TEXAS WATER DEVELOPMENT BOARD
REQUEST FOR RESEARCH AND PLANNING FUNDS
FOR THE REGION F WATER PLANNING GROUP

SUBMITTED ON SEPTEMBER 14, 2006

Prepared by Freese and Nichols, Inc. on behalf of the Region F Water Planning Group

TEXAS WATER DEVELOPMENT BOARD
REQUEST FOR RESEARCH AND PLANNING FUNDS
FOR THE REGION F WATER PLANNING GROUP
September 14, 2006

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Application Instruction Sheet

I. GENERAL INFORMATION

☑ 1. Legal name of applicant(s).

☑ 2. Regional Water Planning Group

☑ 3. Authority of law under which the applicant was created.

☑ 4. Applicant's official representative, Name, Title, Mailing address, Phone number, Fax number, if available, E-mail Address, and Vendor ID Number.

☑ 5. Is this application in response to a Request for Proposals published in the Texas Register? Yes ☑ No ☐

☑ 6. If yes to No. 5 above, list document number and date of publication of the Texas Register.

☑ 7. Type of proposed planning (Check all that apply.):

Initial scope of work	☐
Development of a regional water plan	☐
Revision of a regional water plan	☐
Special studies approved by TWDB	☑

☑ 8. Total grant funds requested from the Texas Water Development Board.

☑ 9. Cash Contribution to the study.

☑ 10. List source of cash contribution, explanation of source of local cash contribution.

☑ 11. Total grant funds requested from the Texas Water Development Board.

☑ 12. Detailed statement of the purpose for which the money will be used. (Not to exceed 1 page.)

☑ 13. Detailed description of why state funding assistance is needed. (Not to exceed 1 page.)

☑ 14. Identify potential sources and amounts of funding available for implementation of viable solutions resulting from proposed planning.

II. PLANNING INFORMATION

☑ 15. A detailed scope of work for proposed planning. (Not to exceed 6 pages.)

- ☑ 16. Prioritization of scope of work tasks by the regional planning group.
- ☑ 17. A task budget for detailed scope of work by task. *Example is attached.*
- ☑ 18. An expense budget for detailed scope of work by expense category. *Example is attached.*
- ☑ 19. A time schedule for completing detailed scope of work by task.
- ☑ 20. Specific deliverables for each task in scope of work.
- ☑ 21. Method of monitoring study progress.
- ☑ 22. Qualifications and direct experience of proposed project staff.

III. WRITTEN ASSURANCES

Written assurance of the following items:

- ☑ Proposed planning does not duplicate existing projects;
- ☑ Implementation of viable solutions identified through the proposed planning will be diligently pursued and identification of potential sources of funding for implementation of viable solutions;
- ☑ If a grant is awarded, written evidence that local matching funds are available for the proposed planning must be provided when the contract is executed.

IV. PROOF OF NOTIFICATION

- ☑ Proof of notification

Develop or revise regional water plans. Eligible applicants requesting funds to develop or revise regional water plans must, not less than 30 days before board consideration of the application, provide notice that an application for planning assistance is being filed with the executive administrator by:

(1) publishing notice once in a newspaper of general circulation in each county located in whole or in part in the regional water planning area; and

(2) mailing notice to each mayor of a municipality with a population of 1,000 or more or which is a county seat and that is located in whole or in part in the regional water planning area, and to each county judge of a county located in whole or in part in the regional water planning area, to all districts and authorities created under Texas Constitution, Article III, §52, or Article XVI, §59, located in whole or in part in the regional water planning area based upon lists of such water districts and river authorities obtained from Texas Commission on Environmental Quality, and all regional water planning groups in the state.

The notice must include the following:

- name and address of applicant and applicant's official representative;
- brief description of the proposed planning area;
- purpose of the proposed planning;
- Texas Water Development Board Executive Administrator's name and address; and
- statement that any comments on the proposed planning must be filed with the applicant and the Texas Water Development board Executive Administrator within 30 days of the date on which the notice is mailed or published.

I. GENERAL INFORMATION

1. Legal name of applicant(s).

Colorado River Municipal Water District

2. Regional Water Planning Group.

Region F

3. Authority of law under which the applicant was created.

The Colorado River Municipal Water District was created by virtue of Article VI, Section 59 of the Texas Constitution as a Conservation and Reclamation District.

4. Applicant's official representative, Name, Title, Mailing address, Phone number, Fax number, if available, E-mail Address, and Vendor ID number.

Mr. John W. Grant
General Manager
Colorado River Municipal Water District
400 East 24th Street
P.O. Box 869
Big Spring, Texas 78721-0869
Phone – 915/267-6341
Fax – 915/267-3121
E-mail – jgrant@crmwd.org
Vendor ID – 75-6003221

5. Is this application in response to a Request for Proposals published in the Texas Register?

Yes ☑ No ☐

6. If yes to No. 5 above, list document number and date of publication of the Texas Register.

31 TexReg 5210, published June 23, 2006.

7. Type of proposed planning (Check all that apply.):

Initial scope of work	□
Development of a regional water plan	□
Revision of a regional water plan	□
Special studies approved by TWDB	☑

8. Total proposed planning cost.

Part 1 – Administrative Costs Previously Authorized

Project	Description	Budget
1	Administrative and Public Participation Activities	$60,540
	Part 1 Total	$60,540

Part 2 – Special Projects for Study

Project	Description	Budget
1	Refinement of Supplies and Potential Projects to Use Fresh and Brackish Groundwater	$152,000
2	Brush Control Study for Portions of the Concho River East of San Angelo, the San Saba and Llano River Watersheds	$60,000
3	Irrigation Survey for Region F in Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green Counties	$46,000
4	Study of the Economics of Rural Water Distribution and Integrated Water Supply Study	$157,000
5	Watershed Management Data Collection in the Upper Concho River Basin	$314,000
6	Evaluation of Water Supplies in the Pecan Bayou Watershed	$71,000
7	Municipal Water Conservation	$25,000
8	Well Location Study for the City of Menard	$24,000
9	Evaluation of the Future Water Supply Potential of Red Bluff Reservoir	$89,000
10	Development and Maintenance of Region F Website	$22,000
	Part 2 Total	$936,000

Part 3 – Interregional Coordination*

Project	Description	Budget
1	Inter-regional Coordination on the Refinement of Colorado Basin Water Availability	$25,000
	Part 3 Total	$25,000

Total of Parts 1, 2 and 3 **$1,021,540**

* Part 3 funding is dependent on TWDB approval of the Region K Project 1 – *Surface Water Availability Modeling*.

9. Cash contribution to the study.

Part 2 – Special Projects for Study

5	Watershed Management Data Collection in the Upper Concho River Basin	$120,000

10. List source of cash contribution, explanation of course of local cash contribution.

Part 2 – Special Projects for Study

Project 5 - Watershed Management Data Collection in the Upper Concho River Basin – The Upper Colorado River Authority and the Texas State Soil and Water Conservation Board are willing to provide up to $120,000 in matching funds ($60,000 per year) for this study.

11. Total grant funds requested from the Texas Water Development Board.

Part 1 – Administrative Costs Previously Authorized

Project	Description	Budget
1	Administrative and Public Participation Activities	$60,540
	Part 1 Total	$60,540

Part 2 – Special Projects for Study

Project	Description	Budget
1	Refinement of Supplies and Potential Projects to Use Fresh and Brackish Groundwater	$152,000
2	Brush Control Study for Portions of the Concho River East of San Angelo, the San Saba and Llano River Watersheds	$60,000
3	Irrigation Survey for Region F in Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green Counties	$46,000
4	Study of the Economics of Rural Water Distribution and Integrated Water Supply Study	$157,000
5	Watershed Management Data Collection in the Upper Concho River Basin	$194,000
6	Evaluation of Water Supplies in the Pecan Bayou Watershed	$71,000
7	Municipal Water Conservation	$25,000
8	Well Location Study for the City of Menard	$24,000
9	Evaluation of the Future Water Supply Potential of Red Bluff Reservoir	$89,000
10	Development and Maintenance of Region F Website	$22,000
	Part 2 Total	$840,000

Part 3 – Interregional Coordination

Project	Description	Budget
1	Inter-regional Coordination on the Refinement of Colorado Basin Water Availability	$25,000
	Part 3 Total	$25,000

Total of Parts 1, 2 and 3 **$925,540**

12. Detailed statement of the purpose for which the money will be used.

In accordance with the request for proposals for special studies to enhance water planning in the region, the funds for each project will be used for at least one of the following eight criteria:

1. Evaluation of new water management strategies in response to changed conditions;
2. Studies that will further implementation of recommended water management strategies;
3. Refinement of water supply information or water management strategies;
4. Activities that will help overcome problems from the last round of planning;
5. Further evaluation of water management strategies, especially regional solutions, to meet needs in small and rural areas;
6. Reevaluation of population and demand projections only under the presence of changed conditions;
7. Interregional coordination; and
8. Administrative and public participation activities.

The table shown below shows how the individual projects meet the criteria. The need and justification for specific projects are discussed in Exhibit IV of this application.

Part	No.	Proposed Study	Criteria							
			1	2	3	4	5	6	7	8
1	1	Administration and Public Participation Activities								X
2	1	Refinement of Supplies and Potential Projects to Use Fresh and Brackish Groundwater		X	X		X			
2	2	Brush Control Study for Portions of the Concho River East of San Angelo, the San Saba and Llano River Watersheds			X		X			
2	3	Irrigation Survey for Region F in Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green Counties		X	X	X				
2	4	Study of the Economics of Rural Water Distribution and Integrated Water Supply Study			X	X	X			
2	5	Watershed Management Data Collection in the Upper Concho River Basin			X		X			
2	6	Evaluation of Water Supplies in the Pecan Bayou Watershed				X			X	
2	7	Municipal Water Conservation			X					
2	8	Well Location Study for the City of Menard		X						
2	9	Evaluation of the Future Water Supply Potential of Red Bluff Reservoir			X	X	X			
2	10	Development and Maintenance of Region F Website								X
3	1	Inter-regional Coordination on the Refinement of Colorado Basin Water Availability				X			X	

13. Detailed description of why state funding assistance is needed.

Part 1 funds are needed for administrative and public participation expenses as required by TAC 356, 357 and 358.

Part 2 funds are needed for specific projects of interest to the Region F Water Planning Group for input in the 2011 Region F Water Plan. By project number, these projects will:

1. Identify the next sources of water to be developed in the Region,
2. Evaluate and prioritize brush control activities in the lower Concho, San Saba and Llano River watersheds in light of data collected from on-going studies
3. Gather information on irrigated agriculture in the six counties with the largest irrigation demand
4. Evaluate the factors that contribute to the economics of rural water systems in the central part of the region and use this information to evaluate regional strategies in the area
5. Perform data collection activities in the Upper Concho River watershed for on-going brush control programs
6. Evaluate the distribution of water supplies among major reservoirs in the Pecan Bayou watershed
7. Collect information on water conservation activities initiated by selected cities in Region F
8. Evaluate locations for a new water well in the Hickory aquifer for the City of Menard
9. Evaluate the potential supplies from Red Bluff Reservoir in light of changes to water delivery and water quality enhancement projects initiated in the State of New Mexico
10. Implement public outreach through development and maintenance of a Region F website

Part 3 funds are needed to coordinate with Region K if the TWDB approves that region's re-evaluation of the 'no-call' strategy from the previous round of planning (Region K Project 1 – Surface Water Availability Modeling).

More detailed information on each project may be found in Exhibit IV.

14. Identify potential sources and amounts of funding available for implementation of viable solutions resulting from proposed planning.

Viable projects will be implemented by individual water providers and other beneficiaries, not by the Region F Water Planning Group. Funding will vary considerably depending on the type of project and the economic resources of the beneficiaries. Potential sources of funding include but are not limited to income from water sales, municipal taxes, bond sales, federal and state loan programs, state participation funds, and grants from federal programs.

