

Work Plan
Borrego Water District
Borrego Springs Pipeline Feasibility Study

BACKGROUND:

The Borrego Springs Community relies on a sole source aquifer to meet overlying water demands. Since these demands are projected to continue to exceed the natural supply to the basin, it is appropriate to seek supplemental, non-native water sources to support the long-term economic viability of the area. In order to satisfy this overdraft, it is necessary to evaluate alternative pipeline routings into Borrego for delivering a water supply source.

A water banking operation is also a possibility in another nearby groundwater basin (Allegretti Sub-basin). Thus, the importation of water into the area should consider not only the need to satisfy the current and near term overdraft on the basin, but should also consider the possibility of a combined importation project and a water banking operation in that sub-basin.

The work effort under this grant includes (1) the final design of a conveyance system that is common to all conveyance alternatives, and could provide a ‘bridge’ supply to BV from an area known as the Dr Nel property and (2) a feasibility study of extending the conveyance system along either of two alignments to the east. One alignment would be along HWY 78 to the Allegretti Sub-basin, a potential water supply source and then further east to a reservoir in the Imperial Irrigation District’s system. Another alignment to be studied would be along a power line easement from Ocotillo Wells to the IID distribution system.

The work under this grant also includes a preliminary evaluation of the Allegretti Sub-basin as a water source for BV and for water banking operation.

The work described in this scope is consistent with the water supply enhancement projects described in the district’s Integrated Water Resources Management Plan (March, 2009)

PIPELINE ALIGNMENTS:

There are three general alignments to be studied, but common to two of the alignments is an initial conveyance system from BV to HWY 78.

Common Conveyance System: Phase 1 do this conveyance system would be from BV to the HWY 78. BWD owns property at this location and prior exploration indicated that the groundwater in this area could provide a limited water supply for BV, perhaps as a temporary or ‘bridge’ supply. This pipeline segment (Phase 1) will be designed, along with a grading plan for the terminal reservoir, under this effort. From this location, the common conveyance system would continue along HWY 78 to an area known as the Allegretti Sub-basin near Ocotillo Wells

Conveyance System to Carter Reservoir: This section of the conveyance system would be from the terminus near Ocotillo Wells to IID’s Carter Reservoir. This section would not be needed if the Allegretti Sub-basin were found to provide adequate water supplies for BV.

Conveyance System to Westside Canal: An alternate to the routing described above, would be from the Ocotillo Wells area along an existing power transmission line to IID’s Westside Canal.

The third conveyance system to be addressed is from Borrego Springs to the Clark Dry Lake area.

Sources of Supplemental Water

Four sources of water appear to be available for importation into the Borrego Valley (BV). All sources are located to the southeast of BV¹ and could be conveyed to BV along alternate conveyance system routes.

Dr Nel Source: The nearest source to BV is the groundwater in the Dr Nel area. The groundwater reservoir in this area does not readily yield water, but the groundwater is of good quality. It is thought that this resource could provide a "bridge" source until plans can be developed to pursue the more extensive water found in the Allegretti sub-basin.

Allegretti Sub-basin: This groundwater basin has been defined as occurring in a 150 square mile area extending from San Diego County into Imperial County. Groundwater is currently extracted from this sub-basin and applied to a farming operation known as the Allegretti Farms (Farms). A 1995 report on the hydrogeologic character of the groundwater beneath the Farms reported that several high capacity wells (2,000 gpm), but with lower quality (1,200 to 1,800 mg/L), supplied the farming operation and that the historic estimated annual production for the period 1983-1994 ranged from about 3,500 to 6,500 acre feet per year (afy). Further, the report concluded that the water levels in the Farm's wells were dropping at a rate of about 3 ft/yr. If the water in this sub-basin were extracted for transport to BV, the extracted water would need to be treated for domestic consumption because of the salt concentration exceeds drinking water standards.

Very little is known about the characteristics of this sub-basin, but a 1970 report estimated the recoverable amount of groundwater in the sub-basin was about 5.75 million acre-feet.

Should an analysis of available data indicate that there is potential for developing a 'water bank' in the sub-basin, that possibility will be considered in this study.

Sources within IID: Two potential sources of water are within the Imperial Irrigation District.

'Exchanged' Colorado River Water: While it is understood that the Colorado River (CR) waters are fully appropriated and obligated, it may be possible to obtain a contract for northern California water and exchange that water for CR delivered into IID and subsequently transported to BV. This would require concurrence of several agencies and an analysis of the ability of the IID system to 'wheel' water through its canals to a convenient location for export to BV.

Irrigation Return Water: A second source within the IID system is the returned flows in the IID farm drainage system that conveys these waters to the Salton Sea. These waters are more saline than the CR waters and contain fertilizer and other chemicals. Consequently, a treatment facility would be needed to purify these waters for domestic use.

