

Request for Amendment to the Region G Water Plan to Add Development of the City of Cleburne Water Supply Projects to Meet Projected Water Supply Shortages

1. Background

The 2006 Brazos G Regional Water Plan recommended two water management strategies. They are conservation and reuse. The City will continue to pursue both of these strategies.

The City commissioned a long-range water supply study that was completed in January 2008. The study showed that the City of Cleburne may have significant increases in industrial demand over the next few years which were not identified in the 2006 Brazos G Regional Water Plan, in particular:

- Brazos Electric Power Company has indicated that they intend to construct Phase II of their existing power plant in Cleburne in the 2013 to 2015 period. This would increase Cleburne's average-day demand by 1.1 to 2.2 MGD, depending on the Phase II unit capacity.
- Representatives of the oil and gas industry have asked Cleburne for water to develop natural gas wells. They are seeking an average of 1.5 MGD for the next few years, with lower amounts needed in the future.
- Other industries currently located in Cleburne have indicated that they expect significant increases in their demands, and the City continues to attract new industries as well.

Municipal demands are also increasing due to growing population. This growth in demand requires that Cleburne develop substantial new supplies in the next few years.

The recommended plan developed in the January 2008 study addressed both the immediate additional water needs and a long-term sustainable supply. The major components of the plan are:

- Optimization of the surface water supplies from Lake Pat Cleburne and Lake Aquilla through planned expansions of the City's existing water treatment plant;
- Maintaining the groundwater for supplemental and peak usage;
- Expanding the reuse wastewater facilities for industrial applications;
- Developing Lake Whitney as a long-term sustainable water supply for the City;

- Continuing the City's Water Conservation Program to preserve water resources.

The Texas Water Development Board at a funding pre-application meeting on April 14, 2008 determined that the water treatment plant expansion and developing Lake Whitney as a long-term sustainable water supply for the City of Cleburne are not specifically included in the 2006 Brazos G Regional Water Plan and thus are not currently eligible for Water Infrastructure funding. Following the April 14, 2008 meeting the City of Cleburne requested that the Brazos G Regional Water Planning Group amend the 2006 Brazos G Regional Water Plan to add the water treatment plant expansion and development of Lake Whitney BRA contracted water supply.

2. Amendment Request

The City of Cleburne respectfully requests that the *2006 Brazos G Regional Water Plan* be amended to add the following City of Cleburne's water management strategies, which include:

- Develop the New West Loop Reclaimed Water Line (reuse of wastewater) and Pump Station. This project would develop a reclaimed water pipeline on the west side of the City, which would join the existing east reclaimed water line serving the Brazos Electric Power Plant(Steam Electric) to form a looped system. This line would supply reclaimed water for oil and gas development (Mining), irrigation use by major water users, and industrial use (Manufacturing) by the existing James Hardie manufacturing plant and others. This project would supply the City of Cleburne and Johnson County mining, manufacturing, steam electric and irrigation water through Cleburne. While an expanded reuse program is identified for Cleburne, this project is not specifically identified as a water management strategy for the City in the 2006 Brazos G Regional Water Plan.
- Complete a 5 MGD expansion of the existing water treatment plant. This project would increase the capacity of the existing water treatment plant to meet projected peak-day needs and to supply treated water from existing and future raw water supply sources. This project would supply the City of Cleburne and Johnson County mining, manufacturing, steam electric and irrigation water through Cleburne.
- Complete the 1.9 MGD Phase I Lake Whitney Water Supply Project. This project would develop part of Cleburne's remaining contractual commitment for water from

the Brazos River Authority (beyond the 4.73 MGD [5,300 acre-feet per year] currently available from Lake Aquilla). The project would require a deep water intake , diversion pump station to take water out of Lake Whitney, an advanced water treatment facility for the Lake Whitney water, blending tanks, a booster pump station, and a pipeline to connect the Lake Whitney supply to the existing Barkman Pipeline for delivery to Cleburne ,and all associated appurtenances for a fully functional and operational water supply delivery and treatment system. This project would supply the City of Cleburne and Johnson County mining, manufacturing, steam electric and irrigation water through Cleburne.

