

INTRODUCTION

In Texas, a minor aquifer is defined as one that supplies large quantities of water in small areas. The Texas Water Development Board recognizes and names 15 such aquifers. One of them is the Brazos River alluvial aquifer, which is part of the alluvial aquifers along major streams that make up the Brazos River system.

BRAZOS RIVER ALLUVIAL & ANCIENT RIVER TERRACES

The Brazos River heads in New Mexico and flows southeastward across Texas to discharge into the Gulf of Mexico. Large quantities of water are available in the alluvial aquifer along the river between northern McLennan and central Fort Bend Counties, Texas. In this reach, the Ancient river alluvial terraces are as much as 20 miles wide. The alluvial terraces, extend to include the San Rivers as the multiple aquifers are tracked south through the counties directly west of Houston. area of PureTex Water's area of interest (see figure 1) these alluvial cover approximately 140 miles, and vary between 300 feet thick to a thickness of 750 feet thick, and include the Burkeville. The flood plain alluvium consists predominantly of gravel and fine to coarse sand, with lesser amounts of clay and silt. Generally, coarser grained material is present in the lower part of the alluvium.

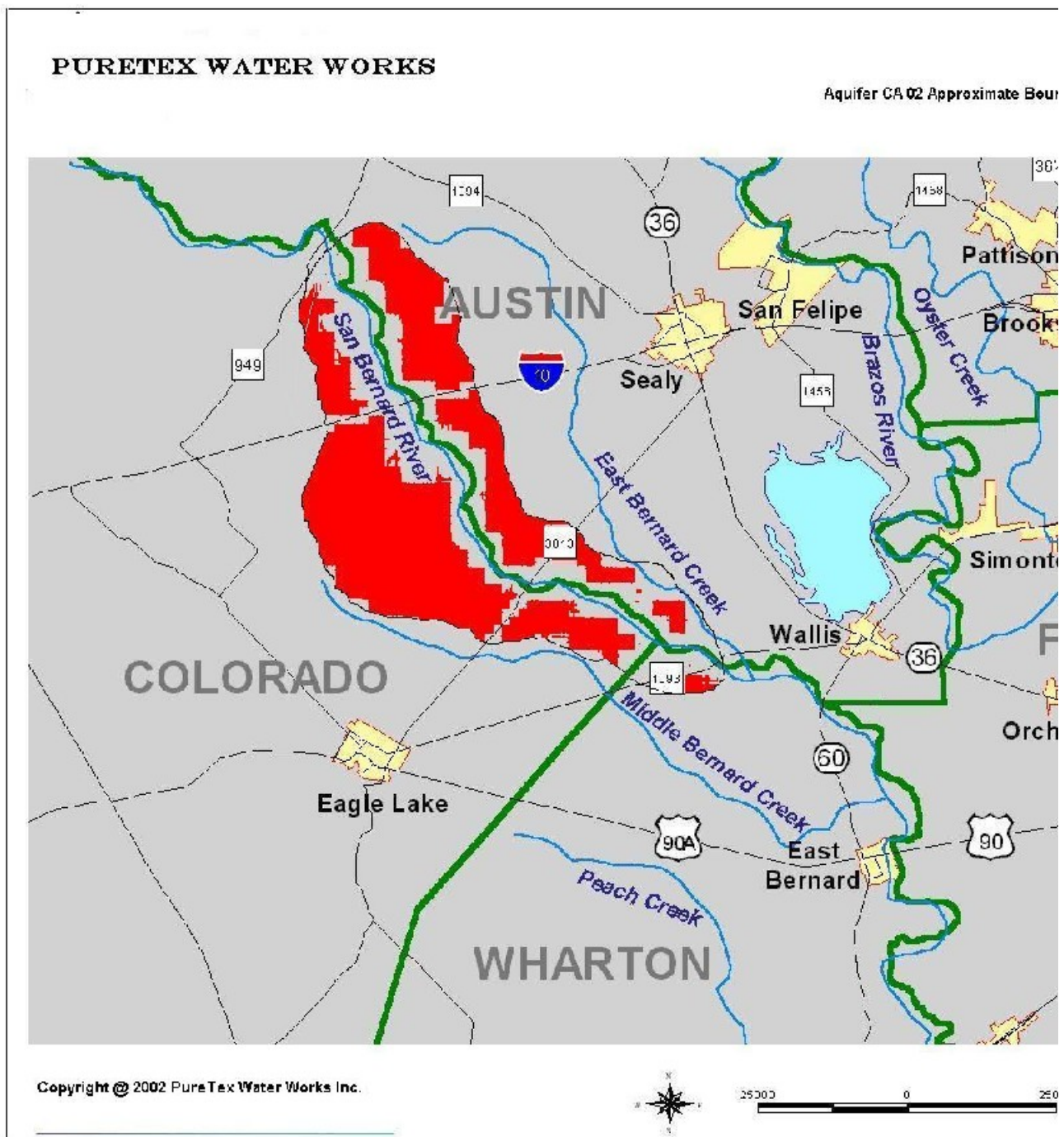


Figure 1 – PureTex Water Works – Area of Interest

In eastern Colorado County and west central Austin County, the saturated part of the alluvial aquifer is about 22 miles wide, and the saturated thickness of the basal sand and gravel is as much as 40 feet. Water from most wells completed in the aquifer is used for irrigation. In addition to irrigation, the chemical quality of the water is generally suitable for human consumption and for domestic and watering purposes, although concentrations of dissolved solids in the water in the eastern portion