II. PLANNING INFORMATION

15. A detailed scope of work for proposed planning.

The scope of work for each project may be found in Exhibit IV.

16. Prioritization of scope of work tasks by the regional planning group.

The prioritization of tasks may be found in Exhibit IV.

17. A task budget for detailed scope of work by task.

The task budget for each project may be found in Exhibit I.

18. An expense budget for detailed scope of work by expense category.

The expense budget for each project may be found in Exhibit I.

19. A time schedule for completing detailed scope of work by task.

The time schedule for completing each project may be found in Exhibit II.

20. Specific deliverables for each task in scope of work.

The deliverables for each task may be found in the Detailed Scope of Work in Exhibit IV.

21. Method of monitoring study progress.

The progress of each project will be monitored using the monthly progress reports that will be submitted to the Texas Water Development Board along with the monthly invoice.

22. Qualification and direct experience of proposed project staff.

Resumes are included in Exhibit V.

III. WRITTEN ASSURANCES

Written assurance of the following items:

- **Proposed planning does not duplicate existing projects.**
  See Exhibit III.

- **Implementation of viable solutions identified through the proposed planning will be diligently pursued and identification of potential sources of funding for implementation of viable solutions.**
  See Exhibit III.

- **If a grant is awarded, written evidence that local matching funds are available for the proposed planning must be provided when the contract is executed.**
  See Exhibit III.

IV. PROOF OF NOTIFICATION

The Colorado River Municipal Water District provided notice with regard to this application requesting funds for regional water planning as follows:

(1) published notice once in a newspaper of general circulation in each county located in whole or in part in the regional water planning area; and

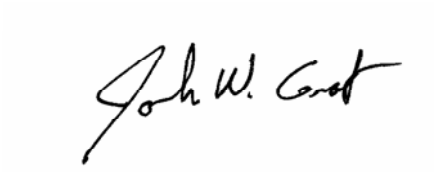
(2) mailed notice to each mayor of a municipality with a population of 1,000 or more or which is a county seat and that is located in whole or in part in the regional water planning area, and to each county judge of a county located in whole or in part in the regional water planning area, to all districts and authorities created under Texas Constitution, Article III, §52, or Article XVI, §59, located in whole or in part in the regional water planning area based upon lists of such water districts and river authorities obtained from Texas Commission on Environmental Quality, and all regional water planning groups in the state.

The notice included the following:

- name and address of applicant and applicant's official representative;
- brief description of the proposed planning area;
- purpose of the proposed planning;
- Texas Water Development Board Executive Administrator's name and address; and
- statement that any comments on the proposed planning must be filed with the applicant and the Texas Water Development board Executive Administrator within 30 days of the date on which the notice is mailed or published.

The Colorado River Municipal Water District has included information regarding the public notice for the public meeting on the grant application and scope of work in Exhibit VI. Exhibit VI includes the following:

- A copy of the notice published in the newspapers
- Publisher's affidavits
- A copy of the notice sent to each mayor of a municipality with a population of 1,000 or more or which is a county seat and that is located in whole or in part in the regional water planning area, and to each county judge of a county located in whole or in part in the regional water planning area
- A copy of the mailing list to which the material was sent.

Submitted By: 

JOHN W. GRANT, Chairman
Administrator
Region F Water Planning Group

Date: September 12, 2006

EXHIBIT I

TASK AND EXPENSE BUDGETS

EXHIBIT I

TASK AND EXPENSE BUDGETS

PART 1

Project 1. Administrative and Public Participation Activities

Task Budget

Task	Description	Total Amount
A	Administrative	$15,000
B	Scope of Work	$15,000
C	Meetings and Public Relations	$30,540
Total		**$60,540**

Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 30,540.00
Subcontractor Services	$ 15,000.00
Voting Planning Member Travel [5]	$ 15,000.00
Overhead [4]	$ 0.00
Profit	$ 0.00
Total	$ 60,540.00

PART 2

Projects in Part 2 are arranged by priority established by the Region F Water Planning Group.

Project 1 Refinement of Supplies and Potential Projects to Use Fresh and Brackish Groundwater

Project 1 Task Budget

Task	Description	Budget
1	Define potential projects	$ 5,000
2	Select five study areas	$ 11,000
3	Refine quantity and quality	$ 81,000
4	Identify disposal & co-development options	$ 25,000
5	Identify data gaps	$ 15,000
6	Conceptual design and cost estimates	$ 15,000
	Total	$ 152,000

Project 1 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 152,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 152,000.00

Project 2 Brush Control Study for Portions of the Concho River East of San Angelo, the San Saba and Llano River Watersheds

Project 2 Task Budget

Task	Description	Budget
1	Data collection	$ 15,000
2	Review research and monitoring data	$ 17,000
3	GIS analysis and mapping	$ 12,000
4	Priority allocation and report	$ 16,000
	Total	$ 60,000

Project 2 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 60,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 60,000.00

Project 3 Irrigation Survey for Region F in Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green Counties

Project 3 Task Budget

Task	Description	Budget
1	Data collection	$ 17,000
2	Coordinate with Task Force	$ 9,000
3	Summarize data & plan development	$ 20,000
	Total	$ 46,000

Project 3 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 46,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 46,000.00

Project 4 Study of the Economics of Rural Water Distribution and Integrated Water Supply

Project 4 Task Budget

Task	Description	Budget
1	Data gathering, survey and site visits	$22,000
2	Develop cost ranges and scenarios	$16,000
3	Information on alternative water paradigms	$5,000
4	Information on distribution systems	$16,000
5	Develop integration scenarios	$40,000
6	Identify likely scenarios & report	$58,000
	Total	$157,000

Project 4 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 157,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 157,000.00

Project 5 Watershed Management Data Collection in the Upper Concho River Basin

Project 5 Task Budget *

Task	Description	Budget
1	Project Administration	$ 10,000
2	Data Collection and Analysis	$ 160,000
3	Reporting	$ 24,000
	Total	$ 194,000

* The budget shown is for TWDB funds only. The funding for this project also includes $120,000 provided by the Upper Colorado River Authority and the Texas State Soil and Water Conservation Board.

Project 5 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 194,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 194,000.00

Project 6 Evaluation of Water Supplies in the Pecan Bayou Watershed

Project 6 Task Budget

Task	Description	Budget
1	Determine flow methodology	$ 13,000
2	Coordination with Region G & K	$ 5,000
3	Develop 4 yield scenarios	$ 34,000
4	Report	$ 19,000
	Total	$ 71,000

Project 6 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 71,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 71,000.00

Project 7 Municipal Water Conservation

Project 7 Task Budget

Task	Description	Budget
1	Survey on practices	$5,000
2	Identify and meet with 3 cities	$7,000
3	Compare BMPs to Region F experience	$6,000
4	Report	$7,000
	Total	$25,000

Project 7 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 25,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 25,000.00

Project 8 Well Location Study for the City of Menard

Project 8 Task Budget

Task	Description	Budget
1	Obtain data	$ 11,000
2	Evaluate ASR & identify implementation issues	$ 7,000
3	Report	$ 6,000
	Total	$ 24,000

Project 8 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 24,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 24,000.00

Project 9 Evaluation of the Future Water Supply Potential of Red Bluff Reservoir

Project 9 Task Budget

Task	Description	Budget
1	Meet and obtain data	$ 14,000
2	Review data & determine methods	$ 26,000
3	Develop water quality data	$ 23,000
4	Identify improvements	$ 11,000
5	Report	$ 15,000
	Total	$ 89,000

Project 9 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 89,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 89,000.00

Project 10 Development and Maintenance of Region F Website

Project 10 Task Budget

Task	Description	Budget
1	Determine location of website	$ 2,000
2	Develop website	$ 10,000
3	Maintenance	$ 10,000
	Total	$ 22,000

Project 10 Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 22,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 22,000.00

PART 3

Project 1 Inter-regional Coordination on the Refinement of Colorado Basin Water Availability

Task Budget

Task	Description	Budget
1	Determine coordination process	$1,000
2	Attend Region K meetings	$12,000
3	Review findings	$12,000
	Total	$25,000

Expense Budget

Category	Total
Salary and Wages [1]	$ 0.00
Fringe [2]	$ 0.00
Travel	$ 0.00
Other Expenses [3]	$ 0.00
Subcontractor Services	$ 25,000.00
Voting Planning Member Travel [5]	$ 0.00
Overhead [4]	$0.00
Profit	$ 0.00
Total	$ 25,000.00

Notes

[1] Salaries and Wages is defined as the cost of salaries of engineers, draftsmen, stenographers, survey men, clerks, laborers, etc., for the time directly chargeable to this contract.

[2] Fringe is defined as the cost of social security contributions, unemployment, excise and payroll taxes, employment compensation insurance, retirement benefits, medical and insurance benefits, sick leave, vacation, and holiday pay applicable thereto.

[3] Other Expenses is defined to include expendable supplies, communications, reproduction, postage, and costs of public meetings.

[4] Overhead is defined as the cost incurred in maintaining a place of business and performing professional services similar to those specified in this contract. These costs shall include the following:

- Indirect salaries, including the portion of the salary of principals and executives that is allocable to general supervision;
- Indirect salary fringe benefits;
- Accounting and legal services related to normal management and business operations;
- Travel costs incurred in the normal course of overall administration of the business;
- Equipment rental;
- Depreciation of furniture, fixtures, equipment and vehicles;
- Dues, subscriptions, and fees associated with trade, business, technical, and professional organizations;
- Other insurance;
- Rent and utilities; and
- Repairs and maintenance of furniture, fixtures, and equipment.

[5] Voting Planning Member Travel Expenses is defined as eligible travel expenses incurred by regional water planning group members that cannot be reimbursed by any other entity, political subdivision, etc.

EXHIBIT II

TIME SCHEDULE

EXHIBIT II

TIME SCHEDULE FOR PROPOSED PROJECTS
REGION F

The schedule provided below is based on the assumption that all requested projects are approved by the Texas Water Development Board. The schedule may be adjusted based on the final projects selected by the Texas Water Development Board.

Time Schedule for Proposed Region F Projects

Part	Project No.	Proposed Study	Week																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	1	Administration and Public Participation Activities																								
2	1	Refinement of Supplies and Potential Projects to Use Fresh and Brackish Groundwater																								
2	2	Brush Control Study for Portions of the Concho River East of San Angelo, the San Saba and Llano River Watersheds																								
2	3	Irrigation Survey for Region F in Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green Counties																								
2	4	Study of the Economics of Rural Water Distribution and Integrated Water Supply Study																								
2	5	Watershed Management Data Collection in the Upper Concho River Basin																								
2	6	Evaluation of Water Supplies in the Pecan Bayou Watershed																								
2	7	Municipal Water Conservation																								
2	8	Well Location Study for the City of Menard																								
2	9	Evaluation of the Future Water Supply Potential of Red Bluff Reservoir																								
2	10	Development and Maintenance of Region F Website																								
3	1	Inter-regional Coordination on the Refinement of Colorado Basin Water Availability																								

EXHIBIT III

WRITTEN ASSURANCES

EXHIBIT III

WRITTEN ASSURANCES

1. Written assurance that the proposed planning does not duplicate existing projects.

The proposed projects for Region F described in this application do not duplicate existing projects. The projects will incorporate available information from existing plans, including the *2006 Region F Water Plan* developed in the last round of regional water planning. The projects are responsive to guidance and requirements developed by the Texas Water Development Board for the development of a regional water plan.

JOHN W. GRANT, Chairman
Administrator
Region F Water Planning Group
September 12, 2006

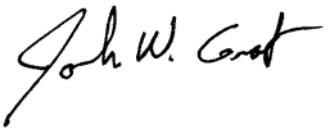
2. Written assurance that implementation of viable solutions identified through the proposed planning will be diligently pursued and identification of potential sources of funding for implementation of viable solutions.

