

# Potter County Well Field Development

## West Texas

### CLIENT

City of Amarillo

### HIGHLIGHTS

- National Ground Water Association Award for Outstanding Ground Water Supply Project
- Multi-year, multi-phase phase project
- Client goals regarding project schedule and well-field capacity were exceeded

DBS&A was retained by the City of Amarillo, Texas, to develop new water supplies from its Potter County water rights holdings to meet future growth needs and address near-term water supply shortfalls due to drought impacts on surface water supplies. The City's goal was to produce an additional 20 to 40 million gallons per day (mgd) of municipal water supply from approximately 45,000 acres of water rights holdings within the Ogallala Aquifer. The project included:

- Hydrogeologic assessments
- Drilling contract procurement and administration
- Municipal well permitting
- Exploratory borehole drilling
- Municipal supply well engineering design, construction and oversight
- Aquifer testing and well performance assessment
- Regulatory reporting
- Well field optimization modeling



Optimal sites for the initial prototype well installations were based on a 3D hydrostratigraphic model.



Phase 1 activities of the multi-year project included hydrogeologic assessments based on the evaluation of geophysical logs and driller's logs from previous test drilling and well installations throughout the area of interest. Subsurface lithology and stratigraphy data were incorporated into a three-dimensional (3D) hydrostratigraphic model, which was used to select optimal sites for prototype well installations based on the thickness of permeable sand and gravel layers and the geometry of the underlying base of aquifer red beds (i.e., distribution of paleochannels).

Additional hydrogeologic assessments included groundwater modeling of future production scenarios to assess aquifer sustainability. The modeling study demonstrated that the initial plans for producing 20 mgd from a limited portion of the City's water rights holdings would result in rapid aquifer depletion. As a result, the well field area was expanded to obtain the desired production capacity while maintaining more favorable long-term aquifer conditions.

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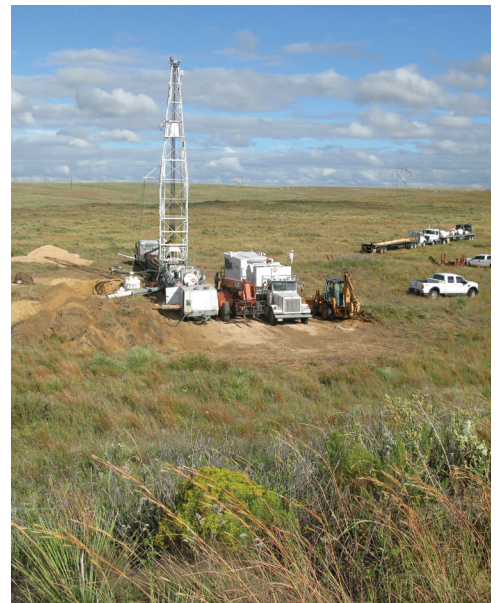
Prototype supply wells demonstrated production capacities ranging from 850 to 1,140 gpm.

Based on the results of the Phase 1 hydrogeologic assessments, DBS&A planned, designed, and oversaw installation of four prototype supply wells ranging from 490 to 900 feet in depth, and conducted pump testing that demonstrated production capacities of 850 to 1,140 gpm. The field program also included the installation of 5 observation wells used to monitor water level drawdown during pumping tests, and drilling 10 exploratory test borings at depths up to 960 feet. The groundwater model was updated based on the Phase 1 field investigation, and groundwater modeling was conducted to develop the final well field design which included 21 supply wells within a well field footprint encompassing about 18 square miles. The initial estimated production capacity of the completed well field was 20.6 mgd.

DBS&A planned and oversaw the drilling of 11 additional exploratory test borings to verify aquifer conditions and provide site-specific data for well design, and prepared and submitted a Multiple Water Well

Drilling Permit application to the Panhandle Groundwater Conservation District (PGCD). Additional modeling scenarios were run at the request of the PGCD demonstrating predicted aquifer impacts from balancing future production demand between the new Potter County well field and the City's existing Carson County well field under most-likely and worst-case pumping scenarios. Our work with the PGCD resulted in the approval of a new permit to drill 17 supply wells and a permitted production ceiling of 24,900 acre-feet per year (22 mgd) from a contiguous tract of nearly 41,000 acres.

DBS&A prepared detailed designs for 17 new municipal supply wells with 16-inch diameter casing and screens ranging in depth from 457 to 704 feet. We also prepared plans and specifications for well drilling and construction along with an activity schedule to complete the well installations using multiple drilling rigs, development rigs, and pumping crews operating simultaneously. Sixteen supply wells and 6 monitor wells were completed under budget and two months ahead of schedule. Recommended maximum operating capacities of the completed wells ranged from 420 to 1,890 gpm, exceeding the target well field production capacity.



Multiple drilling rigs, development rigs, and pumping crews worked simultaneously.