

**Exhibit C**  
**Scope of Work**

(Extracted from the TWDB / BRA Final Contract – signed 5/17/07)

**Brazos G Region Revised Scopes of Work**

**Administration / Public Participation**

Administration of Brazos G Regional Water Planning Group activities, including scope of work development, meetings related to scope of work, public participation and outreach, public notices and mailings, planning group member travel, regular and specially-called planning group and committee meetings, and expenses related to the Brazos G website.

**Study 1 - Impact of drought on reservoir water supplies in the upper Brazos G area**

**Scope:** This work item will extend the naturalized flow record for the applicable upper-basin control points in the Brazos WAM through June 2008 to evaluate if supplies have been furthered reduced since June 2004. In addition, multiple reservoirs in the upper Brazos G area are experiencing extremely low levels, which could affect water quality from the remaining supply. Correlations between water quality constituents and reservoir level will be developed for three reservoirs in the western portion of the region with sufficient available data, in order to determine the level of degradation in water quality that occurs at lower lake levels. The implications of any degradation of water quality during drought with regard to the usability of the water supply from the reservoirs will be discussed and applied to other reservoirs in the region.

**Task 1 - Updated Drought Analysis.**

Update naturalized flows at selected primary control points in the Upper Brazos River Basin and compute firm yields at reservoirs used for water supply. Any update to water availability models will be subject to approval by the TWDB Executive Administrator. Brazos G Area reservoirs will be selected for the study based on the following criteria:

- A. Reservoir level data through a drought period that resulted in storage reductions to 40 percent or less of available conservation capacity.
- B. Available water quality data during the drought cycle, specifically total dissolved solids and nutrients.

**Task 2 - Water Quality Impacts of Drought.**

Collect reservoir water quality data from existing databases (USGS, USEPA, TCEQ, local reservoir owners) for three reservoirs in the western portion of the Brazos G Area, analyze data for relationships between reservoir level and water quality, extrapolate those relationships to other reservoirs in the western Brazos G Area, and determine the effects of low reservoir levels on water quality and water quality impacts on useable supplies from those reservoirs.

Extrapolation of the relationships to other reservoirs will be largely qualitative in nature as no discrete functional relationship will likely be developed that could be universally

applied. All reservoirs supplying water to entities in the western Brazos G Area (above Possum Kingdom Reservoir) will be discussed.

### Task 3 - Report/Meetings.

Prepare a draft and final report to include the following sections: executive summary, purpose of study including how the study supports regional water planning, methodology, results, and recommendations, if applicable. Draft report will be submitted to the planning group and the TWDB for review and comment. All comments will be addressed in the final report. The report will document updated flows and reservoir yields due to drought and the water quality analyses and any affect on supplies. In order to ensure compatibility with previous regional water plans, the development, analysis, and reporting of results will follow similar methodologies, guidance, and agency rules. The report findings will be presented to the Brazos G RWPG.

The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Brazos G Regional Water Plan. The development, analysis, and reporting of results will follow methodologies and guidance according to Exhibit B and agency rules.

## **Study 2 - Re-evaluate water management strategies for the Nolan County area**

**Scope:** A local scale groundwater model will be developed and used as a tool to evaluate groundwater supplies from well field(s) in south-central Nolan County. The local scale model will be centered on the existing Champion Well Field and extend several miles beyond potential well field expansion areas. This will include some areas where aquifers other than the Edwards-Trinity Aquifer exist, such as the Dockum. To the extent possible, information from TWDB's GAMs will be used to delineate the aquifer's framework and estimate recharge and pumping. Pumping and water level data from the Champion Well Field and other data will be used for model calibration.

After development, the model will be used to estimate the long-term supply of water from the Champion Well Field and its potential as a long-term water management strategy for the City of Sweetwater in the Regional Water Plan. The long-term evaluation will also consider water quality. As needed, alternative well field operations will be identified to prolong and/or increase existing groundwater supplies.