The Region F Water Planning Group will diligently pursue the implementation of and financing for viable solutions identified through the proposed planning to the extent that the Regional Water Planning Group involvement is consistent with the regional plan, is appropriate for the recommended strategy and the Planning Group has the authority to participate.

JOHN W. GRANT, Chairman
Administrator
Region F Water Planning Group
September 12, 2006

3. Written assurance that if a grant is awarded, written evidence that local matching funds are available for the proposed planning must be provided when the contract is executed.

If a project stating that matching funds are available is approved for study, the entities making such statements will provide written documentation during the contract negotiation phase.



JOHN W. GRANT, Chairman
Administrator
Region F Water Planning Group
September 12, 2006

EXHIBIT IV

DETAILED SCOPES OF WORK
AND JUSTIFICATION FOR PROJECTS

EXHIBIT IV
DETAILED SCOPES OF WORK
AND JUSTIFICATION FOR PROJECTS

PART 1 – Administrative and Public Participation Activities

The Texas Water Development Board has allocated $60,540 to the Region F Water Planning Group for administrative and public participation activities. These funds will be used as follows:

Detailed Scope of Work:

A. Administrative – Funds will be used for required newspaper notifications, notifications mailed to the TWDB-specified list of contacts, and other administrative duties and expenses.
B. Scope of Work – Funds will be used for reimbursement to the consultants for the development of the scopes of work and planning grant application.
C. Meetings and Public Participation – Funds will be used for planning group member travel, meeting materials, and other expenses associated with public participation.

PART 2 – Region F Special Projects

Ranking of projects by Region F Water Planning Group

Ranking	Project Description
1	Refinement of Supplies and Potential Projects to Use Fresh and Brackish Groundwater
2	Brush Control Study for Portions of the Concho River East of San Angelo, the San Saba and Llano River Watersheds
3	Irrigation Survey for Region F in Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green Counties
4	Study of the Economics of Rural Water Distribution and Integrated Water Supply Study
5	Watershed Management Data Collection in the Upper Concho River Basin
6	Evaluation of Water Supplies in the Pecan Bayou Watershed
7	Municipal Water Conservation
8	Well Location Study for the City of Menard
9	Evaluation of the Future Water Supply Potential of Red Bluff Reservoir
10	Development and Maintenance of Region F Website

Project Justifications and Scopes of Work

1. Refinement of Supplies and Potential Projects to Use Fresh and Brackish Groundwater

Description

Region F has limited water sources for existing entities and future growth. Virtually all of the surface water is fully developed and allocated to existing uses. Future water supplies for the region will likely need to come from groundwater or wastewater reuse. During the last round of planning the region sponsored a study on available brackish

groundwater, which provided a broad overview of the potential groundwater sources by aquifer and ranked the sources based on depth, productivity, and quality. The region also recommended the use of brackish groundwater with desalination for future supplies for the City of Andrews and CRMWD. As follow-on to the brackish water study and refinement of the recommended desalination strategies, this study proposes to select up to five sites to be further defined as potential future water sources for Region F. Evaluation criteria will include the potential of using brackish water pumping as a means to protect water quality for fresh-water portions of an aquifer or surface water sources. This study will also consider smaller fresh water sources that could be used to meet local needs.

How Study Meets TWDB Evaluation Criteria

Implementation of Water Management Strategies – Part of this study is a follow-on to proposed brackish desalination strategies proposed for the City of Andrews and CRMWD. In the 2006 Region F plan, these strategies were evaluated using generic criteria developed for screening projects. This study will generate more detailed site-specific information needed to refine these strategies.

Refinement of Information – This study will build on existing information on brackish groundwater sources developed by TWDB, Region F and others and identify up to three specific projects for implementation in addition to the CRMWD and Andrews strategies.

Regional Solutions for Small Communities or Rural Areas – The CRMWD desalination project will provide water to its customers, many of which are small and rural communities. It is likely that other projects identified in the study will also have regional applications for similar communities.

Address a Need – This project will develop information on one of the few sources of new water available to meet needs in most of Region F: development of groundwater sources.

Duplication of Effort - This study uses previous studies as the basis for development of new projects or re-evaluation of previous identified projects. Although the Andrews and CRMWD projects are recommended strategies, these projects have only been evaluated using screening criteria. This study will generate more detailed site-specific information needed to advance implementation of these strategies. Therefore, this study does not duplicate any other efforts known to the Region F Water Planning Group.

Ranking by Region F Water Planning Group and Study Cost

This project was ranked first by the Region F Water Planning Group. The estimated cost of this study is $152,000.

Beneficiaries

City of Andrews, CRMWD and other Region F water user groups (Other groups may include, but are not limited to, the cities of Pecos, Fort Stockton, Menard, Eden, and Miles and Millersville-Doole Water Supply Corporation.)

Scope of Work

1. Contact representatives of CRMWD, City of Andrews, City of San Angelo, and others to define potential projects based on projected demands. Assess potential

groundwater sources, potential for co-development with other projects, disposal options for brackish concentrate and other factors, including distance from demands, economic feasibility, and hydrogeologic limitations.

2. Select up to five groundwater study areas based on existing data, considering the potential for fresh or brackish groundwater development, location of water needs, potential impacts on fresh water sources, and economic feasibility to retrieve and use the water. Fresh water sources include smaller, localized aquifers currently classified as 'other aquifer' by the Texas Water Development Board.
3. Collect available hydrogeologic data for each site, including geophysical logs, drillers logs, pumping tests, water level and quality information, and other available data. Refine the estimated volume of retrievable quality groundwater, and the expected range of water quality, fields and the expected production rate of a typical well in the aquifer.
4. For brackish groundwater sources, identify potential disposal options for brackish concentrate, including dedicated disposal wells, co-disposal with oil-field brines, evaporation, and other options. Evaluate potential for co-development with other proposed water supply strategies as a mechanism for cost reduction and to meet long term needs.
5. Identify gaps in information regarding source of groundwater and disposal options and identify field studies required to advance the projects. Develop a list of tasks required to collect the additional information.
6. Develop conceptual designs and cost estimates for the potential projects, including treatment facilities, well fields, concentrate management options, and transmission and storage facilities. Evaluate potential environmental, agricultural and rural issues, and other natural resource issues associated with implementation of the potential projects. Develop a draft technical memorandum and presentation for the Region F Water Planning Group. Based on comments from Region F and others, finalize technical memorandum.

Deliverables

Technical memorandum including information needed for incorporation into the 2011 Region F Plan

2. Brush Control Study for Portions of the Concho River East of San Angelo, the San Saba and Llano River Watersheds

Description

The Concho, San Saba and Llano Rivers, including tributaries such as Brady Creek, are the source of all or most of the municipal water supplies for several small cities in Region F, as well as the major part of irrigation water supply in several Region F counties. The brush control project along the North Concho River in the region has demonstrated that substantial increases in stream flow can be obtained by managed brush eradication. Other brush control projects elsewhere have shown similar results. There are also areas in the

watersheds where aquifer recharge could be significantly increased by brush control. Further, there is an interregional component in that the surface flows from these watersheds provide additional water to the Highland Lakes for the Lower Colorado.

Previous studies have primarily focused on controlling juniper (cedar) and mesquite. This study would refine previous estimates of the effectiveness of brush control in the watershed based on historical monitoring data collected from other brush control projects, address consideration of salt cedar control, and identify priority portions of the three watersheds where control of juniper, mesquite and/or salt cedar would be most effective in increasing surface water supplies and aquifer recharge.

How Study Meets TWDB Evaluation Criteria

Refinement of Information – This study is (1) a summary of existing information and (2) a comparison of assumptions and modeling results used in previous studies to historical monitoring data collected from on-going brush control programs. This study also integrates studies and information developed by federal, state and other agencies applicable to this part of Region F.

Regional Solutions for Small Communities and Rural Areas – The study focuses on a large portion of Region F which is primarily rural. Benefits from brush control could be realized for the entire watershed downstream of the study area.

Address a Need – The reliability of water supplies in this portion of Region F has been significantly impacted by invasive brush. Bush control is a cost-effective method to protect and enhance these supplies.

Duplication of Effort – Although previous studies have evaluated areas for brush control and developed priority rankings of watersheds, this study is unique because:

- It considers all three primary invasive brush species (previous evaluations have focused on either mesquite/juniper or salt cedar)
- It will compare monitoring data from on-going brush control projects to assumptions and modeling results used in previous studies
- It will focus on specific areas in Region F where brush has impacted the reliability of water supplies

This study does not duplicate any other studies known to the Region F Water Planning Group.

Ranking by Region F Water Planning Group and Study Costs

This study was ranked second by the Region F Water Planning Group. The estimated study cost is $60,000.

Beneficiaries

Potential beneficiaries include the cities of Ballinger, Brady, Menard, Junction, irrigators along the watersheds of the three rivers and tributaries, and groundwater and surface water users, including rural residents, livestock, wildlife and downstream users in the Lower Colorado River Basin.

Scope of Work

1. Obtain the following information:
    a. Past studies in Region F and elsewhere to determine which areas within the target watersheds brush control would be most effective in increasing streamflows and increasing aquifer recharge.
    b. Historical monitoring data for on-going brush control programs in Texas and elsewhere.
    c. Data from the Texas State Soil and Water Conservation Board, NRCS, groundwater conservation districts and others on which areas within the target watersheds that are most densely infested with the three invasive species, and which are most accessible for brush control.
2. Review existing research to determine if modeling parameters such as evapotranspiration and runoff coefficients (required for hydrologic models such as SWAT or HSPF) that have been used in previous modeling studies are appropriate for the three basins. To judge the appropriateness, properties such as geology, soil type, vegetation, land use, slope and other factors for the three watersheds will be compared to other watersheds. Review historical monitoring information from on-going brush control projects and compare to assumptions and modeling results used in previous studies. Assess the benefit of using refined aerial photos and other remote sensing approaches to better identify optimum areas for brush control.
3. Using GIS to focus on each of the three watersheds (as opposed to the entire region), summarize the soil types, topography, slope, geologic formations, land use practices, vegetation, and other flood plain conditions in Region F that are most beneficial and cost effective in removing brush, based on techniques recommended in the most recent research. Develop a map of priority areas within the three watersheds for brush control.
4. Develop a priority allocation among salt cedar, mesquite and juniper eradication within the priority areas that considers the (a) water supply that could be generated by brush control, (b) the need for new supplies within the watershed, and (c) environmental and recreational benefits of creating new supplies in the watershed. Develop a draft technical memorandum and present the results to the Region F Water Planning Group. Based on comments from the planning group and others, finalize the technical memorandum.

Deliverables

Technical memorandum including information needed for incorporation into the 2011 Region F Plan

3. Irrigation Survey for Region F in Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green Counties

Description

The 2006 Region F Regional Water Planning Group Plan indicates there will be substantial unmet water supply needs for irrigation, particularly in the western portion of the region. Conservation will be the priority strategy for meeting those needs, but it was determined during the 2006 Region F planning period that more accurate information is needed regarding the number of acres irrigated, the type of crops, and the type of equipment used. As the largest demand category in Region F, accurate information on irrigated agriculture is of great concern to the Region F Water Planning Group.

The Region F Water Planning Group has proposed developing an Irrigation Task Force to facilitate collection and review of the data. This study will focus on collecting and summarizing existing information on irrigated agriculture in the study area and coordinating with the Task Force to identify gaps or inaccuracies in the data and identify means to collect additional data needed for further water planning efforts. These data will be used to refine and further develop irrigation demand projections and conservation strategies in the next planning cycle. Data may also be used to refine water demand locations in the Edwards-Trinity GAM and other GAMs.

How Study Meets TWDB Evaluation Criteria

Refinement of Information – This study will identify data gaps in irrigation data that are of great concern to the Region F Water Planning Group and identify means to collect the information needed to close those gaps.