The City believes that this amendment meets the Texas Water Development Board criteria for a minor amendment to the *2006 Brazos G Regional Water Plan*, as laid out in Texas Administrative Code Rule 357.16:

- It does not result in over allocation of an existing or planned source of water. The amendment does not change the allocation of any source of supply. The project develops, in phases , the current BRA contracted amount of 9,700 acre-feet per year and does not rely on any new allocations.
- It does not relate to a new reservoir. The amendment only relates to the development of treatment and transmission facilities.
- It does not have a significant impact on instream flows, environmental flows, or freshwater flows to bays and estuaries.
- It does not have a significant impact on water planning or previously adopted management strategies.
- It does not delete or change any legal requirements of the plan.

If the Brazos G Regional Planning Group or the Texas Water Development Board determines that the requested amendment cannot be processed as a minor amendment, the City requests that it be processed as a major amendment.

3. Description of Strategy

The City of Cleburne currently obtains its water supply from four sources:

- Lake Pat Cleburne;
- Lake Aquilla and the associated Barkman Pipeline;

- Seven groundwater wells in the Trinity Sands Aquifer;
- Direct reuse of treated wastewater for industrial supplies.

The main source of Cleburne's existing water supply is Lake Pat Cleburne which has 5,760 acre-feet per year of adjudicated municipal water rights. The certificate of adjudication was amended in January 2002 to authorize the City to use the bed and banks of Lake Pat Cleburne to deliver 5,300 acre-feet per year of water from Lake Aquilla and 4,700 acre-feet per year of water from Lake Whitney.

It is estimated that the yield of Lake Pat Cleburne will decrease by about 0.29 MGD between 2006 to the year 2050.

The supply available from Lake Aquilla may decrease significantly over the same period. If the yield of Lake Aquilla decreases as indicated by recent BRA analysis, Cleburne (and other holders of contracts for water from the Lake) will not be able to divert the full contracted amount as a reliable supply.

Annual Average Day Supply Capability of the Existing Water Sources

	2006 (MGD)	2050 (MGD)
Lake Pat Cleburne	4.66	4.38
Lake Aquilla (BRA Contract)	4.73	3.57
Groundwater	1.0	1.0
Direct Reuse of Treated Wastewater	0.6	5.0

The current existing water supply is 10.98 MGD and the current projected drought condition demand is 11.38 MGD.

To meet the existing and long-term water supply need it will be necessary to develop the Lake Whitney BRA contracted water supply. Cleburne has an existing contract with BRA for use of as much as 15,000 acre-feet per year of water from the Brazos River Authority. BRA has indicated that the 15,000 acre-feet per year can be supplied from any part of its system (subject to availability) and Cleburne is currently using 5,300 acre-feet per year from Lake Aquilla.

Based on preliminary examination of the Lake Whitney reservoir topography, an intake and pump station from Lake Whitney could be located on the eastern shore of the lake. Other

diversion locations maybe evaluated and other future take points identified. Lake Whitney water would be treated at an advanced water treatment plant located on the eastern shore. The water would not be disinfected to meet drinking water standards, but the TDS and chlorides would be reduced to match the target water quality in Lake Pat Cleburne and Lake Aquilla. The partially treated water would then be blended with Lake Aquilla water in the Barkman pipeline and pumped to the City's treatment plant or Lake Pat Cleburne for rediversion and treatment. Future options may include full treatment at the take point.

4. Available Supply

The City of Cleburne has a water right for 5,760 acre-feet per year for municipal use and 240 acre-feet per year for irrigation from Lake Pat Cleburne. The City has contracted for 15,000 acre-feet from BRA of which 5,300 acre-feet per year is supplied from Lake Aquilla and the remaining 9,700 acre-feet per year will be supplied from Lake Whitney. The proposed project which is the subject of this amendment will make this 9,700 acre-feet per year available as a reliable water supply for the City of Cleburne.

