Maintain and Expand Kansas-Based Data Services to the National Groundwater Monitoring Network, 2023–2024

October 10, 2025

Funded by the

U.S. Geological Survey — Grant G23AC00303
07/15/2023 to 07/14/2025

Submitted by:
Brownie Wilson, Jim Butler, Ed Reboulet, and Steve Knobbe

Primary Contact:
Brownie Wilson
bwilson1@ku.edu

Kansas Geological Survey, Geohydrology Program
University of Kansas, 1930 Constant Avenue,
Lawrence, KS 66047
785-864-3965

Kansas Geological Survey Open-File Report 2025-61

GEOHYDROLOGY

KU KANSAS GEOLOGICAL SURVEY
The University of Kansas

Maintain and Expand Kansas-Based Data Services to the National Groundwater Monitoring Network, 2023–2024

October 10, 2025

Funded by the
U.S. Geological Survey — Grant G23AC00303
07/15/2023 to 07/14/2025

Kansas Geological Survey Open-File Report 2025-61

Submitted by:

Brownie Wilson, Jim Butler, Ed Reboulet, and Steve Knobbe

bwilson1@ku.edu

Kansas Geological Survey, Geohydrology Program
University of Kansas, 1930 Constant Avenue,
Lawrence, KS 66047
785-864-3965

Disclaimer

The Kansas Geological Survey does not guarantee this document to be free from errors or inaccuracies and disclaims any responsibility or liability for interpretations based on data used in the production of this document or decisions based thereon. The views and conclusions contained in this document are those of the author and should not be interpreted as representing the opinions or policies of the U.S. Geological Survey. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Geological Survey.

TABLE OF CONTENTS

Introduction

The National Groundwater Monitoring Network (NGWMN) is an effort led by the U.S. Geological Survey (USGS) to establish a network of selected monitoring wells across the country to facilitate the planning and management of groundwater resources. The NGWMN serves as a single data portal that retrieves, in real time, construction, lithology, depth-to-water measurements, and water-quality data that are maintained and served to the portal from a variety of participating local, state, and federal sources. The NGWMN can be accessed at the following URL: http:// https://www.usgs.gov/apps/ngwmn/.

In 2016 (federal fiscal year 2016), the USGS provided funding support through Cooperative Agreement G16AC00017 to the Kansas Geological Survey (KGS) to become a data provider to the NGWMN (Wilson, 2016). The project period started January 1, 2016, and ended December 31, 2016. Under this agreement, the KGS evaluated monitoring sites for inclusion in the NGWMN, worked with USGS staff to populate the data portal with monitoring well sites that met a set of minimum data standards, and then developed a series of web services that allowed the NGWMN real-time data access to the state's well construction, lithology, and depth-to-water measurements records.

In 2017 (FY2016), the USGS provided funding support to the KGS through Cooperative Agreement G16AC00363 to maintain persistent data services to the NGWMN (Wilson, 2017). This included preserving existing web services and applying routine updates to existing network sites, which included removing well sites that were no longer viable and uploading replacement and new well site locations. The project period started October 10, 2016, and ended September 30, 2017.

In 2018 (FY2017), the USGS awarded funding to the KGS under Cooperative Agreement G17AC00170 to update the Kansas portion of the well registry, maintain the persistent data services to the NGWMN, and install a network of trend wells in the Kansas River alluvial aquifer, which underlies a river valley in Kansas with major population growth and economic activity but without an active water-level observation network at the state level (Wilson, 2019). This two-year project started July 1, 2017, and was completed June 4, 2019.

In the summer of 2019 (FY2019), the USGS awarded funding to the KGS under Cooperative Agreement G19AC00191 to continue updates and maintenance of the Kansas portion of the well registry and persistent data services but also to expand the number of wells participating in the NGWMN by including all the annually measured wells from the Kansas Cooperative Water-Level Network. Additionally, the project called for well maintenance on four selected trend wells by redeveloping the sites to ensure a continued good hydraulic connection with the High Plains aquifer (HPA). This two-year project started on July 15, 2019, and was delayed by travel restrictions related to the COVID-19 pandemic. After receiving a no-cost extension, the project was completed on December 23, 2021 (Wilson et al., 2022).

In 2021 (FY2021), the USGS awarded funding from the NGWMN program to the KGS under Cooperative Agreement G21AC10419 to update the Kansas portion of the well registry, maintain the persistent data services to the NGWMN, and install two trend well nests in southwest Kansas where the HPA and the unconfined Dakota aquifer are in hydraulic contact with each other. Each well nest consists of two well casings—one drilled and screened in the HPA and a second drilled

and screened in the Dakota. These four new water-level observation sites fill in the trend well coverage for the HPA in Kansas and help understand the interactions between the HPA and underlying Dakota aquifer system. The project was completed in July of 2023 and the final report submitted in early September of 2023 (Wilson et al., 2023)

During the summer of 2023 (FY 2023), the USGS awarded funding to the KGS under Cooperative Agreement G23AC00303-00 to continue updates and maintenance of the Kansas portion of the well registry, maintain persistent data services to the NGWMN, and install two trend wells — one in southwest Kansas and the other in northwest Kansas. This report documents the activities and achievements during the grant period.

Existing Kansas NGWMN Well Sites

The NGWMN started serving Kansas-based groundwater data in September 2016 from 133 surveillance wells — those that are measured annually during the winter months — and four trend wells, which are true observation wells that record water levels in real time throughout the year (Wilson, 2016). Through each subsequent NGWMN contract, the registry was updated by removing wells that were no longer measurable and adding new well sites that met the NGWMN data requirements or fit into a special studies classification related to the HPA. At the start of this project (summer 2023), the NGWMN network included 1,316 Kansas wells (fig. 1).