Overcome Problems Identified in the Last Round of Planning – The Region F Water Planning Group is very interested in having accurate, site-specific information for use in developing demand projections and evaluating conservation strategies. Some of the data, particularly on the types of irrigation equipment in use, are not readily available, are out-of-date, or do not fit the experience of conservation district or irrigated agriculture representatives on the Region F Water Planning Group. This study will develop ways to meet those identified data needs.

Duplication of Effort – Because this study consists primarily of collecting and summarizing existing data and identifying data gaps, it does not duplicate other efforts known by the Region F Water Planning Group.

Ranking by Region F Water Planning Group and Study Costs

This study was ranked third by the Region F Water Planning Group. The estimated budget for this study is $46,000.

Beneficiaries

Region F irrigators, municipalities and rural public water supply systems in and outside of the targeted areas that may benefit from groundwater supplies freed up by implementation of irrigation conservation strategies, and planners.

Scope of Work

1. Collect existing data on irrigated agriculture in the targeted counties (Glasscock, Midland, Reagan, Pecos, Reeves, and Tom Green counties), focusing on number of acres irrigated, the type of crops, sources of water, location of use, and the type of irrigation equipment used. Data sources include previous Region F planning efforts, TWDB, irrigation districts, groundwater conservation districts, Extension Service, NRCS, FSA, EQUIP program and other sources. Develop summaries of data and present to the Region F Irrigation Task Force. Collect and summarize additional data from sources identified by the Task Force.
2. Meet with the Region F Irrigation Task Force to identify data needs for irrigated agriculture in the target counties. Assist the Task Force with developing methods to collect and summarize additional data needed to fill data gaps.
3. Summarize additional data collected by the Task Force and others during the two-year planning cycle. Identify data that could refine demand locations in the Edwards-Trinity GAM and other GAMs and provide to TWDB. Develop a draft technical memorandum describing available data, sources of data, data collected by the Task Force, data needs identified in the study, and a plan to collect any needed data. Present the results of the study to the Region F Water Planning Group. Finalize technical memorandum based on comments from Region F and others.

Deliverables

Technical memorandum including information for use in the next two-year cycle of planning, focusing particularly on data needed to refine irrigation demand projections and conservation strategies.

4. Study of the Economics of Rural Water Distribution and Integrated Water Supply Study

Description

Rural areas of Region F are served by several rural water supply corporations, ranging from small systems like the Lohn Water Supply Company to large multi-county systems like Millersview-Doole Water Supply Corportaion. Most of these systems are in areas where water is unreliable or of poor quality and some are subject to water quality standards for naturally occurring elements such as arsenic and radionuclides. These systems provide domestic and livestock water to farmers and ranchers and to small rural municipal customers. Sources of water include deep wells into sources such as the Hickory aquifer or treated surface water. Many of these systems face challenges such as meeting water quality standards or reliability issues for surface water sources. These issues are made more challenging by the depressed economic conditions in rural areas, small population densities, large distances to alternative sources of water, and political and social barriers among water users. Although regionalization may be an option for some systems, there may be a point at which the small quantity of water combined with

large distances between sources and low population densities makes regionalization uneconomical. This study would be performed in two steps:

A) Gather information from rural water supply systems in the central and eastern portions of Region F and develop information that could be used by the RWPG and others to identify characteristics that make regionalization a practical and affordable water management strategy. This study will focus on Runnels, Coke, Concho, Brown, Coleman and McCulloch Counties.

B) Using the output from phase I, perform an evaluation of potential regionalization strategies that could be used to meet water supply needs in Runnels, Coke, Concho and McCulloch Counties.

How Study Meets TWDB Evaluation Criteria

Refinement of Information – This study will collect and analyze information regarding cost-effectiveness of regionalization strategies based on actual data from Region F rural water providers

Overcome Problems Identified in Last Round of Planning – The water supply needs in the central portion of Region F are difficult to meet because of the lack of cost-effective strategies. This study will collect information regarding the economics of regionalization that will help contribute to further evaluation of water management strategies to meet needs in the area.

Regional Solutions for Small Communities and Rural Areas – The area in consideration consists entirely of small communities and rural areas. The study will evaluate the cost-effectiveness of regional solutions based on actual information collected from Region F water providers.

Addresses a Need – Most of the area in consideration has water supply needs either because of water quality problems or reliability problems associated with existing water supplies.

Duplication of Effort – Previous Region F planning efforts were unable to identify cost-effective regional solutions to water quality and reliability problems in the study area. This study will focus on identifying factors that contribute to making regionalization a cost-effective strategy, and then use that information to identify specific portions of the study area that may benefit from regionalization. As such, this study does not duplicate any studies known to the Region F Water Planning Group.

Ranking by Region F Water Planning Group and Study Costs

This study was ranked fourth by the Region F Water Planning Group. The cost of this study is estimated to be $157,000.

Beneficiaries

Region F Water Planning Group, rural water suppliers in Region F and elsewhere, other water planners, as well as Ballinger, Winters, Millersview-Doole WSC, Brady, Bronte, Robert Lee, Paint Rock, Eden, Melvin and other water suppliers in Runnels, Coke, Concho and McCulloch Counties.

Scope of Work

1. Gather basic data on regional water suppliers in Region F from TWDB, TCEQ and other sources. Relevant data include but are not limited to population served, source(s) of water, area served, maps of distribution systems, miles of pipeline, other distribution facilities such as pump stations and storage tanks, water quality and reliability information, and cost of water (purchase, treatment, distribution and maintenance). Identify gaps in data. In conjunction with representatives of rural water supplier on the Region F WPG and others, develop a survey to gather additional information from water providers. Follow up the survey with telephone calls to gather additional information. Identify up to six rural water providers for site visits to gather additional information.

2. Based on the above data and data from other sources, develop typical cost ranges for treating and distributing water for rural water systems in Region F. Using these data, develop costs for treatment and distribution over areas of 100, 250, 500, and 1000 square miles for ranges of population densities typically found in the identified counties. Include in the costs water provided for livestock purposes. Evaluate the impact of advanced water treatment costs (i.e. treating naturally occurring elements such as arsenic, radionuclides and fluorides) on the affordability of these systems. Systematically vary individual variables to determine which variables have the most impact on the economics of these systems. Include all costs associated with advanced treatment, including disposal of treatment waste and costs associated with water loss to waste streams. Identify social, political and regulatory issues associated with rural regional water systems.

3. Gather information on alternatives to traditional water service paradigms from the State of Texas, USDA and others. Identify potential alternative water service paradigms that may be applicable to these portions of Region F. Alternatives include point-of-use treatment, self-construction of water service lines, bottled water programs, point-of-entry treatment, and alternative sources such as rainwater harvesting, etc. Identify technological and regulatory issues associated with alternative water service paradigms.

4. Obtain information on existing potable water distribution facilities in Runnels, Coke, Concho and McCulloch counties, including system maps and any existing distribution models. Identify water supply systems that have existing infrastructure (pump stations, storage and distribution lines) that could be used to interconnect systems. Using existing distribution models where available, develop a model of the identified facilities. Based on information from tasks 1 through 3, identify areas that might benefit from regionalization or alternative water supply paradigms.

5. Develop up to five infrastructure improvement scenarios that could be used to interconnect systems. Use the model to size infrastructure and evaluate the feasibility of these interconnections. Evaluate the potential of integrating interconnection with other strategies such as ASR, reuse, advanced treatment (desalination or removal of radionuclides, fluorides or arsenic), or undeveloped

water supplies. Identify potential compatibility issues and water quality associated with interconnections of different water sources.

6. Based on the above analyses, identify the most likely scenarios for increasing the reliability of supplies in the central part of Region F, using either regionalization strategies, alternative water supply paradigms, or both. Develop planning level cost estimates for each of the most likely scenarios. Compare the unit cost of water for the project to costs for current systems and recommended water management strategies in the 2006 Region F Water Plan. Evaluate potential environmental, agricultural and rural issues, and other natural resource issues associated with implementation of the potential projects. Develop a draft technical memorandum and presentation for the Region F Water Planning Group. Based on comments from Region F and others, finalize technical memorandum.

Deliverables

Technical memorandum including information needed for incorporation into the 2011 Region F Plan

5. Watershed Management Data Collection in the Upper Concho River Basin

Description

The Upper Concho River watershed (the North, Middle and South Concho Rivers) is located in Sterling, Coke and Tom Green, Irion and Schleicher Counties in Region F. Since 1960 the much of the watershed has undergone significant hydrologic changes including significant decreases in surface water runoff to O.C. Fisher Reservoir on the North Concho River. In response to these changes, the North Concho River Restoration Program was initiated and has been in operation since 2000. The hydrologic restoration of the North Concho watershed focuses on the removal or treatment of brush (juniper and mesquite) to enhance water yields. To evaluate the hydrologic response to these activities, the Upper Colorado River Authority (UCRA) has been monitoring groundwater elevations, stream base flows, flood flow characteristics and instream losses. Data collected to date indicate a gradual shift to pre-brush conditions, showing increases in groundwater elevations and stream base flows. These activities are an on-going process. It will take continued effort to control the invasion of non-native brush species and document the program's impact on improving the North Concho watershed. This study proposes to fund the continued monitoring of the hydrologic restoration activities in the North Concho River watershed, as well as monitoring conditions in other parts of the Upper Concho. These activities would be conducted by UCRA staff and reported to the Regional Water Planning Group, TWDB and other state agencies. The Upper Colorado River Authority and the Texas State Soil and Water Conservation Board are willing to contribute up to $120,000 ($60,000 per year) in matching funds to support this effort.

How Study Meets TWDB Evaluation Criteria

Refinement of Information – This study will continue monitoring of the on-going brush control programs in these watersheds and analyze the effectiveness of these programs.

Regional Solutions for Small Communities and Rural Areas – The study focuses on a large portion of Region F which is primarily rural. Benefits from brush control could be realized for the entire watershed downstream of the study area.

Address a Need – The reliability of water supplies in this portion of Region F has been significantly impacted by invasive brush. Bush control is a cost-effective method to protect and enhance these supplies.

Availability of Local Funds – The Upper Colorado River Authority and Texas State Soil and Water Conservation Board anticipate that as much as $120,000 ($60,000 per year) in matching funds could be available to support the effort.

Duplication of Effort – No other entities are collecting this information. Therefore, this study does not duplicate any other studies known to the Region F Water Planning Group.

Ranking by Region F Water Planning Group and Study Costs

This study is ranked fifth by the Region F Water Planning Group. The total estimated cost of the study is $314,000. The estimated cost to be funded through this planning grant is $194,000.

Beneficiaries
City of San Angelo and Region F water users

Scope of Work

1. Management of all administrative functions of the project
2. Perform Data Collections and Analysis:
    a. Paired watershed study (Mesquite Sites) –measure evapotranspiration from upland mesquite trees using Eddy Covariance equipment at two 200 acre paired watershed sites
    b. Paired watershed study (Juniper Sites) - measure effects of brush removal on storm event runoff at two small drainage basins of similar size, topography and flora
    c. North Concho River surface water flow measurements - manually obtain quarterly flow measurements supplemented with USGS gauging station data; include quantification and characterization of storm event runoff flows over the measurement period
    d. Sterling Creek surface water flow measurements - manually obtain quarterly measurements
    e. Chalk Creek surface water flow measurements – conduct storm event runoff monitoring utilizing USGS gauging station data
    f. East and West Forks of Grape Creek surface water flow measurements - manually obtain periodic measurements of East Fork and West Fork of Grape Creek, obtain data from USGS gauging station located near the confluence of Grape Creek and the North Concho River

g. Manually obtain measurements of relative ground water elevations from a basin-wide grid of water wells

h. Add two additional monitoring well sites in the South and Middle Concho basins

i. Analyze data to assess performance of the on-going watershed protection program in the North Concho River Basin. Include estimates of impacts of on-going brush management program on stream flows and ground water recharge.