aquifer closest to the current Brazos River exceed 1,000 milligrams per liter and the water is classified as hard. In the PureTex area West of Sealy, Texas the water quality exceeds that which are off after treatment by most cities in Texas today. An estimated 1,000 irrigation shallow wells pump from the alluvial aquifer; yields of most of the wells range from 250 to 500 gallons per minute from a depth of more than 100 foot depth. Many wells completed in the 1970's by the rice farming community yielded rates of production of 3 million to 5.5 million gallons per day using small diameter pipe.

PureTex Water and its natural resource affiliates have been operating in this area for over thirty years and in that time several evaluations have been completed on the productivity of this water resource. Considering the aquifer's geological setting, its high transmissivity, and its proven capacity for sustainability, engineers estimate that in its area of interest, PureTex can guarantee delivery of 450,000,000 gallons per day of cool, clear, clean, crisp, and safe drinking water supply for the Houston area for 63 years from year 2006 to year 2065 without depletion of the aquifer.

DEVELOPMENT AND TRANSMISSION OF WATER TO THE HOUSTON AREA

PureTex Water Works has retained a local engineering firm on a five year contract to create and administer a plan to construct a well field and conveyance system for its water resources to the agencies that make up the users of drinking water in the Houston Area. That plan as shown in figure 3, reflects delivery of a 92 inch water line from eastern Colorado County to Harris County along the State Highway 1093, and coincides with the later development of the Allens Creek reservoir.