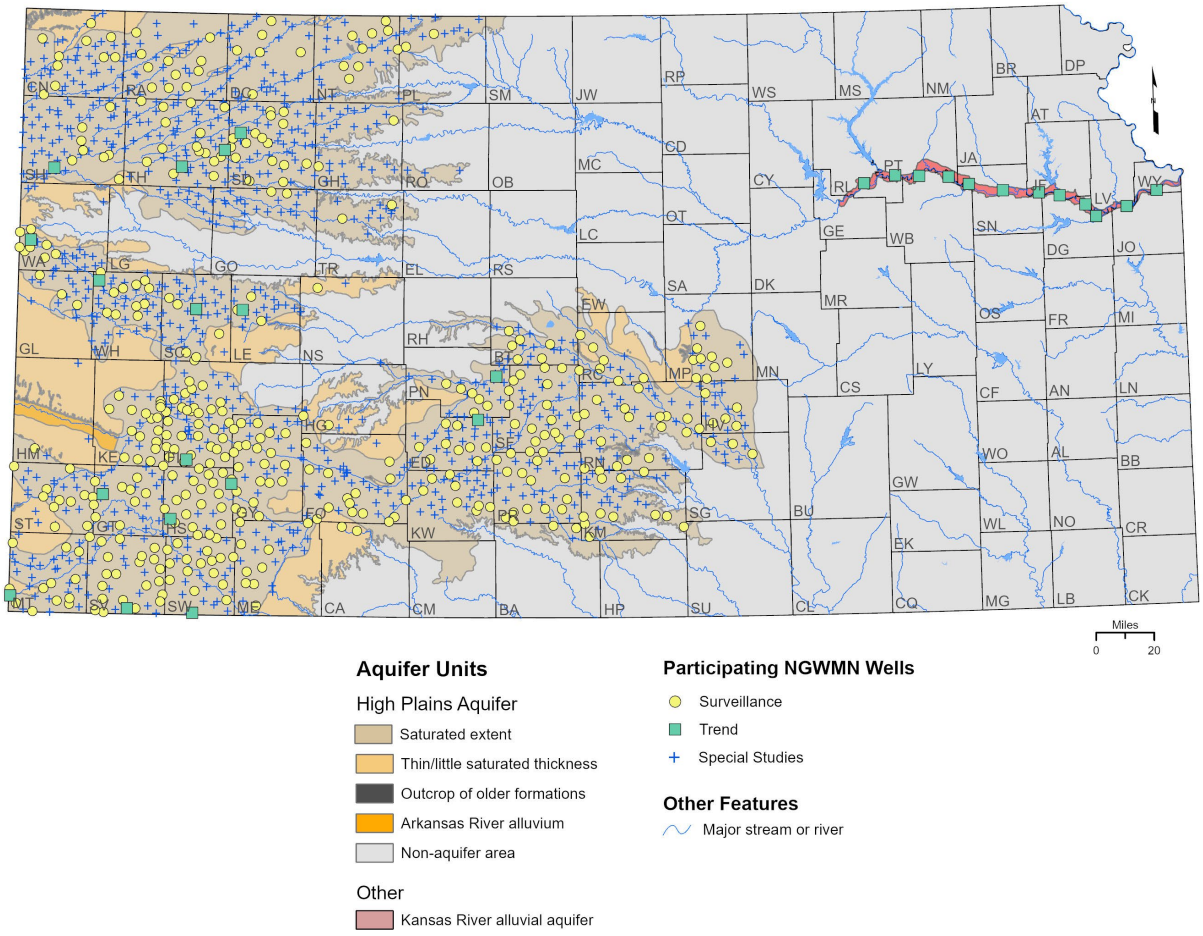

Figure 1. 2023 NGWMN sites in the Kansas High Plains aquifer and the Kansas River alluvial aquifer.

All well sites in the HPA are part of the larger Kansas Cooperative Water-Level Network, a collection of approximately 1,400 wells measured annually by the KGS in cooperation with the Kansas Department of Agriculture, Division of Water Resources (Miller et al., 1998). The vast majority of measurements take place in the month of January, typically from irrigation wells, using steel or electric tapes, which have precisions down to hundredths of a foot. Customized software developed by the KGS combined with global positioning systems are used to ensure the same wells are measured each year and to conduct on-site data validations of depth-to-water measurements. The KGS further randomly selects 7% of the wells each year to be re-measured by a second person within 24 hours of the initial visit. Referred to as “QA” wells, these extra measurements serve to provide quality assurance of the collected data. Additional statistical and GIS reviews are conducted later on the entire data set to identify abnormal or anomalous measurements. If necessary, well sites are re-measured the same day to within a month, depending on the circumstances.

The Kansas Cooperative Water-Level Network also consists of a growing collection of continuously monitored wells. Referred to as “index wells,” these sites are equipped with pressure transducers that record water levels every hour and, with telemetry systems, provide real-time access to water-level data throughout the year (Butler et al., 2025). The index well program was expanded into the Kansas River alluvial aquifer to better understand the dynamics of the aquifer and its interactions with the river (Butler et al., 2022; Wilson, 2019). Index wells are also manually measured throughout the calendar year, typically every three to four months.

Depth-to-water measurements, both manually and electronically recorded, are stored in an Oracle-based enterprise-level relational database (RDMS) called the Water Information Storage and Retrieval Database (WIZARD). WIZARD evolved from the U.S. Geological Survey’s Ground Water Site Inventory in the mid-1990s (Hausberger et al., 1998) and today represents the largest repository of depth-to-water measurements in Kansas. Measured well sites are used to track temporal changes in water-table elevations and estimates of water availability. WIZARD currently consists of more than 57,000 well sites with more than 660,000 water-level measurements. Data can be accessed at the following URL:

http://www.kgs.ku.edu/Magellan/WaterLevels/index.html

A key feature of the NGWMN data framework is that participating wells must have associated construction and lithology descriptions. In Kansas, this information can be obtained from the Water Well Completion Records Database (WWC5). Since the mid-1970s, water well drilling companies have been required to provide location, type, use, casing, lithology, and other information to the Kansas Department of Health and Environment any time a well is constructed, reconstructed, or plugged. The KGS stores more than 310,000 WWC5 records (fig. 2) in an Oracle RDMS and serves these data to the public through the following URL:

http://www.kgs.ku.edu/Magellan/WaterWell/index.html

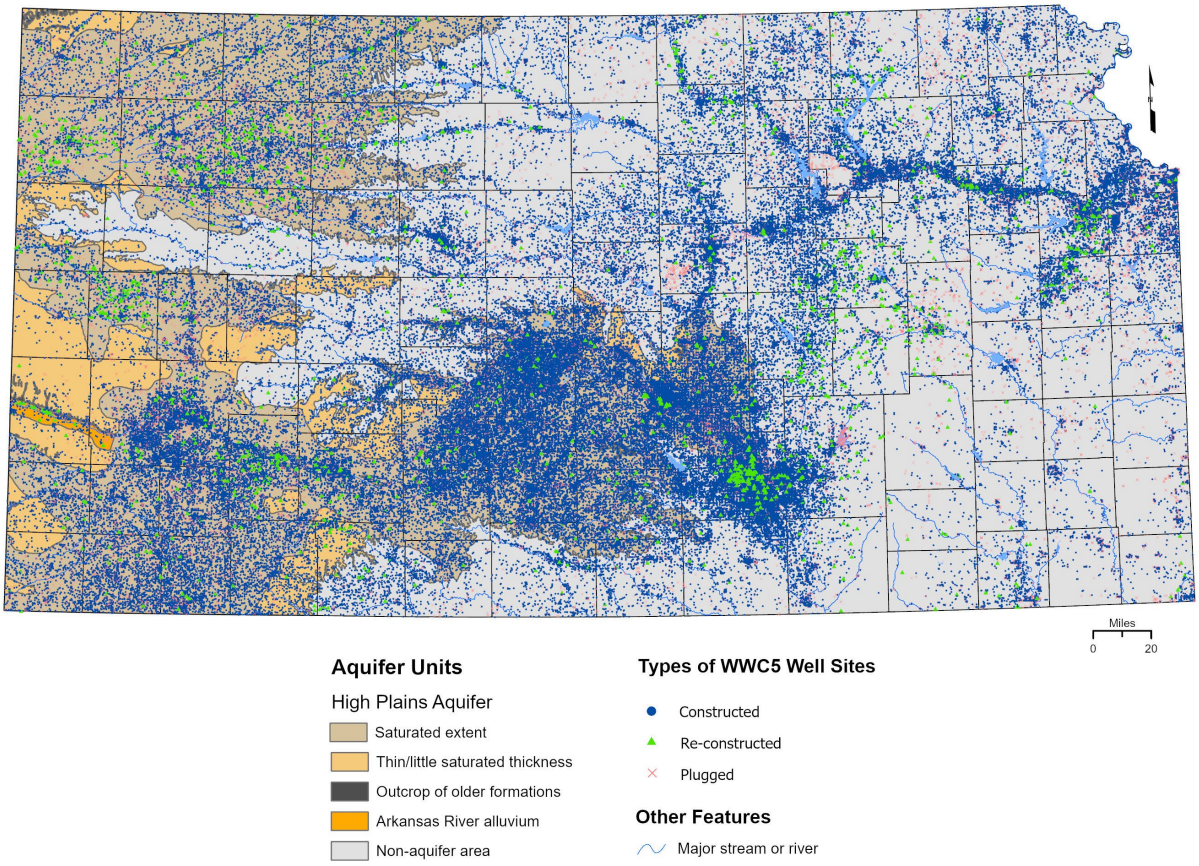

Figure 2. WWC5 well sites.

Existing Kansas NGWMN Data Streams

Data are streamed to the NGWMN through a series of web services, standardized protocols by which data are transmitted and shared across the internet. The Kansas web services were developed as a single Adobe ColdFusion component, stored on a Linux web server running Apache software. The ColdFusion component has four methods (one representing each service [i.e., water levels, lithology, screens, and casings]), supports REST protocol, and returns XML-formatted web documents.

Each of the four methods provided under the Kansas web service is called using a URL-based variable along with a list of one or more site IDs for NGWMN wells. A list of the methods for an example well/site number is shown below.

- Water Levels Method
  - http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?**method=WaterLevels**&sites=371237100455301
- Lithology Method
  - http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?**method=Lithology**&sites=371237100455301
- Casing Method
  - http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?**method=Casing**&sites=371237100455301
- Screens Method
  - http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?**method=Screens**&sites=371237100455301

A more detailed description of each process can be found in the report “Establishing Kansas as a Data Provider to the National Groundwater Monitoring Network” (Wilson, 2016).

Kansas 2024 and 2025 Updates to the NGWMN

At the conclusion of the 2024 and 2025 water-level collection campaigns and subsequent data review and follow-up, the KGS assessed the participating NGWMN wells to make sure the sites were still measurable and to determine whether the annual changes in the water table were representative of aquifer conditions for given areas. Table 1 lists wells that were dropped from the NGWMN data portal and the reason for removal.

Table 1
2024 and 2025 Kansas Wells Removed from the NGWMN Data Portal

Site Number	Legal Description	Reason for Removal
393917100073901	04S 25W 34CDC 01	Sanitarian well cap installed. No more access.
394106101371301	04S 38W 20CCC 01	Well destroyed by mower.
393557100214701	05S 27W 21CCA 01	Dry hole.
393656100285601	05S 28W 17DAC 01	Bottom 50ft of tape covered in sludge.
393558100495001	05S 31W 20CCA 01	Well plugged.
393724101321401	05S 38W 13BAD 01	Blocked at 101 ft.
393712101470601	05S 40W 14BCD 01	Well exceptionally difficult to measure.
393104100221201	06S 27W 19ADC 01	Well plugged.
393403101575901	06S 42W 02AAA 01	Dry hole.
392433100330201	07S 29W 27CCC 01	Well used for stockwater and pumps 24/7.
391545099420601	09S 21W 19AAB 01	Well plugged.
390022100363001	12S 30W 13CCB 01	Well plugged.
384653101484401	15S 40W 06BDB 01	New pump installed and no longer has downhole access.
384549101525501	15S 41W 09BDD 01	Hitting bottom of well.
384027101493301	16S 41W 11CCB 01	Now stockwater well, runs 24/7.
383414101212801	17S 37W 13CDD 01	Dry hole.
381847097450101	20S 04W 15BDD 01	Well plugged.
380614097594201	22S 06W 28CCB 01	Blocked down hole.
380929098345101	22S 11W 07BBB 01	Well destroyed.
380807101054001	22S 34W 18CDD 01	Solid block at 3ft.
380324097462401	23S 04W 16BBB 01	Now stockwater well, runs 24/7.
380424100593301	23S 33W 07BBC 01	Dry hole and got tape stuck and broke off at bottom.
375252098235701	25S 10W 14BBB 01	Blocked down hole.
375153098274401	25S 10W 19ABD 01	Blocked down hole.
375339100331401	25S 29W 07BCB 01	Diaphragm installed, no down-hole access.
375239100552401	25S 33W 15DAC 01	Spotty cuts.
375338101044001	25S 34W 08CAB 01	Well re-equipped and no longer measurable.
374428099260501	26S 19W 31AAC 01	Broke tape in well.
374519100480901	26S 32W 27DAC 01	Well is starting to "grab" tape.
374747100552101	26S 33W 10CCD 01	Well damaged and no longer has down-hole access.

374203101095101	27S 35W 17ADD 01	Dry hole.
373759101274201	28S 38W 10ABB 01	Open hole with questionable measurements.
373716101430301	28S 40W 08CDD 01	Well is always pumping.
373106098204301	29S 09W 18DCB 01	Well plugged and new well drilled (added as 373106098204302)
373309099384901	29S 21W 05BBB 01	Well is abandoned and water table reaching drill depth.
373018100521101	29S 32W 19CCC 01	Well becoming dangerous to measure.
373134101045301	29S 34W 18BDD 01	Blocked down hole.
373009101234301	29S 37W 29BBA 01	Well is becoming dangerous to measure.
372539100142504	30S 27W 23ABB 04	Bottom 80ft of tape covered in petroleum smelling grime.
372214101211701	31S 37W 09BBC 01	Measuring tube blocked.
372117101280901	31S 38W 17ADB 01	Abandoned well giving questionable measurements.
371641100594601	32S 34W 10DAA 01	Many restrictions and broke tape in well.
371516101022801	32S 34W 20BAD 01	Pump shifted — measuring point blocked.
371328101060301	32S 35W 35BBD 01	Well plugged and new well drilled (added as 371328101060302)
371713101125601	32S 36W 03DDC 01	Well removed and farmed over.
371530101320601	32S 39W 14DDD 01	Measuring point blocked.
371154100412801	33S 31W 09AAB 01	Well is becoming dangerous to measure (replaced with 371110100413301).
370758101272501	33S 38W 33CAA 01	Blocked at 80 ft and bottom 40 ft of tape covered in grime.
370001101472201	35S 41W 16CCD 01	Blocked at 65 ft.