3. Reporting

    a. Generation of quarterly, interim and final reports

Deliverables

A technical memorandum summarizing the results of the study that meets criteria for inclusion in the 2011 Region F Plan.

6. Evaluation of Water Supplies in the Pecan Bayou Watershed

Description

The subordination analysis in the 2006 Region F Plan assumed full subordination of Lake Brownwood to Lake Coleman, Hords Creek Reservoir and Lake Clyde. Because it is unlikely that Lake Brownwood would be fully subordinated to upstream junior water rights, the 2006 plan over-estimated water supplies from the upstream reservoirs and under-estimated supplies from Lake Brownwood. This study would develop a more realistic evaluation of potential supplies from these reservoirs.

How Study Meets TWDB Criteria

Overcome Problems Identified in Last Round of Regional Planning – This study will address shortcomings in the methodology used in the previous water plan by balancing water among users in the Pecan Bayou watershed.

Interregional Coordination – This study will require coordination with Region G and Region K.

Duplication of Effort – Region F is not aware of any other previous or on-going studies that address water rights issues in the Pecan Bayou watershed.

Ranking by Region F Water Planning Group and Study Cost

This project was ranked sixth by the Region F Water Planning Group. The estimated study cost is $71,000.

Beneficiaries

BCWID customers, City of Coleman, City of Clyde (Region G)

Scope of Work

1. Obtain historical records for reservoirs in the Pecan Bayou watershed. Develop historical inflows into the reservoirs. Compare these flows to naturalized flows used in the Colorado WAM. Evaluate historical long-term channel losses in the watershed. Make a determination of the most appropriate flows for use in the project (historical or WAM-based flows).
2. Contact representatives of Region G for coordination on water supply impacts for Lake Clyde. Contact representatives of Region K about the assumptions and results of the study. It is not anticipated that this study will have any impact on water supplies outside of the Pecan Bayou watershed.
3. In conjunction with BCWID, the City of Coleman, and the City of Clyde, develop up to four scenarios under which Lake Brownwood would make calls on water from upstream reservoirs. Determine the impact on yield of the reservoirs for each scenario. Select the most likely scenario as the basis for water supply from these sources in the 2011 Region F plan. Evaluate potential environmental, agricultural and rural issues, and other natural resource issues associated with implementation of these scenarios.
4. Develop a draft technical memorandum describing water rights issues in the Pecan Bayou watershed, the methodology used in the study and the results of the study. Provide memorandum to Regions G, F and K, as well as other stakeholders in the Pecan Bayou watershed. Present the results to the Region F Water Planning Group. Finalize technical memorandum based on comments from Regions G, F and K, and other interested parties.

Deliverables

Technical memorandum including information needed for incorporation into the 2011 Region F Plan.

7. Municipal Water Conservation

Description

Region F is located in arid West Texas and is subject to frequent droughts. The region has limited water sources for existing entities and future growth. As such, conservation is an important water management strategy to meet demands in the region. However, there is little data on the measures currently employed in the region and the effectiveness of these measures. This study will focus on municipal conservation strategies and collect data to assist in identifying the conservation strategies most appropriate for Region F cities.

How Study Meets TWDB Evaluation Criteria

Refinement of Information – This study will generate information on savings and costs of current water conservation practices specific to Region F. These data may be used for future evaluations of water conservation in Region F and other similar areas.

Duplication of Effort – Although the State of Texas will be collecting information on water conservation, these data may not be available for this round of planning. This study will also focus on recent water conservation efforts. Therefore, the Region F Water Planning Group is not aware of duplication with any other efforts.

Ranking by Region F Water Planning Group and Study Costs

This study was ranked seventh by the Region F Water Planning Group. The estimated cost of this study is $25,000.

Beneficiaries

Region F municipal water user groups

Scope of Work

1. Survey up to 10 Region F cities on current conservation practices. A list of conservation practices identified by the Water Conservation Task Force will be provided for reference. Document current practices and the costs of implementing those practices.
2. Identify up to 3 cities that are actively employing conservation measures. Collect data on historical water use and assess potential savings associated with conservation practices. Via conference call, meet with each city to discuss current conservation programs, issues, and challenges to implementation, including the costs and financing water conservation activities.
3. Review best management practices for municipal users identified by the Conservation Task Force. Compare water savings estimates and costs listed in the best management practices to savings and costs for the cities in Region F. Identify municipal conservation practices that may be appropriate for Region F with an estimated range of potential water savings for each applicable practice.
4. Develop and draft technical memorandum describing the results of the study. Present the results of the study to the Region F Water Planning Group. Finalize technical memorandum based on comments by Region F and others.

Deliverables

Technical memorandum including information needed for incorporation into the 2011 Region F Plan.

8. Well Location Study for the City of Menard

Description

The City of Menard has identified the Hickory aquifer as a potential supply for the city. This source was incorporated in the 2006 Region F Plan. This study would identify potential sites near the city for a Hickory well, as well as identify potential implementation issues associated with the project. Factors considered will be quantity

and quality of the supply, integration with the existing distribution system, and cost of implementation.

How Study Meets TWDB Evaluation Criteria

Implementation of Water Management Strategy – A Hickory well was a recommended strategy for the City of Menard in the 2006 Region F plan. This study will provide information needed to implement that strategy.

Addresses a Need – The City of Menard has an identified need in the 2006 Region F Plan.

Duplication of Effort – The City of Menard is in the process of obtaining financing to implement this strategy. This study will provide final planning-level information needed to implement the strategy. The Region F Water Planning Group is not aware of other studies addressing this strategy.

Ranking by Region F Water Planning Group and Study Cost

The Region F Water Planning Group ranked this project eighth. The estimated cost of the project is $24,000.

Beneficiaries

The City of Menard

Scope of Work

1. Obtain information on existing and proposed infrastructure facilities (tanks, pump stations and distribution lines) for the City of Menard. Obtain existing information on the quality and quantity of water from the Hickory aquifer in the area. Obtain geophysical logs to assist in defining depth and characteristics of the Hickory aquifer in the vicinity of Menard. Make a site visit to the city to evaluate potential sites for a well. Identify up to three potential locations for a Hickory well. Develop conceptual costs for improvements needed to tie the well to the existing distribution system.
2. Evaluate the potential of the new well for use as an ASR facility. Identify potential implementation issues for development of supplies from the Hickory aquifer.
3. Develop and draft technical memorandum describing the results of the study. Provide draft to the City of Menard and the Region F Water Planning Group. Present the results of the study to the Region F Water Planning Group. Finalize technical memorandum based on comments by the City of Menard, Region F and others.

Deliverables

A technical memorandum describing the results of the study.

9. Evaluation of the Future Water Supply Potential of Red Bluff Reservoir

Description

At one time Red Bluff Reservoir provided a significant amount of irrigation water in the western part of Region F. As a result of upstream water development, interstate water supply issues, water quality deterioration and other factors, the ability of the reservoir to provide irrigation water has been diminished. This study will evaluate the future of the reservoir taking into account changes to water supply operations initiated in the State of New Mexico, including both passage of water, salt cedar removal, and water quality improvement projects, as well as potential improvements needed by the Red Bluff Water Power Control District to improve water deliveries to irrigators.

How Study Meets TWDB Evaluation Criteria

Refine Information – This study will refine information on Red Bluff Reservoir and the users of water from the reservoir in light of settlement of issues with the State of New Mexico and water quality improvement programs upstream of the reservoir.

Overcome Problems Identified in Last Round of Regional Planning – The Rio Grande WAM shows approximately 10,000 acre-feet more yield than previous evaluations of the supply of the reservoir. This study will determine if that additional yield represents a reliable supply.

Regional Solutions to Meet Needs in Small Communities and Rural Areas – Red Bluff Reservoir is an irrigation water supply in a largely rural portion of Region F.

Duplication of Effort – Region F is not aware of other studies that address water supply issues from Red Bluff Reservoir

Ranking by Region F Water Planning Group and Study Cost

This study was ranked ninth by the Region F Water Planning Group. The budget for this project is estimated to be $89,000.

Beneficiaries

Users of water from Red Bluff Reservoir

Scope of Work

1. Meet with representatives of the Red Bluff Water Power Control District and irrigation districts that obtain water from Red Bluff Reservoir to discuss the project. Obtain any previous studies regarding water supply from the reservoir. Obtain historical data regarding storage in and water use from the reservoir. Obtain historical water quality records for the reservoir and for the Pecos River above the reservoir.
2. Review previous yield studies, the Rio Grande WAM and other water supply studies in the Pecos Basin (including studies from New Mexico). Determine appropriate methodology for determining the yield of the reservoir in light of

changes to upstream operation of the Pecos River. Refine future water supply estimates from the reservoir.

3. Develop historical total dissolved solids (TDS) data for inflow into the reservoir. Adjust historical data for impact of existing and proposed water quality improvement projects above the reservoir. Perform conservative water quality modeling of the reservoir to determine potential impact of changed operations on the reservoir.
4. Based on previous studies and discussions with the District and irrigators, make an assessment of potential improvements that might improve the efficiency of irrigation operations in the area. Develop planning-level cost estimates for proposed improvements.
5. Develop and draft technical memorandum describing the results of the study. Provide draft to the Red Bluff irrigation districts and the Region F Water Planning Group. Present the results of the study to the Region F Water Planning Group. Finalize technical memorandum based on comments by Region F and others.

Deliverables

Technical memorandum including information needed for incorporation into the 2011 Region F Plan.

10. Development and Maintenance of Region F Website

Description

A web site is a convenient tool for disseminating information regarding the regional water issues and regional planning activities. This project proposes to develop a website to disseminate information on Region F water planning with an emphasis on educating the public on water conservation and wastewater reuse. Both of these water management strategies are important components in the region's overall water plan to meet current and future water demands. Public education and support of these strategy types will further the implementation of the Region F recommended strategies.

How Project Meets TWDB Evaluation Criteria

Public Participation – This project would provide a convenient and flexible method for public outreach and participation.

Duplication of Effort – The information on this website would be a supplement to information found on the TWDB website. Region F is not aware of any other public outreach or participation activities associated with the planning process in Region F.

Ranking by Region F Water Planning Group and Project Cost

This project was ranked tenth by the Region F Water Planning Group. The estimated cost of the project is $22,000.

Beneficiaries

The public and the Region F Water Planning Group

Scope of Work

1. In conjunction with the Region F Water Planning Group, determine the best location for the proposed website. Potential locations include but are not limited to the Freese and Nichols, Inc. server and the CRMWD server.
2. Develop website with a public access area for dissemination of information regarding water conservation, wastewater reuse, regional water planning activities and other issues specific to Region F. Include links to the TWDB Water IQ program and other appropriate information websites. Provide a mechanism for public feedback to the Regional Water Planning Group.
3. Maintain the website for the 2-year biennium funding.

Deliverables

Region F website.

PART 3 – Interregional Coordination

The project in Part 3 is a companion project to the Region K Project 1 – *Surface Water Availability Modeling*, and it is assumed that funding of this project will be granted if funding is approved for the Region K project. As a result, this project was not ranked by the Region F Water Planning Group.

1. Inter-Regional Coordination on the Refinement of Colorado Basin Water Availability

Description

In the first biennium of this planning cycle, Region K intends to conduct a technical review of the Colorado River Basin water availability models (WAMs) that were used for the 2006 regional water plans. The Region K effort will include identification of potential modifications to the WAM to refine water availability in the Lower Colorado River Basin, identify and incorporate water supply agreements that are not reflected in the model, and determine what additional studies may be needed. As part of this study, Region F will coordinate with Region K and review the recommendations from the Region K study.

This study will only be implemented if TWDB funds the Region K study.