If revised estimates of long-term supplies from the well field are shown to be less than assumed in 2006, the water management strategies for Sweetwater and Nolan County will be reevaluated. Alternative strategies identified to-date includes 1. supply from City of Abilene, 2. other groundwater, 3. smaller configuration or off-channel alternative to Double Mountain Fork Reservoir, and 4. scalping operation into Lake Sweetwater.

### Task 1 - Update Champion Well Field Supplies Available and Evaluate Alternative Water Management Strategies.

- A. Develop a localized groundwater model of the Edwards-Trinity and Dockum aquifers in the vicinity of the Champion Well Field in Nolan County. Tasks

involved in the development of the MODFLOW model such as conceptualization, description of aquifer properties, pumping, recharge and water levels will generally follow the GAM model development process that is outlined in:

[http://www.twdb.state.tx.us/GAM/GAM\\_documents/GAM\\_RFQ\\_Oct2005.pdf](http://www.twdb.state.tx.us/GAM/GAM_documents/GAM_RFQ_Oct2005.pdf)

Abbreviated data sets and displays of results are expected because of the limited size of the model area. The MODFLOW modeling application will be used and will be compatible with the Groundwater Vistas modeling system. Data set structures and file naming conventions will generally follow GAM conventions to allow TWDB GAM staff to utilize these data in refining the applicable GAM models.

- B. Coordinate with TWDB GAM Program staff.
  - a. Two informational meetings between the modeling consultants (HDR) and TWDB staff will take place at the following points in the project:
    - i. Prior to the model development.

At this meeting, HDR's conceptual plan for model development will be provided to TWDB for discussion and review at the meeting. HDR will provide information regarding the conceptual model framework, data available for calibration, and the anticipated calibration procedures. HDR will consider TWDB comments from the meeting and incorporate those into the model as appropriate and as budget allows.
    - ii. After model calibration.

At this meeting, HDR will present the calibrated model to the TWDB and discuss results of the calibration efforts.
- C. Use the model in a 2010 to 2060 simulation to estimate long-term supplies available from the well field. Identify operational strategies to prolong the well field life.
- D. Report and coordinate with the City of Sweetwater and other affected Nolan County entities.
- E. Evaluate Alternative Water Management Strategies.

If long-term supplies from the well field are shown to be insufficient for the planning period, alternative strategies will be required to meet future demands in the Nolan County Area. As allowed by the budget remaining after completion of Tasks 1.A, 1.B, 1.C and 1.D, identify and evaluate alternative strategies to increase supplies in the Nolan County Area. Potential alternative strategies that have been identified and might be evaluated include, but are not limited to, 1. supply from City of Abilene, 2. other groundwater, 3. smaller configuration or off-channel alternative to Double Mountain Fork Reservoir, 4. scalping operation into Lake Sweetwater. If the long-term supplies from the well field are shown to be sufficient for the planning period, this task will not be undertaken and the study budget should be reduced by the funds remaining following completion of Tasks 1.A, 1.B, 1.C and 1.D.

Task 2 - Report/RWPG Meetings.

Prepare a draft and final report following the GAM report guidelines that are applicable to this localized study. At a minimum, the report will include the following sections: executive summary, purpose of study including how the study supports regional water planning, methodology, results, and recommendations, if applicable. Because of the local nature of the model area and overlap with an existing GAM (Edward-Trinity Plateau) and another (Dockum) that is under development, the following information is considered to be available from these GAM reports and will not be included in this study's final report: water quality; sensitivity analysis; county results; discussions on Groundwater Districts, Groundwater Management Areas and Regional Water Planning Groups; histograms of hydraulic conductivity; net sand thickness maps; population; and typical predictive simulations with Drought of Record. The draft report, as well as MODFLOW files, will be submitted to the planning group and the TWDB for review and comment. All comments will be addressed in the final report. Present final report and report findings to the Sweetwater City Council and up to two Brazos G Regional Water Planning Group meetings.

The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Brazos G Regional Water Plan. The development, analysis, and reporting of results will follow methodologies and guidance according to Exhibit B and agency rules.