Table 2 lists 32 new well sites added to the NGWMN portal in 2024 and 2025. All of the wells are part of the Kansas Cooperative Water Level Network in the HPA region of Kansas. The only well with the minimum data requirements to be classified as a “surveillance” well, 392848100351301, was originally dropped in 2022 after it was reported the site would be plugged. However, given that the well was re-furbished and not a new installation, the site was added back into the NGWMN portal in 2024. The two trend well sites were drilled as part of this contract (covered in more detail later in the report).

Table 2
Wells Added in 2022 and 2023 to the NGWMN Data Portal

Site Number	Legal Description	Well Depth	Well Type	Local Aquifer
393644101370901	05S 38W 17CCC 01	260	Trend	Ogallala Formation
393104100221202	06S 27W 19ADC 02	143	Special	Ogallala Formation
392848100351301	07S 29W 05BBB 01	190	Surveillance	Ogallala Formation
385633101580901	13S 42W 10ABD 01	184	Special	Ogallala Formation
383943101490201	16S 41W 14ACC 01	250	Special	Ogallala Formation
383625100353701	17S 30W 01BCC 01	184	Special	Ogallala Formation
381327100520801	21S 32W 18DDB 01	216	Special	Ogallala Formation

375429100330301	25S 29W 06BCD 01	303	Special	Ogallala Formation
375144100563701	25S 33W 21DCA 02	420	Special	Ogallala Formation
374947100561801	25S 33W 34CCC 02	492	Special	Ogallala-Dakota Formation
375426101113601	25S 35W 05CBB 01	597	Special	Ogallala-Dakota Formation
374747100552102	26S 33W 10CCD 02	571	Special	Ogallala-Dakota Formation
374712101555201	26S 42W 17DBD 01	425	Special	Ogallala Formation
374856098400301	27S 12W 19ADC 01	119	Special	Quaternary System
374203101095102	27S 35W 17ADD 02	510	Special	Ogallala Formation
373508099382901	28S 21W 29BAA 01	173	Special	Ogallala Formation
373655099592601	28S 24W 18BDA 01	297	Special	Ogallala Formation
373833100325101	28S 30W 01DAB 01	380	Special	Ogallala Formation
373106098204302	29S 09W 18DCB 02	147	Special	Quaternary System
373040101044501	29S 34W 19DBB 01	626	Special	Ogallala Formation
373301101210401	29S 37W 03DCA 01	405	Special	Ogallala Formation
372935101251701	29S 38W 25DCC 01	370	Special	Ogallala Formation
372318100351501	30S 30W 34DCC 01	467	Trend	Ogallala Formation
372820101172001	30S 36W 05BBC 01	468	Special	Ogallala Formation
372724101382101	30S 40W 12ADD 01	545	Special	Ogallala-Dakota Formation
372039101155601	31S 36W 20BBB 01	514	Special	Ogallala-Dakota Formation
372222101234101	31S 38W 12AAA 01	515	Special	Ogallala-Dakota Formation
372043101543401	31S 42W 20ABB 01	500	Special	Ogallala-Dakota Formation
371758100292301	32S 29W 05BBD 01	405	Special	Ogallala Formation
371328101060302	32S 35W 35BCA 01	581	Special	Ogallala Formation
371110100413301	33S 31W 09DDC 01	300	Special	Ogallala Formation
370735101184701	34S 37W 02BAA 01	595	Special	Ogallala Formation

Other NGWMN-data-related activities during this grant period include updating the web services for trend well 383132100543101 to account for a change in the depth of the downhole sensor and changing the well status from “special” to “surveillance” for well site 385710100473001 once its screening and casing information was entered into the database.

Table 3 lists sites flagged from the NGWMN data monitoring dashboard that contain errors associated with their web services and the adjustments made to correct the problem.

Table 3
2024 and 2025 Identified Sites With Web Service Errors and Corrected Web Services

Site Number	Error Type	Cause and Corrective Action
394106101371301	Log	Incomplete log with construction report. Classification changed from “surveillance” to “special.”
393557100214701	Log	"&" within lithologic description changed to "and."
393403101575901	Log	Incorrect log linked to well site.
391545099420601	Log	"&" within lithologic description changed to "and."
390022100363001	Log	"&" within lithologic description changed to "and."

As of the date of this report, a total of 1,299 wells are being served from the KGS to the NGWMN system; of those, 406 are surveillance wells, 21 are trend wells, and 860 are special study wells in the Kansas Cooperative Water Level Network; the remaining 12 are trend wells in the Kansas River alluvial aquifer (fig. 3).