How Study Meets TWDB Evaluation Criteria

Overcome Problems Identified in the Previous Round of Planning – Region K identified several problems associated with supplied in the Lower Colorado using the "no call" assumption used in the previous round of planning.

Interregional Coordination - Region F will coordinate to verify that changes proposed by Region K do not significantly impact water supplies in Region F.

Duplication of Effort – Region F is not aware of other studies outside of the regional water planning process addressing water rights issues between the Upper and Lower Colorado River Basins.

Ranking by Region F Water Planning Group and Study Cost

Because this project is dependent on funding of the Region K study, the Region F Water Planning Group did not rank this project. The estimated cost of coordination to Region F is $25,000.

Beneficiaries

Major surface water rights holders in Region F and Region K.

Scope of Work

1. Contact Region K representatives and consultants to determine details of coordination and review process.
2. Attend up to three (3) meeting with Region K to review efforts by Region K as needed. Assist with providing water supply agreements in Region F that are not included in the WAM model.
3. Review findings of the Region K study. Develop a draft technical memorandum describing coordination efforts and potential impacts of the Region K study on Region F. Present the results to the Region F Water Planning Group. Based on comments by Region F and others, finalize the memorandum.

Deliverables

Provide memorandum on coordination efforts and potential impacts to Region F water supplies with recommendations proposed by Region K.

EXHIBIT V

RESUMES OF PROPOSED PROJECT STAFF

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RESUMES OF PROPOSED PROJECT STAFF

Simone F. Kiel, P.E.

Engineer V, Associate

Ms. Kiel has varied experience in the water resources and civil engineering fields. Her water resource experience includes water management planning, reservoir operation studies, and groundwater and surface water availability evaluations. Ms. Kiel has worked with Senate Bill One Regional Water Planning since its inception, and has worked with consultant teams in 7 planning group regions. Ms. Kiel's environmental experience ranges from preparing and implementing remedial investigations to the development of feasibility studies and remedial action plans. She has worked on a variety of projects throughout the continental United States.

Education:	*Years experience with Freese and Nichols:*
BS, Civil Engineering, Rice University (1980)	13
MS, Environmental Engineering, Rice University (1987)	*Total years experience:*
	20

Registrations:	Professional Engineer, TX. No. #93615 (2004)
Project Experience:	**Senate Bill One Water Supply Plan, Region F** - Texas Water Development Board - Project Manager for the third round of Senate Bill One regional water planning. Project member for the 2001 Water Supply Plan for Region F, a 32-county region in west Texas. Responsibilities included evaluations of water supplies, development of conceptual plans and associated costs for strategies to meet regional demands, and development of final plan. **Identification and Evaluation of Financing Programs for Brush Control in Texas** -Upper Colorado River Authority– Project manager for the evaluation of financing programs that may be applicable for continuation of the State Brush Control Program. This project included identification of local, state and federal financing programs, including recent legislation that could potentially be used for implementation or maintenance of brush control. **Senate Bill One Regional Water Supply Plan, Region B** - Biggs and Mathews, Inc. - Project manager for Senate Bill One Regional Water Supply Plan for Region B in north Texas. Project included development of water supply estimates for reservoirs and aquifers within the 10-county region, identification of water supply needs and local issues, and the development of water management strategies. **Senate Bill One Water Supply Plan, Region I -** Texas Water Development Board - Project manager for the Senate Bill One Water Supply Plan for Region I, located deep east Texas. Responsibilities included evaluations of current water supplies, development of conceptual plans and associated costs for strategies to meet regional demands, and assisted in the development of the final plan.

	Senate Bill One Water Supply Plan, Regions A, C, E, and G - Texas Water Development Board - Project member for the Senate Bill One Water Supply Plan for Regions A, C, E and G. Responsibilities varied for each region, but generally included evaluations of current water supplies, development of conceptual plans and associated costs for strategies to meet regional demands, and development of the final plan. **Lower Bois d'Arc Creek Reservoir Phase II** - North Texas Municipal Water District. – Assistant Project Manager for studies related to preparing a water rights application and 404 permit application for the development of the proposed Lower Bois d'Arc Creek reservoir in Fannin County. Activities include coordination and management of a team of engineers and scientists, client interface and review of documents developed in support of the permit applications. **West Central Brazos Planning Study** – Brazos River Authority - Project manager for the West Central Brazos River Basin Regional Water Treatment and Distribution Facility Plan. This study evaluated the water supply needs in an eighteen county region in the West Central Brazos River Basin. It provided a plan to transfer water efficiently to entities with needs using existing facilities, modified facilities, and/or new facilities. The study produced a long-term water supply plan for the region as well as an emergency action plan that could be implemented during extreme drought. **Texas Water Allocation Assessment Project** - U.S. Army Corps of Engineers, Fort Worth District - Lead project engineer for the Texas Water Allocation Assessment project. This project includes review of the reports from the 16 Regional Water Planning Groups in Texas and interviews of 95 identified stakeholders to determine if a Federal interest in multipurpose planning initiatives might prove beneficial to meet long-term watershed and related water supply goals. **Watershed Management Plan** - Sabine River Authority - Development of a comprehensive watershed management plan for the Sabine Basin for the Sabine River Authority. Conducted analyses of potential new water supply projects and prepared detailed cost estimates. **Water Supply Studies** - City of Greenville, Texas - Evaluated different water supply and system enhancement strategies for the City of Greenville. Included reservoir operation studies with off-channel diversions and cost evaluations. **Water and Wastewater Plan** - City of Vernon, Texas - Worked together with other team members to develop a comprehensive water and wastewater plan for the City that included an evaluation of the City's current water supply, water distribution system and wastewater system. It included the development of a capital improvement plan to meet the City's needs over a 50-year period for water supply and 20 years for distribution.

Jon S. Albright

Hydrologist V - Associate

Mr. Albright is a Hydrologist and Project Manager in Freese and Nichols' Water Resources Planning group. His background includes the management of Senate Bill One Regional Water Supply Plans and Water Availability Models. He works closely with the Texas Water Development Board, regional water authorities and districts and with local municipalities for water supply modeling and master planning, water resource planning, system operations models, water rights permitting studies, and cost- and size-estimating on water projects.

Education:	*Years experience with Freese and Nichols:*
BS, Hydrology and Water Resources, Tarleton State University (1993)	13
	Total years experience:
	25

Areas of Expertise:	Hydrologic Modeling Reservoir System Operations Water Conservation Water Rights, Laws and Permitting Water Reuse Water Resource Planning Cost Estimating
Project Experience:	2001 and 2006 Region F Water Supply Plan - Texas Water Development Board and The Colorado River Municipal Water District Project Manager for Senate Bill One Regional Water Supply Plans for Region F, a 32-county region in West Texas that includes the Cities of Midland, Odessa, San Angelo and Brownwood. Project included updates of population and water use projections, development of water supply estimates for reservoirs and aquifers, and development of conceptual plans and costs for strategies to meet demands over a 50-year period. The 2006 plan included a complex analysis of a strategy assuming subordination of major water rights in the Colorado Basin, conducted jointly with the Lower Colorado Region. Brazos River Authority – System Operation Permit Served as project hydrologist for water availability modeling associated with studies for the Brazos River Authority's System Operation Permit, a major water rights application seeking additional appropriation of water made available by operating the twelve Authority's reservoirs as a system. The study included evaluations of multiple scenarios with different assumptions on priority calls, environmental inflows, and consideration of other reservoirs as part of the system.

	Brazos and San Jacinto-Brazos Water Availability Model - HDR Texas Commission on Environmental Quality Project Manager for development of naturalized flows, area-capacity and evaporation data for a water availability model of the Brazos and San Jacinto-Brazos River Basins. Trinity-San Jacinto Water Availability Model - Espey Consultants, Inc. Texas Commission on Environmental Quality Assisted in development of naturalized flows, area-capacity and evaporation data for water availability models of the San Jacinto and Trinity River Basins. Neches Water Availability Model - Brown & Root, Inc. Texas Commission on Environmental Quality Project manager for development of naturalized flows for a water availability model of the Neches River Basin. System Operation of Lake Wright Patman and Lake Jim Chapman - U.S. Army Corps of Engineers Fort Worth District Project Manager for a study of changes in operation of Lake Wright Patman and potential system operation of Lake Patman with Lake Jim Chapman. Included development of a daily operation model of the two reservoirs and the intervening watershed between the reservoirs. Operations Policy Lavon/Texoma/Cooper - Water Supply System Operation Update North Texas Municipal Water District Project Manager for an update to operational policies for the North Texas Municipal Water District reservoir system, including development of a daily four-reservoir system operation model. Water Availability Analysis - Espey Consultants, Inc. Trinity River Authority Project hydrologist for water availability analysis for the Trinity Basin, including comparison of naturalized inflows, development of hydrologic data, and modeling of water availability using the WRAP computer model. Water Supply Planning and Permitting - Wheeler Branch Reservoir Somervell County Water District Assisted with modeling of a potential off-channel reservoir in Somervell County as part of the permit application for the reservoir. System Reliability and Enhancement Study - Tarrant Regional Water District Project hydrologist for a study of potential water supply delivery options for the Tarrant Regional Water District, a major water provider encompassing a 10-county area including the City of Fort Worth. Responsibilities included development of a seven-reservoir hydraulic, hydrologic and optimization model to evaluate various potential alternatives. Study has resulted in construction of a major pipeline interconnecting the District's water supply sources.

	Cost Estimates for Reservoirs, Texas Water Development Board - Responsible for updates of cost estimates for reservoirs and transmission projects for the 1996 Texas Water Plan. Operation Procedures Update - City of Abilene, Texas Project hydrologist for an update of operation procedures for Fort Phantom Hill and Hubbard Creek Reservoirs. Phase II Trans/Texas - Brown & Root, Inc. Sizing and Cost Estimating, Brown and Root, Inc. - Hydrologist for various phases of the Trans-Texas Southeast program, including sizing and cost estimation of transmission project, reservoir system operation studies, and status of freshwater inflows into Galveston Bay. Long Range Water Supply Plan - City of Cleburne, Texas Development of hydrologic data and operation studies for potential water supply systems, including water quality, yield, and pumping cost. Modeling for Hydrologic Studies - Lower Neches Valley Authortiy Project hydrologist and programmer responsible for computer models for hydrologic studies in the Neches River Basin. Long-Range Water Supply Plan - City of San Angelo Project Manager for development of a long-range water supply plan for San Angelo, including recommendations for reservoir operation, analysis of wastewater reuse strategies, and improvements to the City's raw water supply system.

John B. Ashworth

John Ashworth has a wide range of experience with water-supply evaluations and water-resource management planning in his 23 years of working for the Texas Water Development Board, and now for LBG-Guyton Associates. He directed the firm's water management planning activities for several of the Texas regions designated by Senate Bill 1. The regional water management plans involved analyses of available water supplies to meet short- and long-term water needs for all water-use categories. The plans also provided for drought contingency water-supply strategies. Mr. Ashworth is also experienced in brackish groundwater desalination assessments, municipal water-supply development and groundwater conservation district activities.

His experience as a geologist with the Texas Water Development Board involved the supervision of the agency's ground-water availability studies. This duty included the identification, characterization and supply analysis of the major and minor aquifers in the state. Additional duties included the supervision of the Priority Ground Water Management Area (Critical Area) Program, Texas/Mexico Border Ground-Water Program, technical assistance to underground water conservation districts and other public entities, and involvement with the Aquifer Storage and Recovery Pilot Program. Technical duties with regard to the above programs consisted of water supply planning, subsurface mapping, test hole drilling, pumping tests, water-quality sampling, well construction analysis, and geophysical log analysis. His experience included project management of a number of multicounty ground-water availability studies requiring extended field reconnaissance, design of monitoring well networks, research of existing data, drilling and coring of test holes, subsurface geophysical studies and subsurface mapping.