Environmental

Environmental impacts could include:

- Possible minor impacts on riparian corridors, depending on location of connecting pipelines and treatment plant.
- Other possible minor impacts from pipeline construction. The impacts of pipeline development will be minimized to the extent possible by following existing roadway corridors and by avoiding environmentally sensitive areas where feasible.
- Intake and Pump Station could potentially have Section 404 permit environmental considerations from the Corps of Engineers regarding construction disturbance of Lake Whitney. All necessary permits and environmental documentation will be acquired.

A summary of environmental issues is presented in Table 1.

Table 1
Environmental Issues:
City of Cleburne Water Supply Project

Water Management Option	Cleburne Water Supply Project
Implementation Measures	Expand the existing water treatment plant by 5 MGD, construction of a Lake Whitney Pump Station, advanced treatment plant and pipeline.
Environmental Water Needs/Instream Flows	Negligible impact.
Bays and Estuaries	Negligible impact.
Fish and Wildlife Habitat	Possible minor impacts on riparian corridors, depending on specific location of pipelines, possible minor impact on aquatic life from lake pump station.
Cultural Resources	Possible low impact.
Threatened and Endangered Species	Possible low impact.

5. **Engineering and Costing**

Figures 1 and 2 show the facilities required to develop the City of Cleburne Water Project. Water from Lake Whitney will be treated at an advanced water treatment plant on the eastern shore and blended to a target level. The brine waste will be disposal in a TCEQ permitted Class I disposal well, other options for brine disposal maybe evaluated . The blended water will be pumped to the Barkman pipeline and diverted to the City’s water treatment plant or Lake Pat Cleburne.

Table 2 summarizes the capital costs for Phase I of the project.

Table 2
Cost Estimate Summary for City of Cleburne
Water Supply Project
(2007 Prices)

LAKE WHITNEY DIVERSION – TDS SCALPING OPTION
(PHASE I)

Item Description	Units/Size	Unit Price (\$ 2007)	Estimated Amount (\$2007)	Estimated Amount (\$2002)
Capital Costs:				
1. Deep Water Intake	Platform Design		\$ 11,750,000	\$ 10,138,000
2. Raw Water Pump Station	4.2 MGD	4,700 ac.ft./yr.	Included in Item #1	
3. Electrical Service	1000 Hp	LS	\$ 1,750,000	\$ 1,509,900
4. Feed Tank	0.5 MG		\$ 300,000	\$ 258,800
5. Pre-Treatment – MF/UF	1.75 MGD		\$ 1,750,000	\$ 1,509,900
6. Transfer Tank	0.5 MG		\$ 300,000	\$ 258,800
7. Desalination Treatment – RO	1.75 MGD		\$ 2,500,000	\$ 2,157,000
8. Transfer Tank	0.5 MG		\$ 300,000	\$ 258,800
9. Chemical Facilities and Administration	1.9 MGD		\$ 225,000	\$ 194,100
10. Transfer Pumps	1.9 MGD		\$ 475,000	\$ 409,800
11. Concentrate Disposal	0.50 MGD			\$ 1,509,900
Brine Concentrator		LS	\$ 1,750,000	\$ 1,509,900
Disposal Well		LS	\$ 1,750,000	
12. Transmission Pipeline	8 miles/18 inch	\$95/ft	\$ 4,012,800	\$ 3,462,300
13. Meters and Connections	LS		\$ 50,000	\$ 43,100
14. Land Acquisition	10 Acres	\$25,000/Ac	\$ 250,000	\$ 215,700
15. Easements	30 ft. wide	\$0.21660/SF	\$ 274,476	\$ 236,800
16. Permitting				
404 Permit (Individual Permit)			\$ 90,000	\$ 77,700
Mitigation			\$ 150,000	\$ 129,400
Threatened/Endangered species habitat assessment			\$ 10,000	\$ 8,600
Cultural resources survey			\$ 20,000	\$ 17,300
Environmental Assessment for 404 Permit			\$ 250,000	\$ 215,700
Archaeological Assessment			\$ 75,000	\$ 64,700
TPWD Sand, Gravel, & Marl Permit			\$ 10,000	\$ 8,600
GLO Grant of Easement			\$ 15,000	\$ 12,900
Permitting "Bed and Banks" through Lake Pat Cleburne			\$ 85,000	\$ 73,300
TCEQ Disposal Well Class I Permit			\$ 250,000	\$ 215,700
Sub-Total			\$ 28,392,276	\$ 24,497,200
17. Engineering, Legal and Contingencies	30%		\$ 8,517,683	\$ 7,349,200
Total Capital Cost			\$ 36,909,958	\$ 31,846,400
Annual Costs				
1. Debt Service (5.50 percent, 20 years)			\$ 3,088,625	\$ 2,664,900
2. Raw Water Purchase (20 year present worth)			\$ 271,425	\$ 234,200
3. Operation and Maintenance				
Pump Station & Transmission			\$ 415,297	\$ 358,300
Water Treatment			\$ 1,416,656	\$ 1,222,300
4. Brine Disposal			\$ 198,332	\$ 171,100
5. Pumping			\$ 45,491	\$ 39,300
Total Annual Phase I			\$ 5,435,826	\$ 4,690,100
Cost per 1000 Gallons Phase I			\$ 7.84	\$ 6.76
Cost per Acre-Ft. Phase I			\$ 2,554.10	\$ 2,204
Treated Water Produced Phase I			1.9 MGD	1.9 MGD