The fourth source is the groundwater basin underneath Clark Dry Lake to the Northeast of the Borrego Springs community.

¹ A third source of supplemental water could be from the Coachella Valley Water District (CVWD). However, that area is currently in an overdraft situation and their supplemental water supply is Colorado River water conveyed from the Colorado River via the All American (AM) Canal. Since IID also obtains its water supply from the AM Canal and their water distribution system is nearer the potential take-out to supply the Borrego area, the CVWD source will not be considered in this investigation.

Scope of Work

Study Element A- Pipeline Routing from Borrego to Ocotillo Wells

This Study Element will provide a design for the routing of a pipeline from the BWD to HWY 78 (Phase 1) and an evaluation of the opportunities and constraints associated with a conveyance system extension to Ocotillo Wells.

Task A1 –Survey and final design of Phase 1 of the common conveyance pipeline – Our current state of knowledge suggests that there is a relatively high certainty that, a water importation into Borrego would originate southeast of BV. Thus, even though this is a feasibility study for the most part, it is desirable at this juncture to prepare a survey and design of a Phase 1 pipeline and grading plan for the terminal reservoir, from the Rams Hill treatment plant along Borrego Springs Road to Highway 78.

Task A2 –Second leg of the common conveyance system to Ocotillo Wells - This investigation would be a review of the route from the intersection of highway S22 and HWY 78 along highway 78 to the vicinity of Ocotillo Wells near the Allegretti Sub-basin. State Property ownership maps and public right-of-way easements will be obtained along this route. The most appropriate alignment would be along public rights-away adjacent to or within the transportation system. The use of this existing transportation system would be carefully reviewed for crossing the Anza Borrego Desert State Park. To ensure and prevent encroachment on to the Park lands, an aerial topographic survey will be conducted. The deliverable will be a map of the alignment showing the opportunities and constrains of various segments of the route.

Task A2a – ROW along HWY 78 - This ROW corridor is very wide for most of SR 78 and there are existing utilities already allowed under an encroachment permit, e.g. a fiber optics project was installed in the early 1990's within SR 78. Additionally a large portion of SR 78 ROW goes through federal (BLM) lands, thus concurrent use would require approval from BLM as well as Caltrans. Normally, Caltrans does not allow for a longitudinal encroachment within access controlled ROW and discourages it within conventional highway rights of way. Thus, a formal exception approved by Caltrans HQ Permits in Sacramento will most likely be needed. An early meeting with Caltrans to discuss a conceptual idea well in advance of any engineering studies would be appropriate.

Study Element B- Pipeline Routing from Ocotillo Wells to Carter Reservoir

Task B1 - Conceptual pipeline routing to Carter Reservoir - This investigation would include a review of the route from Ocotillo Wells to IID's Carter Reservoir. Property ownership maps and public right-of-way easements will be obtained along this route. The most appropriate alignment would be along public rights-away adjacent to or within the transportation system. The use of

this existing transportation system would be carefully reviewed. The deliverable will be a map of the alignment showing the opportunities and constraints of various segments of the route.

Study Element C- Pipeline Routing Investigation along Power Line from Ocotillo Wells to IID's Westside Canal

Task C1 – Alignment along IID power line easement – One of the most attractive pipeline routings appears to be from the Ocotillo Wells area along an existing power line alignment to upper reaches of the IID's Westside Canal and. This alignment would appear to be the most direct route from Borrego, but would not incorporate the groundwater benefits of the Allegretti sub-basin (potential water source). A question has arisen as to the existence of an easement for the power line. A thorough investigation is needed to determine if this alignment is a potential route for a pipeline. Discussions will be held with IID. Property maps and easements that may exist will be obtained and reviewed. A satellite photo will be obtained and used to evaluate routing options and land uses along the proposed route.

Study Element D – Pipeline from Borrego Springs to Clark Lake Aquifer

Task D1 – Identify alignment for transmission line from Borrego Springs to Clark Lake – One of the closest areas that may yield additional water supply to the Borrego Springs area is the area to the Northeast known as Clark Dry Lake (“Clark Lake”) Water samples from the northern side of the lake show that the water quality of the area is suitable for drinking water, and well pumping rates are the subject of another possible grant to address the amount of water that is available. However, the first task, as identified herein, is to delineate the best route to obtain the water through alternative routes to the north side of the lake, and perform preliminary designs of the selected route. Deliverables: a memorandum report relative to right-of-way issues, and preliminary survey and design drawings for the transmission main.