He also authored much of the ground-water availability segment of previous State Water Plans, and was significantly involved in establishing the agency's Senate Bill 1 policies relating to the certification guidelines of underground water conservation district management plans.

Mr. Ashworth's experience with Gas Log Inc. included the evaluation of gas shows during oil field drilling operations and correlation with geophysical log interpretations. This activity resulted in his familiarity with large-scale drilling operations.

Education: B.S. in Geology, 1973, from Lamar University

Registrations: Professional Geoscientist #2238, State of Texas

Technical Societies: Texas Ground Water Association (Director, Ground Water Scientists Division); Texas Water Conservation Association;

Professional History:

LBG-Guyton Associates, Austin, Texas, 2005 to date, Senior Associate
LBG-Guyton Associates, Austin, Texas, 2000 to 2005, Associate
LBG-Guyton Associates, Austin, Texas, 1997 to 1999, Senior Consultant
Concordia Lutheran College, Austin, Texas, 1991, Instructor
Texas Water Development Board, Austin, Texas, 1974 to 1997, Geologist
Gas Log Inc., Houston, Texas, 1973 to 1974, Geologist

Project Experience:

- ***West Texas*** – Principal investigator and author of several regional ground-water availability studies including the following aquifers:

  (a) **Hueco-Mesilla Bolsons Aquifer** - El Paso and Hudspeth Counties.
  (b) **Bone Spring-Victorio Peak Aquifer** - Dell City area of Hudspeth County.
  (c) **Cenozoic Pecos Alluvium Aquifer** - Reeves, Loving, Pecos, Ward, and Winkler Counties.
  (d) **Salt Basin of the West Texas Bolsons Aquifer** - Culberson, Jeff Davis, and Presidio Counties.
  (e) **Edwards-Trinity (Plateau) Aquifer** - Midland, Reagan, Upton, and Glasscock Counties.
  (f) **Dockum Aquifer** - numerous southern High Plains and northern Edwards Plateau counties.
  (g) **Igneous Aquifer** - Brewster, Jeff Davis and Presidio Counties.

  Conducted the following local ground-water availability studies:

  (a) **Balmorhea/Toyahvale** - Jeff Davis and Reeves Counties.
  (b) **Ryan Flat** - Jeff Davis and Presidio Counties
  (c) **Garden City** - Glasscock County.
  (d) **Oil field** - Central Sterling County.

  Conducted an inventory of all public water-supply well fields in 18 West Texas counties.

  Is currently the project manager for the Senate Bill 1 and 2 Region E water planning process. Region E is an area of Far West Texas that includes seven counties and stretches from El Paso to beyond the Big Bend area.

  Also, is currently working with a team of consultants in the establishment of a desalination facility that will provide fresh water for the City of El Paso and the Fort Bliss Army Post.

- ***Central Texas*** – Principal investigator and author of a study and report evaluating the ground-water resources of part of south-central Texas (11 "Hill Country" counties), with emphasis on the lower Cretaceous Trinity formations. The general scope included the collection, compilation, and analysis of ground-water data, test hole drilling, subsurface mapping, and the presentation of the data, conclusions, and recommendations in a published report. Much of this region was later declared a "critical area" due to its

Project Experience: (continued)

limited ground-water availability and rapidly increasing water demand. Later work included monitoring water-level trends during normal and drought climatic conditions. Also, participated in numerous public meetings to provide educational assistance to the citizens of the region. Is currently the project manager for the Senate Bill 1 Region J water planning process. Region J is an area that includes six counties stretching from Kerr to Val Verde County.

- ***Texas High Plains*** – Participated in a regional ground-water study of the High Plains aquifer (principally the Ogallala Formation) in Texas as part of a nationwide (eight-state) study to improve the existing ground-water data base and to develop a computer model capable of predicting future aquifer conditions. Primary area of responsibility was the drilling, coring, and testing of 41 test holes to ascertain permeability and specific yield of the aquifer. Later involvement with the High Plains region included the monitoring of water-level changes over time and continued improvement to the computer model.

- ***East Texas*** – Principal investigator and author of a regional ground-water availability study of the Nacatoch aquifer in 10 northeast Texas counties. The study included the collection, compilation, and analysis of ground-water data, test hole drilling, subsurface mapping, and a published report. Also, assisted in a regional availability study of the Blossom aquifer in the same region.

- ***Texas-Mexico Border*** – Project manager and co-author of a regional study of the Hueco Bolson and Rio Grande Alluvium aquifers as they occur in Texas, Mexico, and New Mexico. The study included a binational agreement to exchange government-approved ground-water data and resulted in a data report presented in both English and Spanish and a major aquifer evaluation report. Additional work included attending numerous meetings concerning water issues as they relate to the Free Trade Agreement and the International Boundary Environmental Plan.

- ***Regional Ground-Water Supply Analysis for the State Water Plan of Texas*** – Supervised and participated in the ongoing appraisal of the ground-water availability of the major and minor aquifers in the State. The scope of this assessment encompasses regional aquifer studies, aquifer computer models, and water-level and water-quality monitoring. Results are continuously reevaluated and applied to the most current State Water Plan. Principal author of the ground-water availability segment of previous and current State Water Plans.

- ***Priority Groundwater Management Area Program*** – Responsible for the Texas Water Development Board's contribution to the legislatively mandated Priority Groundwater Management Area Program (formerly referred to as the Critical Area Program). Assisted in the identification of areas to consider for designation. Conducted studies and authored reports on four of the 16 areas identified for consideration. Studies consisted of an evaluation of existing ground-water data to determine if the area was currently having water supply or quality degradation problems or if such problems were anticipated in the coming 20 years.

James A. Beach

James Beach is a Professional Geoscientist with over 16 years experience in ground-water and surface-water hydrology, water resources, environmental assessments, numerical flow and solute transport modeling, quantitative contamination evaluations, and litigation support. He specializes in application of numerical models to evaluate water resources as well as contaminant flow and contaminant transport in the subsurface. Mr. Beach has experience in field hydrology and hydrogeology and application of quantitative hydrology in the water resources arena. This includes evaluation of ground-water availability and quality in many different aquifer systems, evaluation of current and projected water supply and demand, identification of critical ground-water areas, ground-water/surface water interaction, hydrologic modeling, development of water-management strategies, development of water-supply plans, public interaction, and report preparation.

Mr. Beach has consulted for commercial, industrial and government clients to meet regulatory mandates as well as assisting regulatory agencies in technical issues of evaluating compliance at permitted facilities. He has experience in the application of saturated and unsaturated flow and transport models, GIS applications and mapping, visualization and animation, database development and management, statistical, geostatistical, and stochastic analysis, technology transfer, and regulatory/public interaction.

Mr. Beach has extensive experience characterizing, evaluating, and modeling flow and contaminant transport in unsaturated and saturated zones. He has used quantitative models to evaluate ground-water/surface-water interaction, long-term ground-water availability, recharge, well field impacts, surface-water flow/transport, deep-well injection, natural and enhanced bioremediation, landfill covers, slurry/sheet pile walls, and injection/recovery systems. He has worked at sites with contamination from free and dissolved phases of light and dense nonaqeous organic liquids, radionuclides, inorganic species and metals.

Education:	B.S. in Hydrology, 1987 from Tarleton State University, Stephenville, Texas; M.S. in Hydrology, 1989, from New Mexico Institute of Mining and Technology, Socorro, New Mexico.
Registration:	Certified Ground Water Professional, #118904, National Ground Water Association Professional Geoscientist #2965, State of Texas
Technical Societies:	American Geophysical Union Association of Ground-Water Scientists and Engineers (National Ground Water Association)
Professional History:	**LBG-Guyton Associates, Austin, Texas,** 2005 to date, Senior Associate **LBG-Guyton Associates, Austin, Texas,** 2002-2005, Associate **LBG-Guyton Associates, Austin, Texas**, 1999-2001, Senior Hydrologist **INTERA, Austin Texas,** 1992-1999, Ground-Water Hydrologist

Professional History: (continued)

McCulley, Frick & Gillman, Inc., Austin, Texas, 1989-1992, Ground-Water Hydrologist

Hall Southwest Water Consultants, Austin, Texas, 1987, Staff Hydrologist

Magill Well Service, Eden, Texas, 1984, Assistant Well Driller

Project Experience:

Water Resources, Hydrology, and Modeling

- ***Assessment of Brackish Ground Water for Desalination in Texas –*** Managed project for the Texas Water Development Board to assess the potential for desalinization of brackish ground water in Texas' major and minor aquifers. The study included evaluation of water-quality and geophysical data for over 30 aquifer systems throughout the state and development of hydrogeologic and water-quality maps that can be used to assess potential brackish water projects for planning purposes. The evaluation also included preliminary cost estimation formulas for source water production (wells and well fields) and engineering considerations for different aquifers.
- ***Igneous-Bolson Aquifer Ground-Water Availability Model, Texas –*** Served as project manager and primary modeler to develop a 3-layer MODFLOW model to simulate ground-water flow in the west Texas Bolson and Igneous aquifers. All model data was developed and evaluated within ArcGIS and was compatible/interchangeable with the modeling GUI. Model development and calibration included assimilation of historical pumping and water level data, as well as aquifer characteristics. Aquifer water levels and streamflow data were used to calibrate and verify the steady state and transient models. Predictive simulations, which incorporated 50-year demand projections and potential drought conditions, were used to assess aquifer impact and ground-water availability.
- ***Hydrologic Modeling of Edwards Aquifer Watershed –*** Served as project manager to develop hydrologic models (using HSPF) simulate nine watersheds that contribute recharge to the Edwards Aquifer. The models incorporated available meteorological, hydrological, and geological information to develop estimates of runoff and recharge in the basins for a 50-year period. Water Availability Model (WAM) information was utilized to assess impacts from diversions and flood retardation structures was incorporated. The models are useful for assessing proposed recharge management strategies such as brush control, recharge structures, and precipitation enhancement. In addition, the models can be extended to assess water availability and quality in the basins.
- ***Regional Water Planning – (Central, East, and West Texas) –*** Tasks of the projects included description and quantification of ground-water resources, evaluation of current and projected water supply and demand, identification of critical ground-water areas, development of water management strategies, development of a water supply plan, public interaction and presentations, and report preparation. Working with the RWPGs in these projects helped to identify regional ground-water concerns and strategies to meet future demand. Aquifers evaluated included the Carrizo-Wilcox, Gulf Coast, Edwards-Trinity (Plateau), Sparta, Queen City, Yegua, and Lipan.
- ***San Antonio River Authority, Lower Guadalupe Water Supply Project, South Central Texas –*** Assessed the conjunctive use of surface water and groundwater from the lower part of the river basin as a strategy for increasing water supplies in

Project Experience: (continued)

the upper part of the basin. Used Central Gulf Coast ground-water availability model (GAM) to help assess ground-water availability from the Gulf Coast aquifer in a five county area including all or parts of Goliad, Refugio, and Victoria Counties. Modeling was used to estimate the effects of variations in pumping rate from three potential wellfields for a 45-year period. Simulated drawdown was used to help assess potential mitigation and land subsidence issues.