Note : 2007 Costs were reduced to 2002 Costs using 3 % Inflation per year over 5 years.

Table 2 (Continued)
Cost Estimate Summary for City of Cleburne
5 MGD Water Treatment Plant Expansion
(2007 Prices)

WATER TREATMENT PLANT EXPANSION – 5 MGD

Item Description	Units/Size	Unit Price	Estimated Amount (\$ 2007)	Estimated Amount (\$ 2002)
Capital Costs:				
1. Water Treatment Plant Expansion	5 MGD	LS	\$ 8,000,000	\$ 6,902,500
2. Improvements to Sludge Handling	5 MGD	LS	\$ 750,000	\$ 647,100
3. Miscellaneous Improvements & Pumping		LS	\$ 500,000	\$ 431,400
Sub-Total			\$ 9,250,000	\$ 7,981,000
Engineering, Legal & Contingencies		30%	\$ 2,775,000	\$ 2,394,300
Total			\$ 12,025,000	\$ 10,375,300
Unit Cost @2.5 MGD Average: \$/1000 gallons			\$1.98	\$ 1.71
Unit Cost \$ per gallon capacity			\$2.41	\$ 2.08

Note: 2007 Costs were reduced to 2002 Costs using 3% Inflation per year over 5 years.

Table 2 (Continued)
Cost Estimate Summary for City of Cleburne
New West Loop Reuse Pipeline
(2007 Prices)

WASTEWATER REUSE

New West Loop Reuse Line

New 16" direct wastewater reuse line from WWTP west and looping to meet existing line at Brazos Electric.

Reuse water could be provided for irrigation to Municipal Golf Course (beyond 24 acre-feet from Lake Pat Cleburne).

Hill County College, Walls Hospital and a substantial volume to James Hardie.