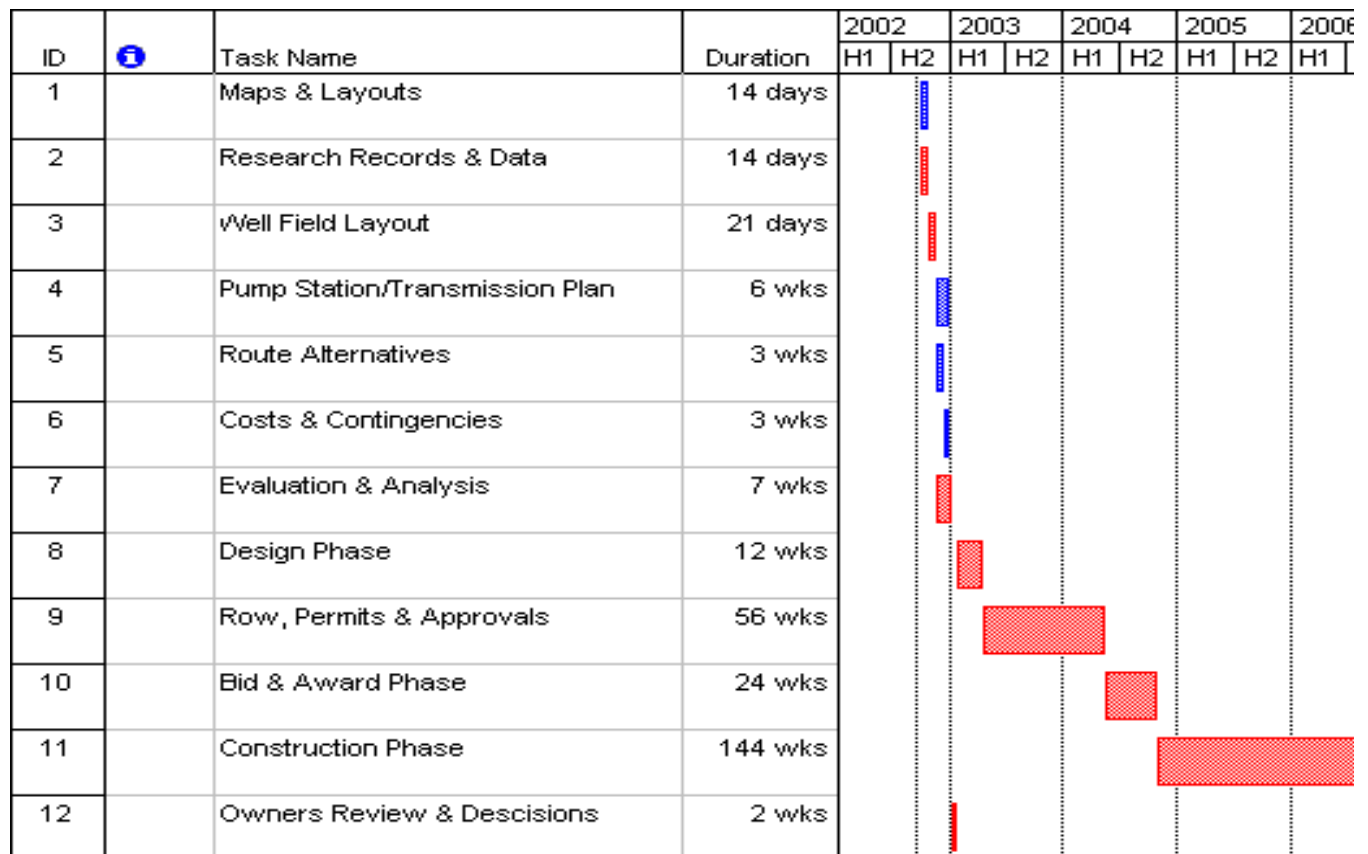


Figure 2 – PureTex Water Works Plan of Development

It assumes a peak production rate of 250,000,000 gals of fresh drinking water through two pumping stations, one of which would be located in the proximity of the proposed Allens Creek Reservoir. This project is estimated to cost approximately \$ 100 million dollars and funded by private interests, and PureTex Water's affiliates. The project is planned to be fully operational by 2007, and providing critical drinking water resources to the Houston Area.

It is apparent that PureTex Water Works' water project appears to be the only alternative both near term and long term for the Houston Metropolitan Area to meet the water shortages that are projected to occur. Analysis of the water resources supply and demand, and recent studies completed by the Texas Water Development Board (See Region H Water Resources Study published in it's final form in July 2002), reflect water shortages that become more accute. The next phase of the Texas Water Development Board's study will include ground water studies, but that is not due until 2005, much to late to have and impact on the near term shortages forecasted. In addition, with the water quality that is being withdrawn from current and long term surface water supplies treatment cost are substantial, and will rise to the point where it will be prohibitive it not impossible to maintain water quality standards from the surface sources. Beside bottled water as a requirement in such cities like Houston today, which does not touch in general the majority of the population in the Houston area, the lack of natural flow to the eco-systems of surface water brings a danger and impact that is just as negative as lack of reliable and safe sources for drinking water.

Also, with the events of September 11, 2001 and considering the current threat that is apparent to the health risk that surface water supplies presents, substantial ground water resources in rural areas like the PureTex Water resource is the only solution to safe and clean drinking water in the region, and in the United States.

SUSTAINABILITY OR DEPLETION OF THE AQUIFER, AND WATER QUALITY

Key water measures used by the water resource industry today are as follows:

Water Measurements

Acre-foot (AF) = 43,560 cubic feet = 325,851 gallons

Acre-foot per year (ac-ft/yr) = 325,851 gallons per year = 893 gallons per day

Gallons per minute (gpm) = 1,440 gallons per day = 1.6 ac-ft/yr

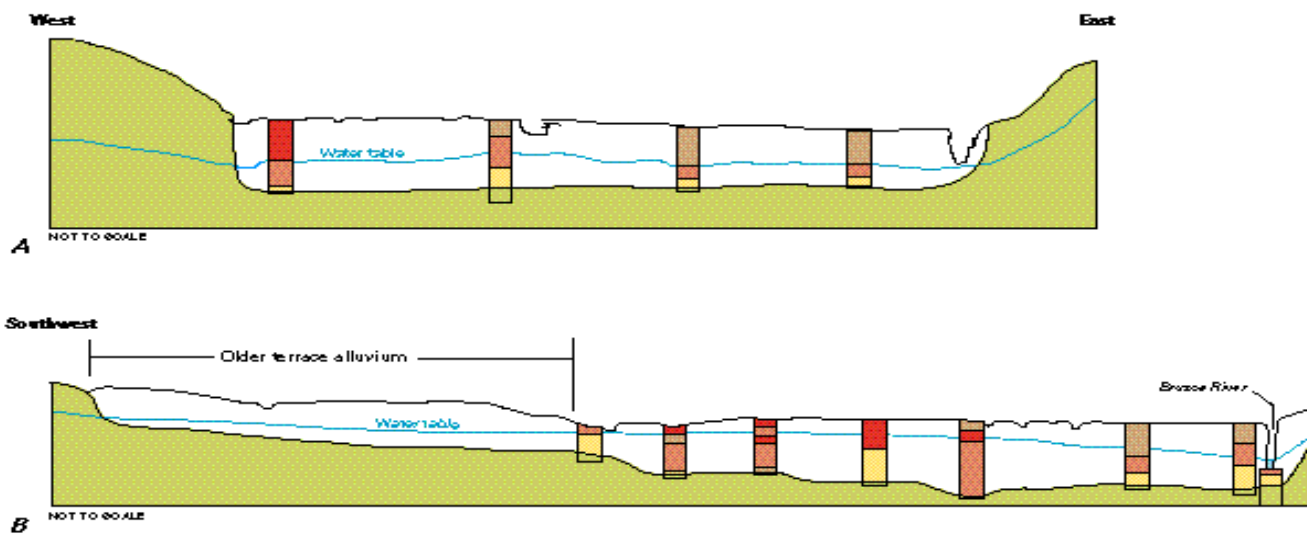
Million gallons per day (mgd) = 1,000,000 gallons per day = 1120 ac-ft/yr

The lower portion of the section in the PureTex Water Works' Area of Interest can be in places feet thick with measured permeability of 5 to 11 darcys. During the 1950's, 60' and 70's in exce 50 water wells were tested and produced from the deeper levels from 400 to 1000 feet below th Beginning in 1979 through 1984, PureTex Water Works' affiliates drilled, completed, and tested volume fresh water wells in this aquifer, completing them with specially designed screen and lin completion techniques working in conjunction with the Halliburton Company. These wells have

rates of 11,000,000 gals per day to 25,000,000 gals per day with very little drawdown. Eventual wells were capped and remain available today for re-entry to be returned to productive wells.

Hydraulic conductivity values determined by laboratory tests on samples of the alluvium in Pure of interest are as great as 12,400 feet per day for gravel. Estimated transmissivity values average 56,600 feet squared per day, and the average specific yield is estimated to be about 75 percent. Transmissivity is a measure of the ease with which water will pass through an aquifer; transmissivity is hydraulic conductivity multiplied by aquifer thickness. The higher the transmissivity, the more permeable the aquifer. The water table in the alluvium ranges from less than 10 to nearly 1100 feet below land surface. The water table gently slopes toward and below the river and streams that make up the Brazos

Recharge to the alluvial aquifer is mainly from precipitation that falls directly on the flood plain and terraces; in PureTex's Area of Interest estimates of recharge range from 24 to 48 inches per year. In PureTex's area of interest the San Bernard River bed consists of very coarse clean white sand that is similar to the same conditions that exist at deep aquifer level. Diagrammatic sections for the area where the Brazos River system is the boundary between Eastern Colorado and Austin Counties, Tex. are shown in



These idealized hydrogeologic sections of the alluvial aquifer along the Brazos River Valley show that fine grained material overlies coarser alluvial materials (A). Alluvial terraces (B) are at higher altitudes relative to the younger alluvium in the flood plain. The water table generally slopes toward the Brazos River.

EXPLANATION	
	Clay and silt
	Sand and clay or sandy clay
	Sand with some silt and clay
	Sand and gravel
	Coastal Plain sediments of Claiborne Group (Eocene)

PureTex Water Works Inc.

Figure 3. Cross-Section of Aquifer Complex