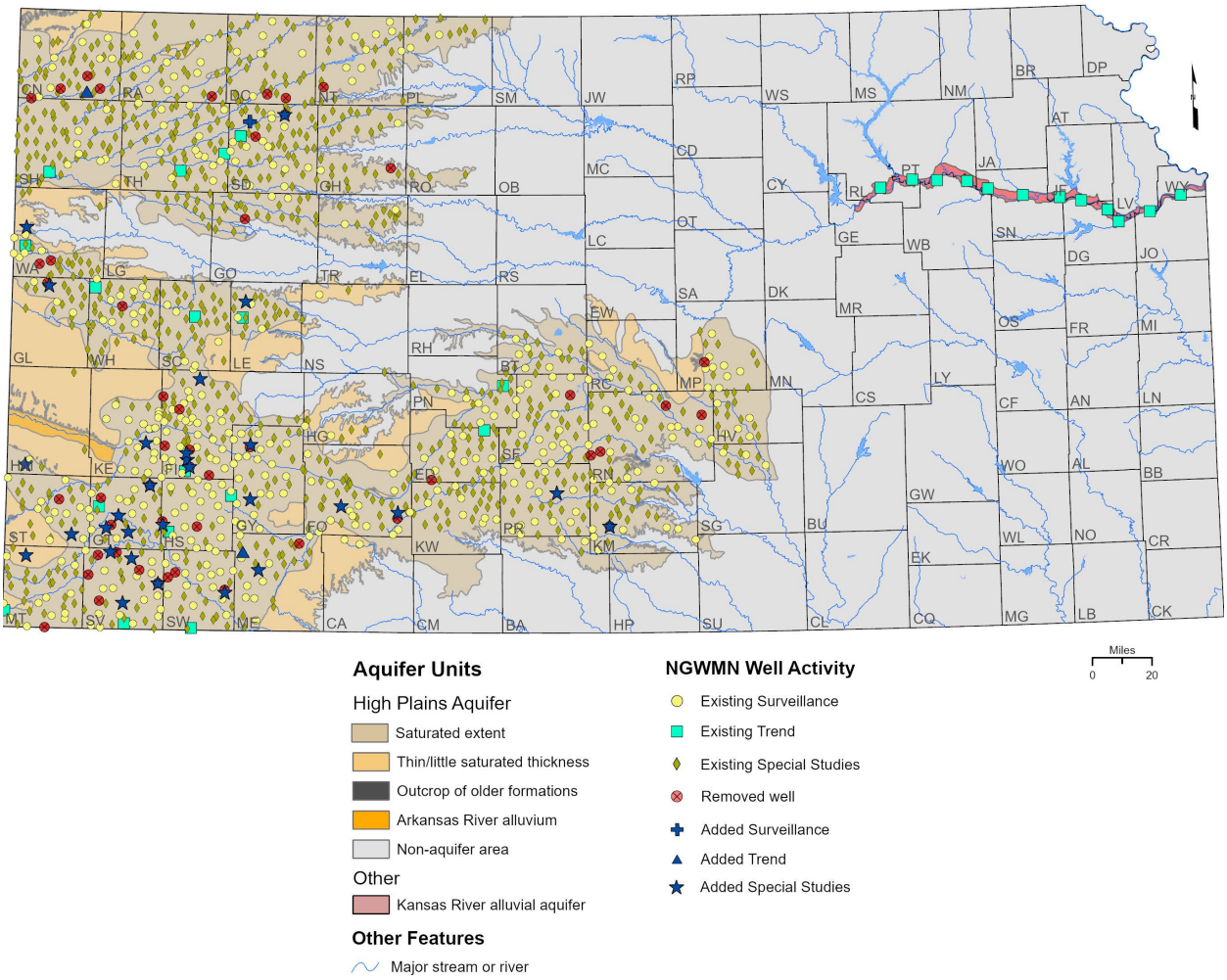

Figure 3. Status and 2024–2025 update activities of KGS-based NGWMN wells.

Trend Well Installation

The second objective of this contract was to install two trend wells and equip them with telemetry units for real-time access to hourly water-level data. Located in the High Plains aquifer region of the state, each site expands the coverage of continuously measured wells (fig. 4) and provides additional data support to voluntary water conservation efforts currently under discussion in portions of northwest and southwest Kansas.

NGWMN funds were used to contract with local drilling companies while the KGS cost-share match, through the Kansas Index Well Program, equipped each site with pressure transducers and telemetry units. The first well was completed in Meade County (southwest Kansas) on December 5, 2024, and equipped to serve real-time, hourly data at the end of February 2025. Completion of the second well in Cheyenne County (northwest Kansas) took longer than expected when the original drilling company declined to follow up on its submitted bid, which required rescheduling the work with another company. This second well was completed on June 23, 2025, and equipped to serve real-time, hourly data in July 2025. Both wells were slug tested in early July of 2025, using solid slugs following the Kansas Geological Survey slug-test guidelines (Butler et al., 1996; Butler, 2019). Submitted drillers' logs for both well nests are provided in Appendix A of this report.

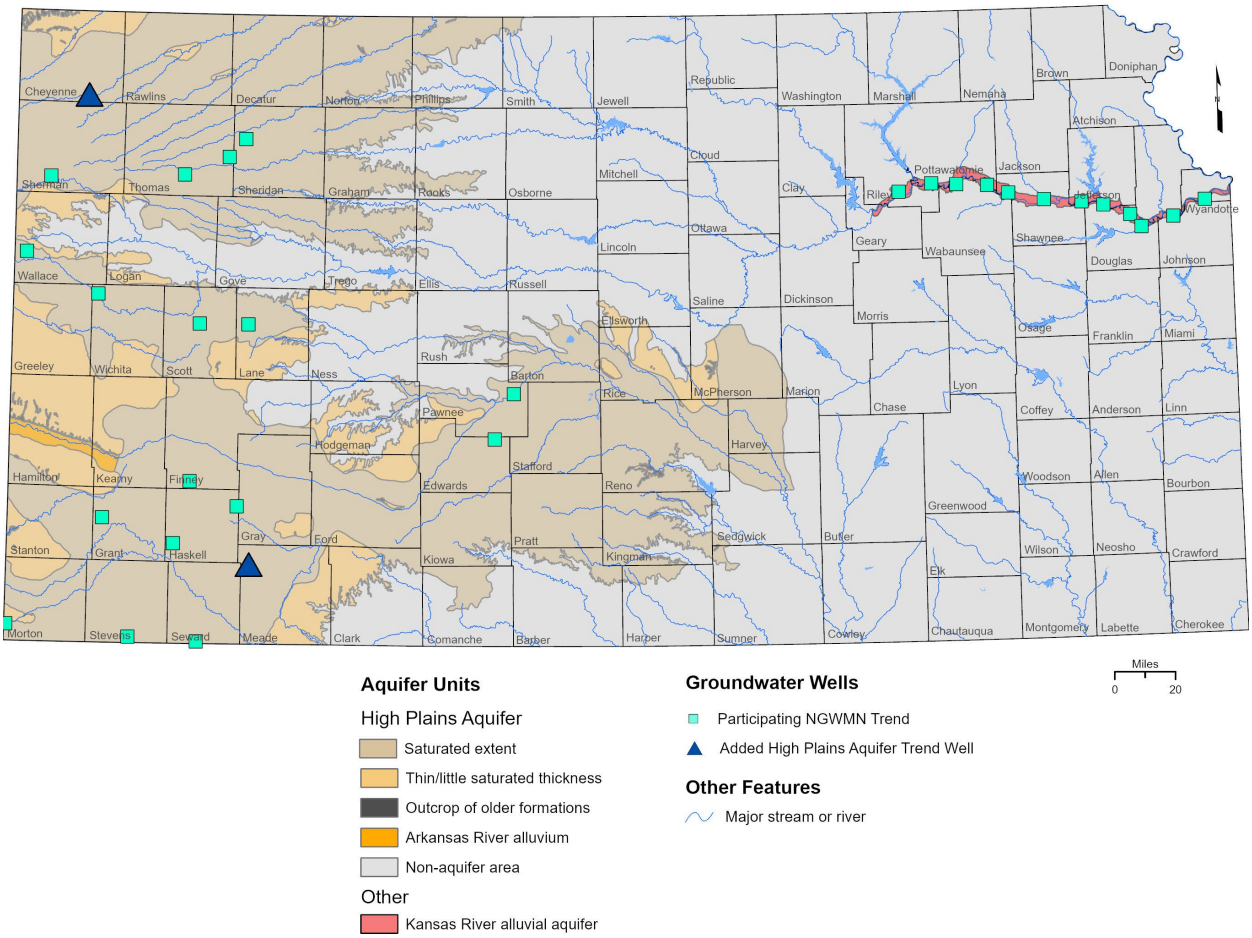

Figure 4. Installed and current Kansas NGWMN trend well locations.

