Issues Relating to the Valuation of Water in the State of Texas

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Overview – Why are we Interested in the cost of water?

Supply and Demand

The population of Texas is projected to almost double by 2060. Unfortunately, the future water supply to meet the state's needs is expected to grow by only about one-fifth of its current availability. The basic economic theory of supply and demand will dictate that value of water in the State (or cost, depending on your vantage point) will be increasing.

Due to the increase in this demand on water resources, the level of regulations relating to the use of water has also increased, further constricting the available supply of water to address the needs of the growing population.

In the face of this daunting economic challenge:

(i) those planning for the continued growth in Texan communities are being asked to address future water needs and budget for the cost of this water;
(ii) owners of water rights are valuing their resources with price increases in mind;
(iii) water developers are attempting to determine the most efficient way to develop new water resources;
(iv) lenders to water development projects are struggling to establish economic valuation data for their collateral; and
(v) politicians who regulate this resource are attempting to manage the expectations of their constituents for the cost of water as a part of everyday life.

In each case, the parties are left to answer the same question: **"What is the cost or value of water?"**

Unfortunately, from transaction to transaction, there is great disparity in the pricing range of water. After a review of these varied costs, one might conclude that the marketplace provides little guidance as to the value of water rights. However, if we break down what contributes to the valuation process, we find there are a handful of factors that influence the valuation process.

What is my water worth?

Five key factors relating to the valuation of water:

- Location
- Quality
- Quantity
- Reliability
- General Principals of Supply and Demand

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Each of these factors will influence the cost and value of water within each region of Texas.

1. **Location** – Generally speaking, the closer the water source is to its ultimate place of use, the higher the value of the water to those who are seeking to use the water. Conversely, the further the water source is to its ultimate place of use, the lower the value of the water to those who are seeking to use the water. The cost to construct the infrastructure to transport the water from where it is located to where it is needed, along with the cost of the energy it will take to move the water through the transportation system, is many times more costly than the water in the ground. Water is heavy and the cost to withdraw, collect, transport and possibly treat the water has a significant impact on value or cost.

Illustration of Costs:

Item	Unit Cost	Transportation Cost	% of Cost
42-gallon barrel of oil	$75.00	$9	12%
42-gallon barrel of water	$ .01	$9	900%

Transportation cost is approximately the same, but with water, it is a much larger % of unit cost. Therefore, transportation is the big difference.

When we speak of “transportation costs,” this can encompass a large array of costs. Factors that impact the transportation cost relating to water may include the following:

a. The distance from its ultimate place of use?
b. Who will pay the cost to relocate the water?
c. Who will pay the energy cost to pump the water to the surface and to the point of delivery?
d. What is the nature of the infrastructure needed to transport the water from the point of withdrawal to the point of delivery and who will pay to construct it?
e. What is the environmental impact of production and delivery of the water?
f. What is the topography from the point of withdrawal to the delivery point?
g. Who will pay the cost to operate and maintain the water transportation system?
h. Who bears the risk of loss in connection with the operation and maintenance of the transportation system?

2. **Quality** – Almost every form of water will require treatment to make it useable. However, some require much less treatment than others. These treatment costs will increase when desalinating brackish water and sea water.

Just as we set out costs for addressing the transportation of water, the cost of treatment will affect value in the same manner. The more the parties are required to spend to treat the water, the more this impacts the per unit development cost and the value of the raw water.

3. **Quantity** – The process of collecting storing, treating and transporting water is a very capital-intensive undertaking with a great deal of fixed costs. Where large transportation costs are involved, there must be a large enough quantity of water within an area to justify the capital cost for the collection and delivery system. The quantity of water available for withdrawal will be affected, not only by physical limitation but also by increasing regulatory limitations. State permits regulate the availability of surface water that can be withdrawn from rivers and streams and are challenged by increasing environmental concerns for Texan river basins. Over 100 groundwater conservation

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districts covering large portions of Texas often have production-limiting regulations that reduce the availability of groundwater. Aggregating a sufficient source of water to justify the cost of a project may significantly add to the cost of a new water project.

Consider a pool of available water which is of a certain distance from its ultimate place of use, and of a certain quality for the ultimate use. If the cost to develop, withdraw, collect, treat and transport the water has certain fixed costs related to that process, the smaller the quantity of water, the higher the per unit cost of the water. Conversely, the greater the pool of water, the larger quantity of water to absorb these fixed costs and the less they will impact the unit cost of the water.

4. **Reliability** – To a certain extent, the "Reliability" of a source of water is just a subset of the factors to To a certain extent, the "Reliability" of a source of water is just a subset of the factors to be considered when determining the impact of the "Quantity" factor in the pricing of water. Just as the quantity of the water available may be necessary to justify the cost of a water transportation and delivery system, it is equally important that the quantity of water available be from a source that provides a predictable yield. If the available quantity might be reduced due to physical aberrations, such as (i) an aquifer which reacts precipitously to drought conditions, or (ii) regulatory intervention due to the terms of a permit, this will increase the risk of investment in the infrastructure and cause a corresponding increase in the cost of or value of the water. This increased cost or impact on value may materialize in a number of ways, including (a) an increased allocation of cost for the infrastructure to withdraw and utilize the water, or (b) a need to acquire more water rights than may otherwise be necessary to provide a cushion against any physical or regulatory cutbacks in the availability of water from the production source.

5. **Competition** – The high cost of water development projects decreases the options for competitive pricing of water resources. The fewer options we have to obtain our water supply, the less competitive forces can help to reduce the cost of our water supply.

How to reduce the cost of water commentary:

The single most important investment our State can make to reduce the cost of our water, and address our State's thirst for growth, will be the development of regional water transportation systems.

As a part of this process, the State should put in place a regulatory scheme which allows water developers to identify regional projects and have them reviewed and approved at the State level instead of at the local groundwater conservation district level where the impact of primarily local concern may frustrate regional planning needs.

These systems will substantially increase competition among available water supplies, help to address each of the four other factors that adversely impact the cost of water and provide State oversight to the development of much needed regional projects under the State Water Plan. The diversification of water supplies will also benefit by diffusing the burden of water withdrawal, thereby reducing stress on the water resources of Texas.

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