Study Element E – Pipeline Routing Environmental and Permitting Issues

Task E1 - Identify environmental issues for all pipeline routings - Crossing the State park will present a difficult problem with respect to minimizing any environmental impacts to the flora and fauna of the park. Meetings will be held with the park authorities to identify existing environmental surveys that have been conducted along the proposed pipeline routing segment. Environmental issues will also be identified for pipeline routings in the areas located outside the State Park. Deliverable: A memorandum report documenting the meetings and discussions. CEQA, NEPA and other permits needed to construct along each routing will be identified.

The following agencies will be contacted:

California Department of Parks and Recreation
U S Bureau of Land Management
U S Fish and Wildlife Service

California Department of Fish and Game
State Lands Commission
Air Quality Management District
California Department of Transportation
County of San Diego Department of Transportation

Each agency will be contacted to determine agency concerns, approvals and permits required for the project. Significant CEQA issues under the California Environmental Quality Act, including growth inducement, will also be identified. Deliverable: A technical memorandum describing the approval and permits required and the identification of significant environmental issues.

Task E2 – Modify pipeline maps - The opportunities/constraints maps developed in Study Element A will be modified to reflect environmental concerns as identified in Study Element E. Potential impacts and alternative mitigation measures for both the park area and the areas outside the park will be identified. These mitigation measures will be included in the final environmental documents to be prepared for the selected project.

Study Element F: Allegretti Sub-basin as a Source Water Study

This Study Element will analyze and define water source availability from the Allegretti Sub-basin for importation into the Borrego Valley. The storage potential (water banking) of the Sub-basin will also be preliminarily evaluated.

Task F1 – Coordinate with IID’s storage and recovery investigation – Recently, the IID announced the initiation of a water storage and recovery investigation to store surplus water in such times that their needs are less than their available supplies for subsequent extracting and deliver into the system in years when their need exceed their available supplies. Their investigation will study groundwater basins in or near their delivery system and may include the BV area and the Allegretti Sub-basin. Thus, early coordination with IID will be essential to expedite both studies and avoid duplicative efforts.

Task F2 – Groundwater export issues. – The Allegretti sub-basin area is located within the Imperial County. The County has adopted a General Plan component which requires obtaining a license to export groundwater out of the County. Discussions with Imperial County will be necessary to determine if they would accept a water trade to allow for export of the water from the Allegretti Farm or some other form of compensation. Deliverable: a memorandum report documenting the meetings and discussions.

Task F3 – Obtain all published reports on the Allegretti Groundwater sub-basin - Reports have been published by the USGS and a consulting firm. These will be reviewed in detail.

Task F4 – Obtain well completion reports, production and quality data for the sub-basin - Well completion reports exist with the DWR and the County of Imperial. These sources will be visited for data availability. Groundwater production information from the ‘Farms’ would be essential in the study. Some data exists as part of a lawsuit by the Farms against the County.

These and other sources will be investigated, such as information derived from the drilling of geothermal wells to the north of the area.

Of special interest is the area to the northwest of the Allegretti Farms, especially that area of the sub-basin that lies with San Diego County. A report published in 2002 indicated that a well, known as the Payne Well, located within the sub-basin, about 1-1/4 miles east of the San Diego-Imperial Counties boundary, indicated that the groundwater pumped from this well contained a relatively low TDS concentration for the region (<2000 mg/L). And further, the well was perforated in both the shallow and deep aquifers and it is known that the shallow aquifer contains relatively saline water. Thus, the deep aquifer at this location may provide good quality water.

Task F5 – Review of ‘source’ data from the existing groundwater model - The County of Imperial contracted with a consulting firm in the 1990s to develop a numerical model of the groundwater resources in the county. It is known as an Integrated Groundwater Surface Water Model (IGSM) and is finite element based. The 1995 model included a large portion of the sub-basin of interest. The model and report will be obtained from the Imperial County and its source data will be reviewed for possible updating and future use in a ‘water bank’ facility in the sub-basin. The input data to the model will be scrutinized for sources and accuracy.

Task F5a – Evaluate the potential use of the County groundwater model - A working model of the sub-basin would be useful in identifying any impacts on the springs that discharge groundwater below the farms and in estimating the potential for developing a water bank. Since the recharge into the sub-basin would necessarily be by well injection (the deep aquifer is confined by overlying clay strata) mounding potential and upward migration of the injected water into the shallow aquifer should be studied. This task will define the level of effort and approximate cost to bring the existing model to a useful condition. However, it is not envisioned that the model would be operated as part of this study.

Task F6 - Conduct additional sampling and testing - It may be necessary to collect samples from existing wells, such as the Payne well and other wells for identification of constituents that maybe problematic for the Reverse Osmosis process that may be necessary to remove salinity from the source water.

Task F7 – Identify water level trends and water quality trends - All water quality data for the sub-basin will be graphed for possible trend indications.

