Exhibit WDCWA-3

Volume 1

DAVIS-WOODLAND WATER SUPPLY PROJECT

Draft Environmental Impact Report

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Lead Agency:
City of Davis, Public Works Department
In Association with:
UC Davis and City of Woodland

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Davis California

WOODLAND

UCDAVIS
UNIVERSITY OF CALIFORNIA

5.2.3 Treatment of Groundwater Supplies Alternative

One of the primary Project goals is to reduce the concentration of dissolved salts in the effluent discharged from the Project Partner's municipal WWTPs. An alternative strategy to reduce the salt loads in the WWTP discharge would be to treat groundwater supplies prior to distribution for municipal use. Conceivably, salts and other dissolved constituents could be removed by reverse osmosis (RO) before distribution of groundwater to the Project Partners' customers. Treating groundwater supplies could effectively reduce salt and other constituent loads.

Facility Description

Two groundwater treatment options were considered: (1) installing water treatment facilities at existing and future municipal water supply wells, and (2) installing two separate WTP facilities, one for the City of Davis and UC Davis and a second for the City of Woodland.

Installing Wellhead Treatment Facilities

The City of Davis currently operates twenty-one groundwater wells to meet municipal demand, the City of Woodland operates nineteen wells, and the UC Davis campus operates six wells. RO facilities would need to be installed at all or most of these wells to meet current and anticipated wastewater discharge limits. Individual-well RO facilities would be installed on existing wells located in existing residential neighborhoods, and at sites with sufficient space. Additional power lines and other electric power facilities would also need to be installed to provide sufficient energy for operating the RO and other appurtenant equipment.

Brine storage and disposal from the RO treatment process would also need to be accommodated. Storage tanks would need to be installed on concrete foundations and would need to be large enough to accommodate peak brine generation rates. An evaluation of construction challenges would need to be done on a site-by-site basis, but it is unlikely that well-head treatment at well locations with confined sites would be technically feasible because the areas surrounding many of the existing wells are developed and there is insufficient space to add necessary facilities at these locations.

Each wellhead RO treatment facility would require routine servicing, including the collection, storage, and disposal of saline brine waste. Therefore, each well site would require access by tanker trucks at intervals to transport and dispose of about 10 to 15 percent of the well's water production, the typical percentage of brine production at an RO facility utilizing current available treatment technology. If the entire 51.8 mgd water demand would be met by groundwater, about 26 to 36 mgd would need to go through RO treatment. RO treatment would result in production of about 2.6 to 5.4 mgd of saline brine. This volume of brine would require a tanker fleet of about 430 to 900 truck trips per day, assuming a capacity of 6,000 gallons per truck. Smaller truck transport capacity, to operate in residential neighborhoods, would increase the number of trucks proportionately.

The brine would need to be transported to a suitable disposal site. Discharge of the saline brine concentrate to local surface or groundwater is currently prohibited. Transport to a suitable saline sink or ocean outfall therefore would likely be required. It is expected that each truck would likely have a round trip of over 150 miles to dispose of the brine waste.

Dual Groundwater Treatment Facilities

Construction of two WTPs, one serving the City of Woodland, and one serving the City of Davis and UC Davis campus would require installation of untreated water transmission pipelines leading from each of the groundwater wells to the respective WTP, and installation of treated water transmission pipelines from the WTPs to the Project Partners' service areas. The WTPs would include RO treatment for most of the Project Partners' wells, to the extent sufficient to meet current and anticipated water quality regulations. A single, centralized WTP serving all three Project Partners is not practical because of the Project Partners' desire to operate separate groundwater systems.

RO would be required at each of the WTP sites. This process would generate waste salt brine of the same volume as described for the wellhead treatment option. About 2.6 to 5.4 mgd of brine would be produced and need to be disposed at a suitable location.

Conclusions Regarding Project Feasibility and Environmental Benefits

There would be at least three serious challenges associated with water supply desalting or demineralization: (1) installation of wellhead treatment facilities in residential neighborhoods, (2) installation of brine storage facilities, and (3) disposal of accumulated brine waste.

Current best available treatment technology generates about 10 to 15 percent saline brine waste. It is estimated that, to meet the new discharge requirements, about 50 to 70 percent of untreated water would pass through the RO treatment unit, and then be blended with the remaining untreated water. The exact percentage would depend on the salt concentrations of the water pumped from individual wells.

Based on combined Project Partners' 2040 demand of 51.8 mgd, brine disposal would range from about 2.6 mgd to 5.4 mgd of brine, with salinity concentrations of up to about 16,000 μmhos/cm EC.