- ***Lipan Aquifer Groundwater Availability Model, Texas –*** Collected and evaluated available hydrogeologic data from ground-water district and state databases. Developed a MODFLOW model to simulate groundwater availability from the upper alluvial aquifer and the lower Permian limestone aquifer. All model data was developed and evaluated within ArcGIS and was compatible/interchangeable with the modeling GUI. Aquifer water levels and streamflow data were used to calibrate and verify the steady state and transient models. The model incorporated stream-aquifer interaction as well as spatially and temporally varying recharge and pumping.
- ***Ground-Water Availability Evaluation of Trinity Aquifer, Bexar and Comal Counties, Texas –*** Developed a MODFLOW ground-water availability model to evaluate the viability of producing Trinity ground water in a portion of the aquifer greatly influenced by surface-water recharge. The model structure was based on site-specific borehole data, and calibrated to a multi-well long-term pump test and was consistent with the TWDB Trinity Aquifer GAM model within the modeled area. The model was used to assess affects of long-term pumping and multiple production scenarios.
- ***Ground-Water Availability Evaluation of Ogallala Aquifer, Andrews and Gaines Counties, Texas –*** Developed a MODFLOW ground-water availability model to predict the viability of producing large amounts of Ogallala ground water over a 25-year period from two proposed well fields for power generation cooling water. The regional model was calibrated and verified with "predevelopment" water levels and with water levels collected over a 50-year period. It accounted for past and future irrigation and municipal usage, incorporated heterogeneity in hydraulic properties, and paleo-channels that greatly influenced the ground-water availability.
- ***Evaluation of Ground-Water Availability for the Gulf Coast Aquifer, Texas –*** Utilized existing hydrogeologic evaluations, databases, and ground-water models in east Texas and the Coastal Bend area to develop availability estimates, sustainable yields, and long-term impacts from current and proposed ground-water usage.
- ***Update and Recalibration of Ground-Water Model for Reno, Nevada –*** Converted a complex, non-standard model to MODFLOW-96. The model implemented domestic and municipal pumping; distribution system leakage; recharge from mountain-fronts, precipitation, and irrigation; evapotranspiration; rivers and streams; and discharge from springs and man-made pits. The model will be used to complete wellhead protection assessment and evaluate long-term effects of multiple production scenarios. Data was developed within ArcView GIS and interchanged with ground-water model.
- ***Evaluation of Ground-Water Availability in the Carrizo-Wilcox Aquifer –*** Utilized existing MODFLOW ground-water flow model in northeast and central Texas to develop availability estimates and to determine the long-term impacts from projected ground-water demand. Evaluation helped identify potentially critical areas and aided in the development of a set of wells throughout the region to help assess future water-level changes.

Project Experience: (continued)

- ***Lignite Mines, Texas –*** Performed numerous aquifer tests and analysis, well installations, ground-water sampling and monitoring. Developed datasets, parameter distributions, and ground-water models for mine dewatering and depressurization in central and east Texas lignite mines.

Hydrologic and Hydrogeologic Characterization

- ***Longhorn Pipeline, Central Texas –*** Supported the permitting process for the 19-mile pipeline replacement that crossed the Edwards Aquifer recharge and contributing zones. Performed watershed delineation, statistical analysis of streamflow, rainfall-runoff analysis, surface-water flow and transport analysis and risk assessment, overland flow calculations, assessment of detention ponds, and rainfall intensity-duration-frequency analysis. Evaluated shallow geology in 19-mile trench to assess potential for karst recharge to the aquifer. Developed watershed parameters needed to estimate runoff and travel time estimates from the pipeline to surface waterways and karst recharge features, and identified emergency response sites along tributaries. Performed trench percolation tests in karst areas to assess the nature and extent of contamination caused by potential pipeline releases.
- ***Gas Storage and Transfer Station, Kansas –*** Part of a team that developed and implemented a sampling plan to evaluate the source of elevated chloride concentrations in the shallow aquifer system. The evaluation successfully delineated naturally occurring chloride contamination from that portion of a plume that was caused by onsite brine storage ponds.
- ***Surface Lignite Mine, Rockdale, Texas –*** Developed and implemented an aquifer testing program to support dewatering evaluations. The fieldwork included well installation and development, as well as aquifer testing. Quantitative evaluation of aquifer test data was also completed.
- ***Rendering Plant, San Angelo, Texas –*** Performed field investigation to determine extent of contamination at a site contaminated with diesel fuel after years of surface spills. Investigation entailed collection of soil samples, installation of monitoring wells, well development, ground-water sampling, and hydraulic testing. Also included preparation of a remedial action plan.
- ***Comanche Peak Steam Electric Station, Glen Rose, Texas –*** Quarterly sampling and evaluation of ground-water data from Class I RCRA landfills. Also aided in the preparation of a work plan for clean closure of one landfill that was in direct hydraulic connection with the cooling lake; this plan was accepted and the landfill was later closed.

Ground-Water Modeling

- ***Kenai Peninsula, Alaska*** – Developed a three-dimensional ground-water flow model of a complex faulted glacial geological system below a petroleum refinery that was contaminated with light nonaqeous-phase liquids. The calibrated ground-water model was used to evaluate the effectiveness of various control and containment scenarios, including implementation of extraction/injection wells and sheet-pile walls. Estimated the total quantity of LNAPL in the aquifer based on the measured thickness in contaminated wells.
- ***Refinery Complex, Texas Gulf Coast*** – Led technical team to develop appropriate site conceptual model and a three-dimensional flow and transport model (2.1 million grid blocks) to statistically evaluate alleged ground-water contamination by

petroleum hydrocarbons in a heterogeneous aquifer. State-of-the-art geostatistical and stochastic modeling tools were utilized to complete the analysis; visualization/animation techniques were used to effectively illustrate model results.

Project Experience: (continued)

- ***Paris, France*** – Developed and complex three-dimensional regional ground-water flow and transport model to evaluate the movement of high-level radionuclide wastes from a proposed geologic repository in eastern France. The model incorporated near-surface karst regions as well as very deep units identified as potential repository zones. An adjoint sensitivity analysis was used to evaluate sensitivity of contaminant travel times to receptor environments based on uncertainty in the physical properties.
- ***Columbus Air Force Base, Mississippi*** – Calibrated and verified a two-dimensional transient flow and transport model (Bioplume II) to evaluate natural attenuation of dissolved phase jet fuel components (benzene, dichlorobenzene, naphthalene, p-xylene) and tritium in a shallow alluvial aquifer. Site characterization data and historical plume monitoring data was used to develop a reliable site model to predict down gradient concentrations at the site. Aerobic and anaerobic biodegradation as well as nondestructive natural attenuation mechanisms were incorporated to evaluate the fate of the plume.
- ***Deep Well Injection Facility, Southeast Texas*** – Developed a SWIFT-II transport model to demonstrate no migration under EPA regulations.
- ***Bunker Hill Superfund Site, Smelterville Flats Area, Idaho*** – Using MODFLOW, developed a saturated ground-water flow model to evaluate/design fluid residence times and travel paths through constructed wetlands. The ground water was contaminated with heavy metals and the constructed wetlands were designed to maintain a reducing environment for metals precipitation. The USGS code MODPATH was used to perform particle tracking through the wetlands area.
- ***DOE WIPP Facility, Carlsbad, New Mexico*** – Applied the SWIFT-II flow and transport model to investigate the transient pressure response of slanted well bores with the very low conductivity halite zones of the Salado Formation. This evaluation was performed to determine the effects of well bore slant on the results of permeability testing interpretations.

Field Experience:

Mr. Beach's field experience includes the following:

- Streamflow measurements
- Surface-water sampling
- Ground-water sampling
- Pump and slug tests
- Well test analysis
- Ground-water monitoring
- Water-quality analysis
- Field instrumentation
- Drilling and geologic logging
- Well installation and development
- Well design

Fred Teagarden, UCRA Senior Hydrologist: Mr. Teagarden has a B.S. from Angelo State University in Biology and Chemistry and has worked in the water industry for 45 years. He is currently employed as Senior Hydrologist for the Upper Colorado River Authority (UCRA), and has served in that capacity since 1991. Prior to employment with the UCRA, Mr. Teagarden was employed by a Civil Engineering firm and participated in many water and wastewater related projects over a 20 year period. During his career, Mr. Teagarden has worked for the Texas Water Quality Board, the City of San Angelo Water Department, the City of Wichita Fall Water Department and the Texas Parks and Wildlife Department. Also during his career, Mr. Teagarden has been licensed as a grade "A" Water & Wastewater Certificate holder and as a Registered Sanitarian.

Chuck Brown, UCRA Staff Hydrologist: Mr. Brown has over 20 years experience in field and laboratory monitoring of water quality data and general hydrologic activities. He has been employed as a Staff Hydrologist with the Upper Colorado River Authority (UCRA) since 2000. He is currently responsible for all Clean Rivers Program fixed station monitoring, 319h NPS stormwater abatement project monitoring, and field investigations.

Scott McWilliams, UCRA Staff Hydrogeologist: Mr. McWilliams has a BS in Geology and an MPA (Master of Public Administration). He has been employed as a Staff Hydrogeologist for the Upper Colorado River Authority (UCRA) since 2001. He is licensed by the State of Texas Board of Professional Geoscientists, License #6035. He has over 25 combined years experience in petroleum geology, environmental geology, and hydrogeology. He has worked on numerous water quality protection, groundwater remediation, and groundwater monitoring projects, and has conducted numerous groundwater studies in Texas.

EXHIBIT VI

PUBLIC NOTICE

EXHIBIT VI

PUBLIC NOTICE

The Colorado River Municipal Water District published a notice regarding the public meeting to take input on scope of work ideas. The public notice also provided information regarding the Region F Water Planning Group's intent to develop and submit a grant application for Texas Water Development Board funding. The following documents are included in the appendix:

- A copy of the notice published in the newspapers
- Publisher's affidavits
- A copy of the notice sent to each mayor of a municipality with a population of 1,000 or more or which is a county seat and that is located in whole or in part in the regional water planning area, and to each county judge of a county located in whole or in part in the regional water planning area
- A copy of the mailing list to which the material was sent.

EXHIBIT VII

PUBLIC COMMENTS

EXHIBIT VII

PUBLIC COMMENTS

A public meeting regarding scope of work development was held on Friday, August 11, 2006, at 1:30 P.M. The meeting was held at the Colorado River Municipal Water District offices located at 400 East 24th Street, Big Spring, Texas. Oral comments received at the meeting were incorporated into the final scope of work for the project and are summarized below. The Region F Water Planning Group met in an open public meeting on Monday, August 28, 2006 at Howard College, 1001 Birdwell, Big Spring, Texas. At this meeting, the RWPG finalized the ranking of the projects, approved the draft scope of work, and authorized the Executive Committee to make any necessary changes to the scope.

The Region F Water Planning Group accepted written comments through September 11, 2006. Written comments were submitted to Chairman John Grant. No written comments have been received.

Oral Comments

Summary of oral comments received at the public meeting on the development of the scope of work for this planning grant application, held on August 11, 2006 in Big Spring:

1. Carolyn Runge (Menard County UGCD): Brush control is the single most important strategy in Region F. She would like to see an expansion of the watershed data collection study to areas outside of the North Concho watershed. She suggested that the study include a recharge component and develop prioritization projects. Ms. Runge also discussed the irrigation equipment survey. She is concerned that there is little accurate information on irrigation water use in Region F. Collecting data on crop type and acreages are a good start. Ms. Runge suggested that Region F consider adding water use to irrigation survey.
2. Kenneth Dierschke (Agriculture): Mr. Dierschke discussed the irrigation survey strategy. He emphasized the need to contact the people that are already collecting this data – GCDs and others. Mr. Dierscheke stated that there are a wide variety of crops in Region F, and the study will need to collect data on the crop type. On a different topic, Mr. Dierschke mentioned that the Region F planning group may want to consider the possible locations of proposed nuclear reactors when evaluating the potential for brackish water supplies. The super heated water associated with these reactors (HT3R reactor) may be able to be used with brackish water treatment.
3. Joe David Ross (Sonora County): Mr. Ross generally agreed with the statements made by Ms. Runge and Mr. Dierschke. Mr. Ross discussed the need for more data – specifically irrigation use data and groundwater data on the Edwards-Trinity Aquifer. Mr. Ross supports the desalination study, economics of rural water distribution, and groundwater study to obtain more information.

4. Wendell Moody (Concho County.): Mr. Moody supports the economics of rural water distribution study. He also agrees that brush control is an important study. Mr. Moody stated that shallow groundwater wells are not dependable, and removing brush is important to landowners and small rural cities.