Meade County Well

The Meade County trend well was completed on December 5, 2024, in sec. 34, T. 30 S., R. 30 W. 8 miles north of Plains, Kansas (fig. 4). The well is composed of a 2.5-inch PVC casing, completed to 420 ft and then screened from 420 to 460 ft to bedrock. A gravel pack runs from 60 to 460 ft below the land surface. A series of slug tests using 2 ft and 4 ft solid slugs were completed at the Meade well on July 7, 2025. The slug test results indicate the well has a good hydraulic connection with the aquifer. Water levels in the aquifer recovered within 15 seconds (fig. 5).

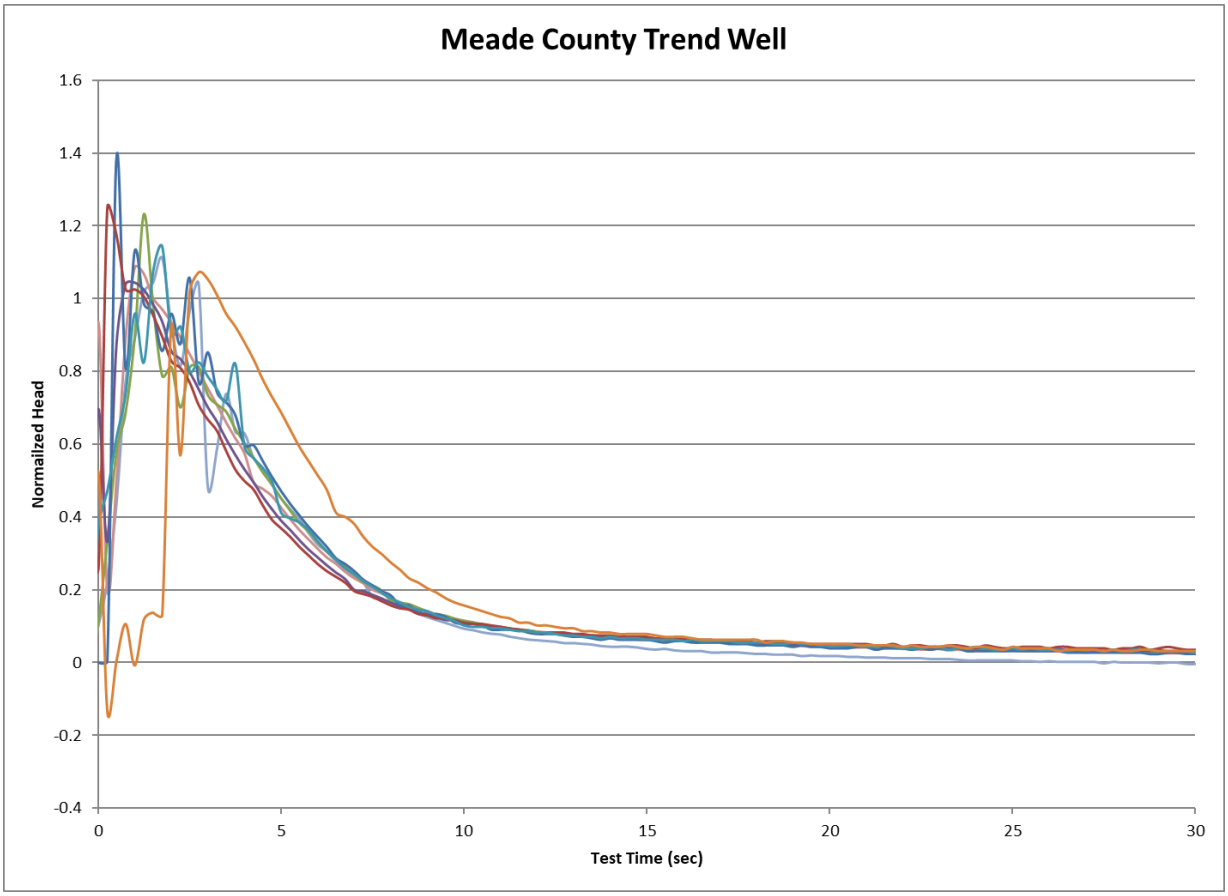

Figure 5. Normalized head (H(t)/H0) versus time since test initiation plots for a series of slug tests performed at the Meade well on July 7, 2025; H0 is the initial water-level change at the start of the slug test, H(t) is the deviation from static at time t. Slug tests were performed in both falling-head or slug-in mode (solid slug introduced into the water column) and rising-head or slug-out mode (solid slug removed from the water column).

Cheyenne County Well

The Cheyenne County trend well was completed on June 23, 2025, in sec. 17, T. 05 S., R. 38 W. roughly 20 miles north of Goodland, Kansas (fig. 4). The well is composed of a 2.5-inch PVC casing, completed to 205 ft and then screened from 205 to 245 ft to bedrock. A gravel pack runs from 20 to 245 ft below the land surface. A series of slug tests using 2 ft and 4 ft solid slugs were completed at the Cheynne well on July 7, 2025. The slug test results indicate the well has a good hydraulic connection with the aquifer. Water levels in the aquifer recovered within 7 seconds (fig. 5).

