EXHIBIT B

SCOPE OF WORK

PURPOSE

The purpose of EXHIBIT B is to outline the Scope of Work associated with the Texas Water Development Board Research and Planning Fund Research Grant (TWDB Contract No. 1004831105)

BACKGROUND

Task 1 - Upflow Calcite Contactors Desktop Study. The use of upflow contactors globally is recognized to be an emerging method of post-treatment of permeate to provide a non-blended, stable, non-corrosive, finished water. The technology has rapidly gained ground on a global scale where desalination provides a drought-proof supply of drinking water, but design criteria to develop these systems is not established in the United States. A preliminary review of technical papers will be performed so that global information can be condensed and presented with the goal to better assist designers in the development of future designs.

Task 2- Upflow Calcite Contactor Pilot Study. Typically, brackish groundwater RO permeate is blended with feed water to provide appropriate pH, alkalinity and hardness adjustment of finished water to prevent distribution infrastructure corrosion. However, blending the feed and permeate may be limited by high concentrations of emerging contaminants, nitrates, arsenic, or radionuclides in the groundwater. The use of upflow calcite contactors for post-treatment of RO permeate is an emerging technology to provide a non-corrosive finished water without the use of bypass blending. However, there is insufficient guidance for optimizing upflow calcite contactor design based on loading rate, particle size, and calcite purity. These design parameters will be evaluated during piloting with the goal of developing guidance criteria for calcite contactor design.

SCOPE OF SERVICES

PROJECT MANAGEMENT AND COORDINATION

CONTRACTOR will provide project management to coordinate, conduct, and manage the work including buget and schedule. The project manager will make staffing allocations, manage quality, monitor budget versus progress and approve project invoices. Quarterly progress reports will be submitted to TWDB as an attachment to invoices in accordance with TWDB guidelines.

Within the first 60 days of the commencement of this CONTRACT, CONTRACTOR will consult with TWDB staff to prepare a list of entities that potentially may be affected by the results of this RESEARCH PROJECT. With the FINAL REPORT, the CONTRACTOR will provide an updated list of entities to TWDB staff that potentially may be affected by the results of this RESEARCH PROJECT.

Deliverables:

- *Quarterly Progress Reports*
- *A list of entities to TWDB staff that potentially may be affected by the results of this RESEARCH PROJECT.*

TASK 1 - UPFLOW CALCITE CONTACTOR DESKTOP STUDY

1.1 - Literature Review

CONTRACTOR will perform a literature review by analyzing published reports and documents related to upflow calcite contactors in peer-reviewed journal articles and published or located (but not limited to) in university studies..

1.2 - Calcite Manufacture Survey

CONTRACTOR will identify and contact up to five U.S. calcite manufacturers to determine specifications (for example, NSF Certification, purity, and particle size) of their products.

1.3 - Data Gap Analysis

CONTRACTOR will assess the results of previous work elements for potential gaps in information with respect to what additional studies might be undertaken to bridge those gaps. Based on best professional judgment, a preliminary set of recommendations for studies to bridge data gaps will be presented in Component A of the Draft Final and Final Report (Task 1.4). A preliminary ranking will be performed to prioritize future studies.

1.4 – Component A of Draft Final Report

The literature review, calcite manufacturer survey, and data gap analysis will be summarized by the CONTRACTOR as Component A of the Draft Final Report. Component A will be submitted to the TWDB for review. Component A will be submitted with the draft pilot testign protocol (Task 1.5). It is assumed that TWDB will have 45 days to review Component A and the draft protocol, after which the CONTRACTOR and TWDB will meet to discuss review comments. Appropriate comments from TWDB will be incorporated into Component A of the Final Report, which will be submitted to TWDB as part of the final report (Task 2.5).

1.5 - Prepare Draft and Final Protocol for Pilot Testing

CONTRACTOR will prepare and submit a draft protocol to the TWDB for initial discussion of pilot testing goals, requirements, and to present the preliminary pilot testing plan for Task 2. The draft protocol will be submitted with Component A of the Draft Final Report (Task 1.4). TWDB will have 45 days to review the draft protocol and Component A, after which the CONTRACTOR and TWDB will meet to discuss review comments. CONTRACTOR will incorporate TWDB

comments as appropriate and the final protocol will be submitted to TWDB. Final Protocol will be included in the appendix of the Final Report.

Task 1 Deliverables:

1. *Draft Final Report Component A – State-of-the-Technology for Upflow Calcite Contactors*
2. *Draft Pilot Testing Protocol*

TASK 2 – UPFLOW CALCITE CONTACTOR PILOT STUDY

2.1 - Pilot Equipment Mobilization and Assembly

CONTRACTOR will mobilize and assemble the following processes for pilot testing:

A. A pilot-scale carbon dioxide generation and injection system.

B. Up to four upflow calcite contactors (design specifications to be determined after Task 1 is completed).

Additional ancillary equipment, such as appropriate water quality probes, sample taps, and piping will be included in the upflow calcite contactor construction.

2.2 - Pilot Plant Operations

CONTRACTOR will utilize facilities at the Kay Bailey Hutchison Plant in El Paso, Texas to produce the permeate needed for the upflow calcite contactor pilot operations. Pilot testing of the upflow calcite contactors will be conducted with four experiments, in which hydraulic residence time, calcite particle size, and calcite purity will be varied. The range of values to be tested for the hydraulic residence time, calcite particle size, and calcite purity will be determined during Task 1. Each set of experiments will run for approximately one month. Influent and effluent water quality (for example, calcium, alkalinity, arsenic) will be analyzed by the University of Texas at El Paso (UTEP) or a contract lab as appropriate. UTEP will provide a quality assurance/quality control plan for water quality analyses conducted in their laboratory. Particle size distributions of the calcite particles will be analyzed at the beginning and end of each experiment to evaluate particle size reduction. X-ray fluorescence (XRF) of the calcite particles from up to five (5) select contactors will be analyzed for the presence of adsorbed inorganic compounds on the particles. The pilot plant will be operated for up to 4 months in order to complete all the experiments.

2.3 - Pilot Plant Disassembly and Demobilization

CONTRACTOR will disassemble, remove, and/or dispose of all pilot plant equipment, plumbing, appurtenant facilities, and all test residuals from the pilot site in a safe and legal manner.

2.4 - Corrosivity Modeling

Based on the effluent water quality from each pilot upflow calcite contactor, the CONTRACTOR will evaluate its corrosivity using a spreadsheet to calculate the Langlier Saturation Index (LSI), Ryznar Index, and Calcium Carbonate Precipitation Potential (CCPP).

2.5 - Draft Final and Final Report

The CONTRACTOR will prepare a Component B of Draft Final Report summarizing the pilot study results and make recommendations regarding acceptable operation and application of an upflow calcite contactor. The Draft Final Report (of B) will be completed according to TWDB requirements. Seven (7) double-sided copies of the Draft Final Report will be submitted to TWDB for review. It is assumed that TWDB will have 45 days to review the Draft Final Report, after which the CONTRACTOR and TWDB will meet to discuss review comments. Appropriate comments from TWDB will be incorporated into the Final Report(Component A &B).

The CONTRACTOR will prepare a Final Component A and Final Component B making up the Final Report. The Final Report (Component A &B) will be completed according to TWDB requirements. The appendix of the Final Report will also contain the Final Pilot Protocol. The CONTRACTOR will submit seven (7) double-sided copies and one (1) electronic copy in Portable Document Format (PDF) of the Final Report to the TWDB.

Task 2 Deliverables:

Draft Component B
Final Component A
Final Component B