Construction Items	Total Units	Unit Cost(s)	2007 Cost	2002 Cost
New 16" reuse pipeline	56505	\$ 95	\$ 5,367,975	\$ 4,631,600
Pump Station – Installed	1	\$ 450,000	\$ 450,000	\$ 388,300
Meter	1	\$ 50,000	\$ 50,000	\$ 43,100
Storage Tank – standpipe	1	\$ 400,000	\$ 400,000	\$ 431,400
Easements	30' Wide	\$ 6.50	\$ 339,030	\$ 292,500
Sub-Total			\$ 6,607,005	\$ 5,700,600
Engineering & Contingencies (@30% of sub-total)			\$ 1,982,102	\$ 1,710,200
Total Capital Cost			\$ 8,559,107	\$ 7,384,900
Debt Service 20 years @ 5.5 %			\$ 716,200	\$ 618,000
Annual Pumping Cost	Unit Cost(s)	Total Units	2007 Cost	2002 Cost
1.5 MGD @ 500 TDH, 200 Hp	\$0.09 Per kW-H	1,307,000 kW-H	\$ 117,630	\$ 101,500
Annual O&M Cost				
1% of Pipeline Cost (Includes Chlorine & Normal)	\$64,416	1	\$ 64,416	\$ 55,600
2.5% of Pump Station Cost	\$13,500	1	\$ 13,500	\$ 11,600
Total O&M cost			\$ 77,916	\$ 67,200
Total Annual Cost (Capital + O&M)			\$ 989,662	\$ 853,900
Cost/1000 gallons (Based on 1.5MGD)			\$1.81	\$ 1.56

Note : 2007 Costs were reduced to 2002 Costs using 3% Inflation per year over 5 years.

Table 3 summarizes the capital costs for the recommended short-term Water Supply Projects for Cleburne.

Table 3
Recommended Short-Term Projects for Cleburne

Project Description	Estimated Supply (MGD)	Estimated Capital Cost
West Side Reuse Line and Pump Station	2.4	\$8,600,000
5 MGD Water Treatment Plant Expansion	-	\$12,025,000
1.9 MGD Lake Whitney project Phase I	1.9	\$36,910,000
TOTAL	4.3	\$57,535,000

Table 3 shows the estimated cost of each of these projects and the supply available from them. The three projects would supply a total of about 4.3 mgd for Cleburne (although supplies from the reuse pipeline would continue to grow over time), and the total estimated capital cost (at 2007 prices) is \$57,535,000.

Cleburne will also have to develop additional supplies to meet long-term demands beyond 2020. At this time, it is not clear what Cleburne's best options to meet demands beyond 2020 will be, but the following steps could meet currently forecast demands:

- Complete Water Treatment Plant expansions as needed (5 MGD expansions forecast for 2024, 2034, 2043 and 2050)
- Develop Lake Whitney Phase 2 (2021)
- Develop indirect reuse in Lake Pat Cleburne (2027)
- Develop Lake Whitney Phase 3 or other supply source (2031)

6. Implementation Issues

This project could be developed in cooperation with the Brazos River Authority to provide a regional surface water supply. Other implementation issues will include financing and Section 404 permitting. As shown in Table 4, this water management strategy has been compared to the plan development criteria.

7. **Potential Regulatory Requirements**

Implementation of this water management strategy will require the following permits for pipeline and lake pump station construction:

- U.S. Army Corps of Engineers Section 404 permit for intake and pipeline stream crossings and discharges of fill into wetlands and waters of the U.S. during construction.
- NPDES Stormwater Pollution Prevention Plans.
- Possibly TP&WD Sand, Shell, Gravel, and Marl permits for construction in state-owned stream beds.

Table 4
Comparison of City of Cleburne Water Supply Project
to Plan Development Criteria

<i>Impact category</i>	<i>Comment(s)</i>
A. Water Supply 1. Quantity 2. Reliability 3. Cost	1. Sufficient for local needs. 2. High. 3. Relatively high, but reasonable compared to other similar systems.
B. Environmental Factors 1. Environmental Water Needs 2. Habitat 3. Cultural Resources 4. Bays and Estuaries 5. Threatened and Endangered Species 6. Wetlands	1. Low impact. 2. Low impact. 3. Low impact. 4. Low impact. 5. Low impact. 6. Low impact.
C. Impact on Other State Water Resources D. Threats to Agriculture and Natural Resources E. Equitable Comparison of Strategies Deemed Feasible F. Requirements for Interbasin Transfers G. Third Party Social and Economic Impacts from Voluntary Redistribution	No apparent negative impacts on state water resources. No effect on navigation. None. Done. Not applicable. None.