

Description of Option

Johnson County Special Utility District (JCSUD) is currently pursuing the construction of potable water transmission facilities to supply treated Trinity Basin water to its customers. The facilities will transmit water taken from a connection with the City of Mansfield in accordance with the terms of a recently completed contract between the City and JCSUD.

The transmission facility will ultimately be capable of transmitting the maximum allowed daily demand of 9.0 million gallons per day (MGD), or 10,082 ac-ft per year of treated potable water to the JCSUD system.

Background

The information in Tables 1 and 2 following, taken from the Water Master Plan, Johnson County Special Utility District, 2008 and historical records clearly indicated the need for additional surface water supplies based on growth and usage patterns. Table 1 immediately below shows that:

- During the period from 1993 to 2008 total demand for JCSUD water has grown from 1.81 million gallons per day (MGD) to 4.97 MGD.
- Population served has grown within the same time period from 19,604 to 40,594.
- The percentage of total demand furnished by Trinity wells has shrunk from 53% in 1993 to 30% today.

Table 1

Year	Demand, MGD	Population	Percent Demand, Trinity Aquifer	Percent Demand, Surface Water
1993	1.81	19,604	53	47
1994	2.1	19,671	51	49
1995	2.16	20,837	52	48
1996	2.48	21,656	57	43
1997	2.50	23,334	65	35
1998	3.02	25,649	72	28
1999	3.14	27,794	53	47
2000	3.65	29,499	48	52
2001	3.38	30,385	45	55
2002	3.36	31,141	42	58
2003	3.19	30,608	35	65
2004	3.24	31,235	38	61
2005	4.54	31,556	40	60
2006	4.81	31,581	38	62
2007	4.81	39,672	33	67
2008	4.97	40,594	30	69

Table 2 following indicates the results of projecting usage and population. It shows that:

- By 2028, the population served will have doubled by growing 195%.
- Water demand will have increased 124%.
- Sufficient surface water supplies will be needed to furnish 83% of total demand.

Table 2

Year	Demand, MGD	Population	% Demand, Trinity Aquifer	% Demand, Surface Water
2013	6.05	51,837	26	73
2018	8.27	70,920	22	77
2028	13.6	116,610	16	83

Recent developments have shown that the Trinity and Paluxy aquifers, which furnish JCSUD its ground water, are being developed beyond projected capacity. JCSUD is a ground water system, and has suffered the loss of several wells, with more failures imminent as the aquifers are pumped.

As the tables above indicate, JCSUD will grow increasingly dependent upon treated surface water to meet demands. Note that these population projections are higher than those projected in the 2009 Four-County Study. The differences may perhaps be explained in the differing methodologies and operative growth assumptions used in the 2009 Four-County Study versus that employed in the JCSUD Master Plan. A comparison is shown below in Table 3.

Table 3

Report	2010	2020	2030
JCSUD Master Plan	45,092	80,058	125,748
Four-County Study	32,281	62,092	94,540
Percent Difference	39.7%	29.9%	33.0%

Currently Recommended Water Strategies

The 2006 Brazos G Regional Water Plan, section 4C.17.9.2, Water Supply Plan, lists three strategies to help the District assure a future water supply. Those are:

- Conservation.
- Purchase water from the Trinity River Authority Joe Pool Reservoir Reuse Project.
- Use of Lake Granbury supply and Aquifer Storage and Recover (ASR) in the Trinity Aquifer.

Since the Plan was released, each of these strategies was examined and evaluated by JCSUD management and staff. The results of these evaluations are summarized on the following pages.

- Conservation

The effectiveness of conservation measures in assuring future supplies is questionable when compared to the magnitude of future needs. In essence, the effects of conservation, even when incentivized by judicial enforcement are difficult to quantify in terms of projecting a future surplus or shortage, and hence is not a reliable options.

- Purchase water from the Trinity River Authority Joe Pool Reservoir Reuse Project

This alternative essentially depended upon taking water from Joe Pool Reservoir in amounts equaling that of treated waste water treatment plant effluent discharged into a receiving stream tributary to Joe Pool Reservoir. At this writing, no wastewater treatment plant or plants currently discharge into the Joe Pool watershed in sufficient amounts to justify using the reuse project in the amounts projected for JCSUD needs. Also, utilizing this alternative would require construction of a water treatment plant and miles of pipelines, the output of which would be anchored to one or several waste water treatment plants' effluent discharge, which may or may not match JCSUD needs.

- Use of Lake Granbury Supply

Subject of a previous study by HDR made part of the JCSUD Feasibility Report to apply for TWDB funding, it was determined in that study that that it would not be cost effective for JCSUD to purchase additional water from Lake Granbury. Lake Granbury water requires treatment at the Brazos River Authority's (BRA) SWATS plant by reverse osmosis, which is more expensive than conventionally treated potable water. Although JCSUD currently has 8.73 MGD under contract with the BRA, the expense of SWATS water has been and remains a motivation to obtain more economical supplies of treated surface water from the Trinity Basin.