Brine disposal is the most serious technical challenge that limits renders this alternative infeasible. Yolo County regulations limit deep-well injection of waste brines and strong brine concentrates would require special well designs to operate without adversely affecting local groundwater supplies or other beneficial uses. The other likely means of brine disposal would be conveyance to a treatment facility discharging to the San Francisco Bay or the Pacific Ocean. Currently the East Bay Municipal Utility District (EBMUD) accepts brine waste from industrial facilities in the San Joaquin Valley.

Assuming a typical double-tank truck capacity of 6,000 gallons, about 430 to 900 truck loads per day would be needed to haul the brine to suitable disposal facilities. In many areas a tank truck of this large size may not likely gain access because the wells are located in developed areas where trucks of this size may have limited access, and a smaller truck of about 3,000 to 4,000 gallon capacity would be required. This would substantially increase the required number of needed truck trips.

An existing industrial facility currently incurs a transportation and disposal cost of about $550 per tank truck load using the EBMUD facilities located in Oakland, California (Michael Boccadoro, personal communication, May 2006). The treatment cost component of this process is currently about $0.03 per gallon (Sophia Skoda, EBMUD, personal communication, September 2006). If similar costs were incurred by the Project Partners, the cost of brine transportation and disposal, calculated at 430 to 900 truck trips per day at $550 per truck trip would range from approximately $86 million to over $180 million per year, in 2006 dollars.

Constructing two WTPs capable of treating groundwater extracted from the existing and future well system would require development of a new collection system connecting the individual wells to the WTP, and a corresponding distribution system conveying supplies back to users in the service areas. Associated pumping stations, pipelines, pressure control facilities, and other storage/management systems would also be required.

Treatment of groundwater by RO would require additional pumping to make up for water lost during the RO process. Approximately 10 to 15 percent of the volume of treated water would be removed as brine. In order to meet anticipated demand, this volume would have to be made up by additional groundwater pumping and RO treatment.

Based on these conclusions, installing and operating a groundwater treatment alternative is infeasible. This alternative is also rejected because it would not be environmentally superior to the proposed Project and would likely result in substantial environmental effects associated with new truck traffic or brine pipeline construction, and brine disposal outfall.

5.2.4 Conservation-Only Alternative

The intent of this alternative, as described in the Notice of Preparation for this Draft EIR, was to develop a scenario that would rely upon water conservation measures to completely offset all future increases in water demand. To offset all future water demand increases through conservation, the City of Davis would need to reduce per capita water use by 33.2 percent between now and 2040, and the City of Woodland would need to reduce per capita water use by 41.8 percent.

Water use in both the Cities of Woodland and Davis is dominated by residential use, which accounts for 70 percent and 78 percent of total deliveries, respectively. Therefore, the primary focus of the water conservation would need to emphasize substantial residential water use reductions and significantly increased water use efficiencies.

5.4.2 Environmentally Superior Water Transfer Supply Option

Of the six potential water sellers, only Browns Valley Irrigation District (BVID) would rely upon conservation to supply water to the Project Partners. BVID's conservation program consists of eliminating losses from a leaking water conveyance ditch and would not involve curtailment of agricultural or other beneficial uses, or pumping of groundwater supplies. Therefore, BVID is the environmentally superior water transfer supply option. However, BVID would only be able to supply up to 3.1 TAF/yr of surface water to the Project Partners. This amount is significantly less than the approximately 30.0 TAF/yr of purchased water that would be required to help meet Project demand.

Water transfers from the other potential water sellers would have a less-than-significant impact on the environment. The environmental impact associated with each of the remaining five potential water sellers are essentially the same. None of these water seller options are environmentally superior than another.

5.4.3 Environmentally Superior Alternative

The Project will have significant and unavoidable impacts on: land use and agriculture, air quality, noise, and aesthetic resources. All of these significant and unavoidable impacts are associated with the construction of the Project components.

The Project will not have any significant and unavoidable impacts associated with the diversion of water supplies from the Sacramento River or the transfer of water supplies from the water sellers to the Project Partners. Therefore, none of the water supply alternatives analyzed in this EIR, including the proposed Project, will have any significant environmental impacts. However, the proposed Project can be considered the environmentally superior alternative for the water supply alternatives. The proposed Project will reduce the salt concentrations in the effluent discharged from the Project Partners' wastewater treatment facilities. Water supply Alternatives 1 through 4 would also reduce the salt concentration in the Project Partners' WWTP effluent, but not to the same degree as the proposed Project. For this reason, the proposed Project may be considered the environmentally superior water supply alternative.

5.4.4 Conclusions Regarding Water Supply Alternatives

The No Project Alternative

The No Project Alternative would continue reliance on groundwater supplies to meet the Project Partners' future water demand. The reliability of these supplies is not known and the water quality, while sufficient to meet current standards, is hard and contains high levels of TDS including salts and other constituents. The No Project Alternative therefore would not meet the Project Partners' objective of improving the quality and reliability of their drinking water supplies.