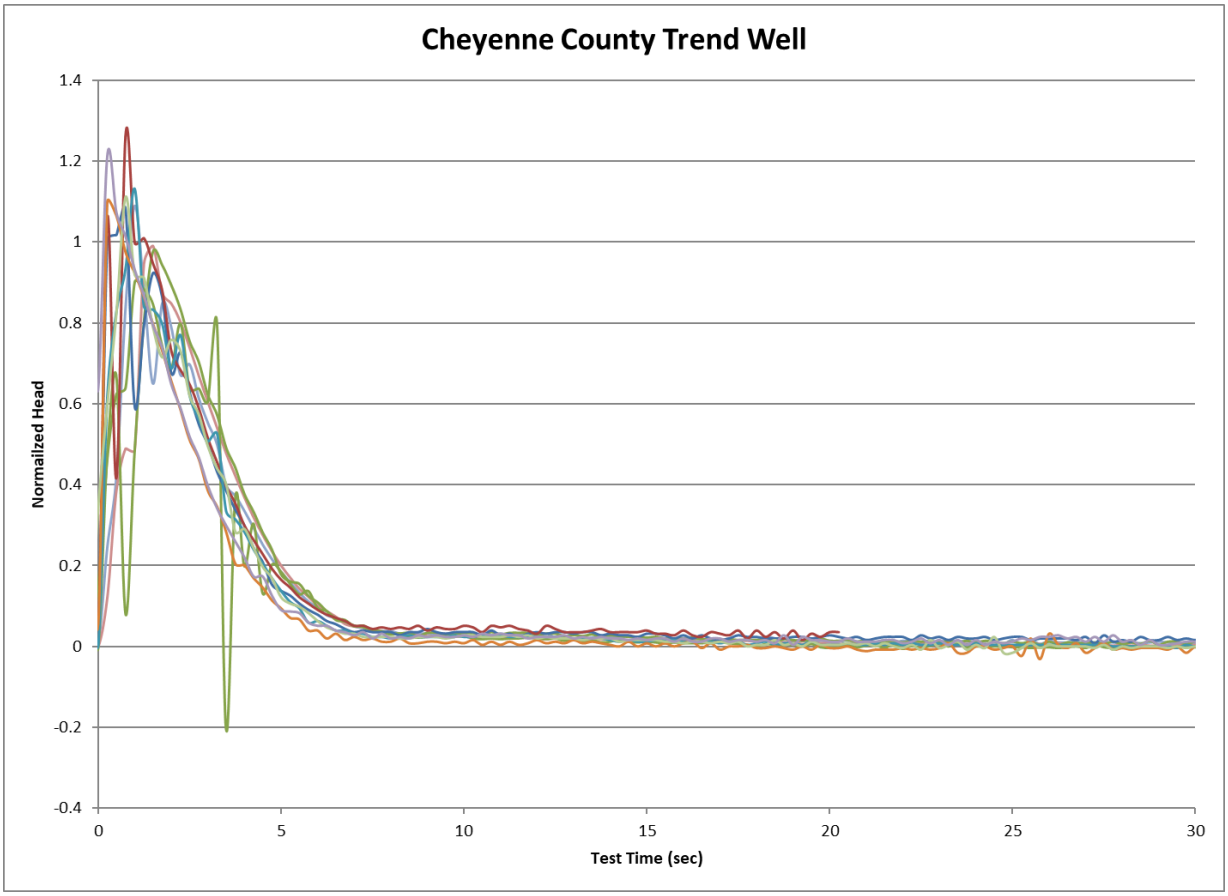

Figure 5. Normalized head (H(t)/H0) versus time since test initiation plots for a series of slug tests performed at the Cheyenne well on July 7, 2025; H0 is the initial water-level change at the start of the slug test, H(t) is the deviation from static at time t. Slug tests were performed in both falling-head or slug-in mode (solid slug introduced into the water column) and rising-head or slug-out mode (solid slug removed from the water column).

Future Developments

The KGS has entered into a seventh grant and cooperative agreement with the USGS. This two-year project, which started September 15, 2025, will work to continue to maintain the Kansas-based web services to the NGWMN and make any needed changes and additions after the Kansas Cooperative Water-Level Network measurements are acquired in the winters of 2025 and 2026.

Acknowledgments

The authors acknowledge the funding and project support of the USGS and thank Jason Fine (best wishes on retirement!) and Candice Hopkins for their assistance and counsel with the NGWMN projects; Keith Hunsinger for his guidance on web service development; and Julie Tollefson, KGS editor, for her review of this report.

References

Butler, J. J., Jr., 2019, The Design, Performance, and Analysis of Slug Tests (2nd edition): CRC Press, Boca Raton, 266 p.

Butler, J. J., Jr., McElwee, C. D., and Liu, W. Z., 1996, Improving the reliability of parameter estimates obtained from slug tests: Ground Water, v. 34, no. 3, p. 480–490.

Butler, J. J., Jr., Reboulet, E., Knobbe, S., Bohling, G. C., Whittemore, D. O., Voss, J., and Wilson, B. B., 2022, Kansas River Alluvial Aquifer Index Well Program: June 2020 to May 2022 Report: Kansas Geological Survey, Open-File Report 2022-6, 83 p.

Butler, J. J., Jr., Whittemore, D. O., Knobbe, S., Reboulet, E., Wilson, B. B., and Bohling, G. C., 2025, High Plains Aquifer Index Well Program: 2024 Annual Report: Kansas Geological Survey, Open-File Report 2025-58, 91 p.

Hausberger, G., Davis, J., Miller, R., Look, K., Adkins-Heljeson, D., Ross, G., Bennett, B., Schloss, J., and Bohling, G., 1998, WISARD: Water Information Storage and Retrieval Database: Kansas Geological Survey, Open-File Report 1998-13, 42 p.

Miller, R. D., Buchanan, R. C., and Brosius, L., 1998, Measuring water levels in Kansas: Kansas Geological Survey, Public Information Circular 12, 4 p.

Wilson, B. B., 2016, Establishing Kansas as a data provider to the National Ground-water Monitoring Network: Kansas Geological Survey, Open-File Report 2016-28, 12 p.

Wilson, B. B., 2017, Maintenance of the Kansas Geological Survey's data services to the National Groundwater Monitoring Network of water levels over the Kansas High Plains aquifer: Kansas Geological Survey, Open-File Report 2017-49, 8 p.

Wilson, B. B., 2019, Maintenance of the Kansas Geological Survey's data services to the National Groundwater Monitoring Network and establishment of a trend well network in the Kansas River alluvial aquifer: Kansas Geological Survey, Open-File Report 2019-17, 24 p.

Wilson, B. B., Butler, J. J., Reboulet, E. C., and Knobbe, S. J., 2022, Maintain existing and expand Kansas-based data services to the National Groundwater Monitoring Network: Kansas Geological Survey, Open-File Report 2022-1, 19 p.

Wilson, B. B., Butler, J. J., Reboulet, E. C., and Knobbe, S. J., 2023, Maintain and expand existing Kansas-based data services to the National Groundwater Monitoring Network: Kansas Geological Survey, Open-File Report 2023-60, 19 p.

Appendix A—Water Well Completion Records for Completed Trend Wells

Meade County Well

KOLAR Document ID: 1805986

WATER WELL RECORD (WWC-5) Constructed × Original Record Correction Change in Well Use

KOLAR DOC ID 1805986 WELL ID Meade County

LOCATION OF WATER WELL

Latitude	37.388262	Longitude	-100.587433	Section	34	Township	30	Range	30 E × W	Fraction	SW ¼ SW ¼ SE ¼
Datum	WGS84	Elevation	2760	County	Meade						

WATER WELL OWNER

Name	
Business	Kansas Geological Survey
Address	1930 Constant Ave Lawrence KS 66047
Well location at owner's address	From Intersection of G & 4 Rd East 1/2 Mile then north 200 yards & East 200 yards

CONSTRUCTION

Borehole interval: from 0 to 460 ft. from ____ to ____ ft.
Borehole diameter: 7 in. ____ in.