### **Study 3 - Regionalization strategies to assist small public water systems in meeting new SDWA requirements**

**Scope:** This task will identify specific public water systems with SDWA compliance problems or potential problems in locations where regionalization could allow multiple small utilities to share resources and reduce individual treatment and personnel costs. In addition, larger water user groups will be identified that might become or participate as regional suppliers. Two (2) potential regional systems will be identified, and the engineering and financial considerations for forming the regional partnerships will be developed and summarized. The specific utilities involved will be contacted, and their interest will be documented.

#### **Task 1 - Evaluate Two Potential Regional Systems.**

Identify two opportunities for regionalization of public water systems, and evaluate the engineering, financial, and other considerations required for regionalization. The regional systems will be developed considering the following:

- A. The individual public water systems' interest in potentially being part of a regional system
- B. Water systems with current treatment issues or potential treatment issues.

If an insufficient number of the targeted public water systems indicate an interest in being part of a regional system, then the scope of the study and the budget shall be reduced accordingly.

#### **Task 2 - Report/Meetings.**

Prepare a draft and final report to include the following sections: executive summary, purpose of study including how the study supports regional water planning,

methodology, results, and recommendations, if applicable. Draft report will be submitted to the planning group and the TWDB for review and comment. All comments will be addressed in the final report.

The report will include maps that delineate the systems' CCN boundaries, the regional system infrastructure (preliminary pipeline routes, relevant treatment plant and storage locations), and where those infrastructure elements would tie into existing utility systems. If CCN boundaries are not available electronically, up to three CCN boundaries, depending on complexity, will be digitized. Present final report and report findings at a Brazos G Regional Water Planning Group meeting.

The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Brazos G Regional Water Plan. The development, analysis, and reporting of results will follow methodologies and guidance according to Exhibit B and agency rules.

#### **Study 4 - Refine water management strategies for Johnson County**

This study will be conducted in cooperation with Region C and the region's Water Supply Study for Ellis County, Southwest Dallas County, Southeast Tarrant County, and Johnson County (Study 7.A).

##### **Task 1 – Review Recent Studies**

Consider the following recent water supply activities in the area since the 2006 Brazos G Plan, including:

- A. Johnson County Special Utility District's Trinity River Basin Water Supply Study
- B. The merger of Johnson County Fresh Water Supply District No. 1 with Johnson County Special Utility District in late 2005. Johnson County FWSD No. 1 is the water supplier for the City of Joshua.
- C. City of Cleburne's ongoing water supply study
- D. City of Arlington's ongoing wholesale water rate study
- E. Brazos River Authority and Tarrant Regional Water District conducted a "Regional Water Supply and Wastewater Service Study for Johnson and Parker Counties" in April 2004 and identified several water delivery scenarios that could provide water supplies to Johnson and Parker County water users

##### **Task 2 – Meet with Area Water Utilities**

Meet with Johnson County water utilities interested in a regional water supply system and Region C representatives to discuss water supply for Johnson County water user groups in the 2006 Brazos G Water Plan, population and water use projections, existing water system infrastructure, current plans to provide future water supplies, possible sources of supply, and discuss potential participant's roles in the regional water supply system. The regional water supply system area will include Ellis, Dallas, Tarrant, and Johnson counties. Brazos G potential participants include, but are not limited to, Mansfield, Alvarado, and Johnson County Special Utility District (including Johnson County Fresh Water Supply District No. 1 and Joshua after merger).

Region C will develop and send a written survey to water suppliers in the study area, and follow-up the survey with up to two telephone calls per surveyed entity. Brazos G will assist Region C by reviewing and providing suggestions regarding form and

content of the draft survey prior to its being mailed, and by participating as needed in follow-up telephone calls for entities in the Brazos G Area. In order to maintain consistency across the study area, it is assumed that Region C will mail the survey to all necessary entities in the Brazos G Area. Brazos G will provide to Region C a list of entities in the Brazos G Area to be surveyed.