- Aquifer Storage and Recover (ASR) in the Trinity Aquifer

The Aquifer Storage and Recover (ASR) in the Trinity Aquifer is probably the most problematic approach for securing additional supplies of water for JCSUD. In essence, the alternative would require JCSUD to make a very large outlay for drilling and completing injection wells in suitable geological formations, constructing treatment facilities, storage tanks and pump stations along with pipelines, easements, permits and a host of system adjustments. Needless to say, the expense would be a very large burden on JCSUD and its customers in terms of debt and water rates.

After careful study and analysis of alternative sources over the years to meet future demands, JCSUD has determined that the most economical source of additional treated surface water supplies is the Trinity River Basin.

Amendment Request

JCSUD has opted to pursue a different strategy from the alternatives listed in the 2006 Brazos G Regional Water Plan, section 4C.17.9.2 to obtain a supply of treated surface water, and therefore requests that the 2006 Brazos G Regional Water Plan be amended to add the strategy adopted by JCSUD.

JCSUD has reached agreement with the City of Mansfield to purchase 9.0 MGD of Trinity Basin treated surface water to furnish future needs. In order to transport the treated water to areas within the JCSUD service area, the District has elected to construct the Trinity Basin Transmission Facility infrastructure project. The project will consist of:

- A new pump station and 1.0 million gallon (MG) ground storage tank.
- A 30-inch diameter transmission line.
- Associated branch lines to transmit water to pumping stations.

The project is intended to ultimately furnish the maximum amount of water available under the current contract between JCSUD and the City of Mansfield: 9.0 MGD, or 10,082 ac-ft per year.

JCSUD believes that this amendment meets the Texas Water Development Board's (TWDB) criteria for a minor amendment 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.
- It does not relate to a new reservoir.
- It does not have a significant effect on in-stream flows, environmental flows or freshwater flows to bays and estuaries.
- It does not delete or change legal requirements of the plan.
- If the Brazos G Regional Planning Group or the TWDB determines that the requested minor amendment cannot be processed as a minor amendment, JCSUD requests that it be processed as a major amendment.

Available Supply

At the present time, JCSUD has the following supplies of water available:

- 9.00 MGD under contract with the City of Mansfield;
- 8.73 MGD under contract with the Brazos River Authority
- 3.40 MGD from groundwater wells (decreasing 3% per year)

The proposed project would make the full 9.0 MGD under contract with the City of Mansfield available as a reliable water supply for JCSUD customers. Layouts of the proposed project are included as attachments at the end of this request.

Environmental

Possible environmental impacts attending the construction of a cross-country pipeline and associated pump station and ground storage tank. It is not anticipated that any endangered species, riparian corridors, wetlands or undisturbed archeological sites will be identified at the proposed pump station and ground storage tank site, nor within any of the water lines' alignments.

Engineering and Costing

The required improvements to implement JCSUD's strategy are summarized in Table 4 on the next page. The estimates are preliminary and are under further review for accuracy.

Table 4
Cost Estimate Summary

Item		Estimated Cost
Engineering		
Basic Engineering	\$	999,500.00
Special Engineering (Insp., environmental, geotech, etc.)	\$	447,500.00
Total Engineering	\$	1,447,000.00
Construction		
New Pump Station and 1.0 MG Ground Storage Tank	\$	3,456,500.00
Transmission Pipeline (30-in diameter, 66,000 ft)	\$	8,166,350.00
Transmission Pipeline (16-in diameter, 7,700 ft)	\$	551,350.00
Transmission Pipeline (12-in diameter, 6,800 ft)	\$	384,250.00
Total Construction Cost	\$	12,558,450.00
Bonds, Land Acquisition and Legal		
Bonds	\$	295,925.00
Land Acquisition and Legal	\$	531,590.00
Total Bonds, Land Acquisition and Legal	\$	827,515.00
Total Project Cost	\$	14,832,965.00
Annual Costs		
Debt Service (5%, 20 years)	\$	1,190,235.00
Operations and Maintenance (2% of construction cost)	\$	251,169.00
Pumping Energy Costs (2,610,500 kW-hr @ 0.06\$/kW-hr)	\$	156,630.00
Purchase of Water (10,082 ac-ft @ \$993.77/ac-ft)	\$	10,019,268.00
Total Annual Cost		
Available Project Yield (ac-ft/yr)		10,082
Annual Cost of Water (\$ per ac-ft)	\$	993,778.00
Annual Cost of Water (\$ per 1,000 gal)	\$	3.05