Task F8 – Prepare technical memorandum report - All information obtained in tasks 1 - 7 will be reviewed and analyzed to define the characteristics of the sub-basin. A technical memorandum report will be prepared to note progress to date.

Task F9 – Identify alternative brine disposal options – If the Allegretti sub-basin is determined to be a feasible water supply source for BV, then brine disposal alternatives would need to be developed and analyzed. These would include discharge into an existing spring located east of the Farm, a pipeline from the desalting facility to the Salton Sea or the use of evaporation ponds.

Task F10 - Evaluate Water Banking issues in the Sub-basin - Since the deep aquifer is considered to be confined, the recharge of banking water must be by injection wells. Several issues must be considered: will the injection mound at the injection well field limit the injection amounts and what percentage of the injected water can be extracted during the recovery phase of the storage before the native waters of poor quality begin to degrade the injection 'bubble' and what percentage of the injected water is likely to escape from the injection bubble, considering the eastward gradient in the sub-basin. These issues will be preliminarily identified qualitatively addressed for future detailed evaluation.

Task F11 Environmental and regulatory issues identification – If the storage and extraction of ground waters appears to be technically feasible, a cursory environment review will be necessary to identify the signification issues that affect the banking and extraction concepts. A discussion with the Colorado River Basin Regional Water Quality Control Board will be necessary.

Task F12 – Prepare a summary report – A report will be prepared summarize the findings, conclusions and recommendations concerning the Tasks F1-11, and will incorporate the progress report in Task F8, as amended following review from stakeholders.

Study Element G - IID as a Source Water Study

As indicated earlier, two sources of water may be available within IID. Colorado River (CR) waters through an 'exchange' and 'returned' flows in the IID farm drainage system that conveys these waters to the Salton Sea. These waters are more saline than the CR waters and contain fertilizer and other chemicals. Consequently, a treatment facility would be needed to purify these waters for domestic use.

Task G1 – Discuss with IID the possibility of 'wheeling' water through their system – Should it be possible to obtain a contract for northern California water and exchange that water for CR delivered into IID and subsequent transported to BV, the concurrence of IID would be required.

Task G2 – Analysis of IID delivery system for 'wheeling' - An analysis of the ability of the IID system to 'wheel' water through its canals to a convenient location for export to BV would be required. It is expected that this analysis would be performed by IID.

Task G3- Identify Colorado River 'place of use' restrictions and other constraints - In prior discussions with CR water rights holders, it was mentioned that there are restrictions concerning the use of Colorado River water outside the designated 'place of use' or the defined service area boundaries of those agencies having rights to the River. If a 'water bank' at the Allegretti Sub-basin appears technically feasible, then this Task will needed to be conducted as CR water would be stored, with some loss in quantity, outside the CR service area. The following agencies will be contacted:

- U S Bureau of Reclamation
- Colorado River Board of California
- State Water Resources Control Board

Deliverable: a memorandum report.

Task G4 - Return flow capture issues – As indicated earlier, a potential source of water is the returned flows in the IID farm drainage system that conveys these waters to the Salton Sea.

There are a multitude of issues with regard to obtaining the ‘right’ to use these waters:

- Ownership of these waters
- Water quality - These waters are more saline than the CR waters and contain fertilizer and other chemicals. Consequently, a treatment facility would be needed to purify these waters for domestic use.
- Impacts on the Salton Sea if these waters are diverted from the sea.

These issues will be briefly explored to define any ‘fatal’ flaws in their potential use as a supply source for BV.

Task G5 – Determine the quality of ‘return’ flows and the need for demineralization – This task will identify the level of water treatment required to reduce the mineral quality to drinking water standards.

Study Element H – Final Pre-feasibility Report and Phase 1 of Common Conveyance System Design

Task H1 – Final report preparation – A final report will be prepared summarizing the findings, conclusions and recommendations of the study.

Task H2--Survey and design of common conveyance system and terminal reservoir site--Aerial Surveying of the importation line will be conducted and Engineering Plan Drawings prepared from that data, as well as a siting and grading plan for the terminal reservoir.

PROJECT SCHEDULE AND COSTS

<u>TASK</u>	<u>COMPLETION DATE</u>	<u>COST(\$)</u>
A	December, 2010	20,000
B	March, 2011	30,000
C	March, 2011	20,000
D	December, 2010	140,000
E	September, 2011	35,000
F	June, 2011	100,000
G	August, 2011	30,000
H1	September, 2011	20,000
H2	December, 2010	90,000
	<u>TOTAL:</u>	<u>\$485,000</u>

ENVIRONMENTAL EFFECTS

The environmental impacts of the proposed study are addressed in the Environmental Information Document (EID) which is a part of this application.