characterize system performance and formulated alternative water conservation programs involving different degrees of facilities modernization. Both project components have been managed by Mr. Davids and implemented by a project team of Davids Engineering staff and hand-picked subcontractors.

## **Benton Irrigation District**

### **Comprehensive Water Conservation Plan and Feasibility Investigation**

Mr. Davids served as principal in charge of this investigation into the feasibility of reducing losses from the BID irrigation system in order to reduce diversions from the Yakima River, thereby increasing instream flows for anadromous fish. Mr. Davids supervised assembly of BID's historical water balance, quantification of water conservation potentials, and formulation and evaluation of alternative water conservation programs. The preferred alternative featured relocation of BID's diversion approximately 60 miles downstream on the river and conversion from a gravity open ditch and pipeline conveyance system to a new, pressurized distribution system. Davids Engineering prepared project designs and cost estimates up through the feasibility level of planning. The project was approved for funding by the Bureau of Reclamation and Washington State Department of Ecology, with final design and construction completed in 2010.

## **Glenn Colusa Irrigation District**

### **Resource Plan Water Supply and Water Transfer Element**

Mr. Davids managed development of Glen Colusa Irrigation District's historical water balance, which serves as the technical foundation for assessing GCID's historical water operations and management, reviewing water management policy, evaluating water allocation decisions, and planning future infrastructure improvements. Development of the water balance began with an assessment of GCID's historical water operations data and related data management processes, discussions with GCID staff regarding system operation and maintenance practices, and inspection of water measurement and control facilities. Based on the information gathered, Mr. Davids developed the water balance structure, selected the period of record to be analyzed, and specified the water balance computation algorithms and sequence. He supervised assembly of the necessary data and development of a linked system of Microsoft Access databases, Excel spreadsheets, and Goldsim applications that enable semi-automated assembly and updating of the water balance. The water balance model was calibrated through the adjustment of the deep percolation of applied water and canal seepage flow paths, so that calculated drain flows match historical records. This is one of the most complex water balances developed by Davids Engineering, featuring separate but linked sub-balances for the main canal, laterals and irrigated lands within ten operational areas, wildlife refuges, and surface drains. The water balance was prepared for the period 2001 through 2008 on a monthly time step.

## **Orland-Artois Water District**

### **Distribution System Pipeline Hydraulic Analysis**

OAWD is a Central Valley Project contractor served by the Tehama-Colusa Canal. The district distributes water to about 30,000 acres of land through a system of gravity and pressurized pipelines with canal side pumping plants. Due to shortages in CVP supplies, the district has initiated development of groundwater supplies to augment its CVP contract supplies. They presently have two deep wells which they have connected to their pipeline system. Davids Engineering assisted the district with identifying locations for new wells based on estimated well capacities, system capacity, historical demands, and pipeline pressure ratings. Hydraulic models of the pipeline system were developed in an Excel spreadsheet designed to efficiently evaluate a wide range of possible well tie-in points. The objective was to identify locations where wells could be connected to the system and run continuously at full capacity without exceeding pipe pressures ratings. Mr. Davids served as project manager and chief engineer on this project.

## **Dunnigan Water District**

### **Distribution System Hydraulic Analysis**

DWD is a Central Valley Project contractor served by the Tehama-Colusa Canal. The district distributes water to about 10,000 acres of land through a system of gravity and pressurized pipelines with canal side pumping plants. A part of a conjunctive water management program to bring surface supplies into the Yolo-Zamora area, DWD evaluated the capacity of its pipeline system serve the northern fringe of the Yolo-Zamora area without compromising the ability to meet district landowner needs. With Mr. Davids acting as project manager and chief engineer, Davids Engineering developed and calibrated hydraulic models of selected pipe laterals to establish peak hydraulic capacity. Davids Engineering then compiled and analyzed historical water delivery records to determine how much system capacity was available for conveyance of other water into the Yolo-Zamora area.

## **Pacific States Marine Fisheries Commission and the California Department of Fish and Game Little Shasta River and Shasta Springs Ranch Irrigation Efficiency Studies**

Mr. Davids served as project manager on these two separate but coordinated investigations into the potential to reduce irrigation diversions through irrigation facility and management improvements. The objective was to increase flows in the Shasta River and Little Shasta River to improve passage and rearing conditions for anadromous fish, primarily coho salmon. Due to the lack of historical records, both investigations featured design and implementation of field data collection programs spanning a 2-year period, and then extensive analysis of the data combined with consultations with the rancher owners and operators. In both cases, packages of facility and management improvements were identified that offered the most cost-effective means of increasing streamflow while sustaining agricultural production for cattle grazing.

Mr. Davids has worked on dozens of other irrigation projects.

## ***Professional Organizations***

American Society of Civil Engineers

Northern California Water Association

U.S. Committee on Irrigation and Drainage (Life Member):

- Board of Directors (1996-2001)
- Board President (2000-2001)
- Chair Long-Range Planning Committee

## ***Publications***

Mr. Davids has authored dozens of project reports and professional papers.