**Task 3 – Meet with Wholesale Water Suppliers**

Assimilate results of the meetings and participate in discussions with water suppliers in the regional area such as Trinity River Authority, Brazos River Authority, and Tarrant Regional Water District. Discuss Johnson County trends in the study area, currently available supplies, discuss potential role in developing additional supplies, and timeline of new projects and infrastructure improvements.

**Task 4 – Review Population Projections**

Review population and demand projections through 2030 considering 2006 Brazos G Water Plan projections, North Central Texas Council of Government traffic survey zone projections, and other projections from individual water providers in the regional study area. Coordinate this effort with Region C. Region C will prepare technical memorandum identifying range of possible projections for study area and provide to water suppliers in the study area, TRA, BRA, and TRWD for review and comment.

**Task 5 – Develop Conceptual Alternatives**

Participate with Region C in developing up to 6 conceptual alternatives to supply water to the study area, which may include regional water treatment plant with raw water supplied from Lake Joe Pool, Brazos River Authority, or Tarrant Regional Water District. Identify short-term treated water options, as necessary. Present to Brazos G RWPG for comment.

**Task 6 – Present Conceptual Plans to Wholesalers and Utilities**

Present conceptual plans to area water suppliers and participate in a meeting to identify four plans for detailed analysis. Meet with Brazos G RWPG to discuss the four plans identified, receive comments, and provide comments to Region C.

**Task 7 – Assist Region C in the Analysis of Supply Alternatives**

Assist Region C in the detailed study of four selected alternative water supply approaches, including associated planning-level capital and operating costs.

**Task 8 – Workshop to Discuss Results**

Participate in workshop with area water suppliers and other entities to discuss draft results of the analysis and the recommended plan.

**Task 9 – Report / Meetings**

The Brazos G consultant will assist Region C in preparing a draft and final report to include the following sections: executive summary, purpose of study including how the study supports regional water planning, methodology, results, and recommendations, if applicable. The Region C and Brazos G consultants will submit the draft report to the Brazos G planning group and the TWDB for review and comment. The Brazos G consultant will assist Region C in addressing comments in the final report.

The report will document the findings of the regional water supply system study, including up to four regional water supply system options (interregional coordination with Region C). Previously developed water supply studies that result in changes to

water management strategies will be provided electronically (typically scanned PDF files) to the TWDB as part of the contract deliverable, to the extent that the original funding entities will allow. In instances where an entity will not allow an entire report to be submitted to the TWDB, specifically-referenced excerpts will be submitted as agreed to by the original funding entity. Provide technical support to Region C as they prepare a draft report summarizing recommendations for water management strategies for the study area. Attend three meetings with Brazos G RWPG during regional water supply study development, including meeting to present final study results.

Region C will be responsible for preparing and submitting the report per TWDB requirements. Results from this study will be included in the 2011 Brazos G Regional Water Plan. The development, analysis, and reporting of results will follow methodologies and guidance according to Exhibit B and agency rules.

Written progress reports will summarize the activities of the Brazos G consultants and the Brazos G consultant's coordination with Region C. These reports will be submitted with payment reimbursement requests and will be compiled into a final activity/coordination report at the end of the study. This report will be substituted for a full study report.

#### **Study 5 - Refine water management strategies for McLennan County**

**Scope:** In McLennan County, the City of Waco has been identified as the primary regional provider. However, Waco supplies are limited and would be virtually fully utilized by Year 2060.

- Task 1 - Explore additional water management strategies for the City, and identify water management strategies for specific water user groups in McLennan County that will serve as alternatives to receiving supply from the City of Waco.
- Task 2 - Coordination with the City of Waco and surrounding communities to identify preferred water management strategies, and evaluation of the capability of those strategies to replace current or contemplated supplies from the City of Waco. The City of Waco has expressed an interest in participating in the funding of this task and could provide \$20,000, which would reduce the necessary TWDB funding accordingly.
- Task 3 - Prepare a draft and final report to include the following sections: executive summary, purpose of study including how the study supports regional water planning, methodology, results, and recommendations, if applicable. A presentation of findings will be made to the Brazos G RWPG