Casing height above land surface: 28 in.
If casing height is less than 12 in. has a variance been approved?* Yes × No
*variance not required for monitoring or environmental remediation wells

Casing type: ThermalPlastic
Blank casing interval: 0 ft. to 420 ft.
Blank casing diameter: 2.5 in.
Casing joints: Threaded
Weight: ____ lbs/ft.
Wall thickness or gauge no.: SCH80
Blank casing interval: ____ ft. to ____ ft.
Blank casing diameter: ____ in.
Casing joints: ____
Weight: ____ lbs/ft.
Wall thickness or gauge no.: ____

Grout interval: 0 ft. to 60 ft.
Grout material: Bentonite
Grout interval: ____ ft. to ____ ft.
Grout material: ____

Screen / perforation material: PVC
Screen / perforation openings: Saw cut
Screen / perforation intervals:
From 420 ft. to 460 ft.
Slot size .32 unit millimeter
From ____ ft. to ____ ft.
Slot size ____ unit ____
Gravel pack intervals:
Gravel pack not used: Gravel size ____ in
From 60 ft. to 460 ft.
Gravel pack not used: Gravel size ____ in
From ____ ft. to ____ ft.

WELL WATER USE

Environmental Remediation / Monitoring Mc

COMPLETION

Depth of completed well: 460 ft.
Depth(s) groundwater encountered:
(1) 248 ft.; (2) ____ ft.;
(3) ____ ft.; (4) dry well

Static water level in well: 248 ft.
× measured below land surface on (mm/dd/yy): 12/05/2024
measured above land surface on (mm/dd/yy): ____

Estimated yield: 10 gpm
Water level was: ____ ft. after ____ hours pumping ____ gpm
Pump installed? Yes × No

Water well disinfected? × Yes No
Date disinfected (mm/dd/yy): 12/05/2024

Aquifer, if known:

NEAREST SOURCE OF POTENTIAL CONTAMINATION

Source: ____
Distance from well: ____ Direction from well: ____
Source description: ____

Source: ____
Distance from well: ____ Direction from well: ____
Source description: ____

× No potential source of contamination within 100 feet.

PERMIT & ID NUMBERS (AS REQUIRED)

DWR Application No.: ____
KDHE / EPA Project Code: NA
Site Name: Meade County IW
KDHE UIC Class V Form Completed: Yes No
County Permit: Yes × No Permit ID: ____
Lease Name & Well #: ____
# of boreholes: ____ # of dewatering wells: ____

LITHOLOGIC LOG

FROM	TO	LITHOLOGY INTERVALS
Attache	Attache	Attached

COMMENTS

CONTRACTOR'S OR LANDOWNERS CERTIFICATION

This water well was constructed × reconstructed pursuant to the stated water well contractor's license and was completed on 12/05/2024. I certify that this record is true to the best of my knowledge and belief. This water well record was completed on 05/08/2025 under the business name of Nash Water Well Service, LLC, Kansas Water Well Contractor's License No. 846 under the authority of the designated person as defined in K.A.R. 28-30-2(j) and signed and certified by the electronic signature of the designated person at its submittal: Trevor Nash.

Send one copy to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well.

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka KS 66612-1367
(785) 296-3565 | K.S.A. 82a-1212 | v2022c

Meade Well (continued)

Form	WWC5.2 - Water Well Record
Doc ID	1805986
Well Owner	Kansas Geological Survey
Contractor	Nash Water Well Service, LLC

Lithology

From	To	Lithology Intervals
0	3	topsoil
3	20	sand,fine to medium,with Tan Clay
20	60	sand,fine,with tan red clay & Streaks of small gravel & thin rock layers
60	75	clay,Tan Clay with fine medium sand
75	102	sand,fine to coarse,with small to large gravel & tan gray clay streaks
102	104	other,Rock
104	120	sand,fine to medium,with tan clay
120	140	sand,fine to coarse
140	160	sand,fine to coarse,with tan clay
160	180	sand,fine to coarse,with streaks of tan clay & thin small gravel sts
180	220	sand,fine to coarse,with small gravel & rock layer
220	240	sand,fine to coarse
240	260	sand,fine to coarse,with small medium gravel & thin layers of tan yellow clay
260	280	sand,fine to coarse,with tan clay streaks

Form	WWC5.2 - Water Well Record
Doc ID	1805986
Well Owner	Kansas Geological Survey
Contractor	Nash Water Well Service, LLC

Lithology

From	To	Lithology Intervals
280	300	sand,fine to coarse,with small medium gravel streaks
300	320	sand,fine to coarse
320	345	sand,fine to coarse,with small gravel & thin streaks of tan clay
345	360	sand,fine to medium,with tan clay streaks & layers
360	380	sand,fine to medium,with white caliche rock tan brown clay
380	400	sand,fine,with tan brown clay streaks & layers
400	420	sand,fine,with tan brown clay streaks & layers
420	440	sand,fine to medium
440	457	sand,fine to coarse,with tan
457	472	shale,unknown,Red Clay

Cheyenne County Well

KOLAR Document ID: 1852991

WATER WELL RECORD (WWC-5)

Constructed × Original Record | Correction | Change in Well Use

KOLAR DOC ID 1852991 WELL ID Cheyenne Cou

LOCATION OF WATER WELL

Latitude	39.61209	Longitude	-101.61913	Section	17	Township	5	Range	38 E × W	Fraction	SW ¼ SW ¼ SW ¼
Datum	WGS84	Elevation	3464	County	Cheyenne						

WATER WELL OWNER

Name	
Business	Kansas Geological Survey
Address	1930 Constant Ave Lawrence Kans 66045
Well location at owner's address	From Hwy 27 and Road D, East for 5 miles, North 20 yards.

CONSTRUCTION

Borehole interval: from 0 to 245 ft. from ____ to ____ ft.
Borehole diameter: 6.25 in. ____ in.

Casing height above land surface: 24 in.
If casing height is less than 12 in. has a variance been approved?* Yes × No
*variance not required for monitoring or environmental remediation wells
Casing type: ThermalPlastic
Blank casing interval: 0 ft. to 205 ft.
Blank casing diameter: 2.5 in.
Casing joints: Threaded
Weight: ____ lbs/ft.
Wall thickness or gauge no.: .125
Blank casing interval: ____ ft. to ____ ft.
Blank casing diameter: ____ in.
Casing joints: ____
Weight: ____ lbs/ft.
Wall thickness or gauge no.: ____

Grout interval: 0 ft. to 20 ft.
Grout material: Bentonite
Grout interval: ____ ft. to ____ ft.
Grout material: ____

Screen / perforation material: PVC
Screen / perforation openings: Mill slot
Screen / perforation intervals:
From 205 ft. to 245 ft.
Slot size .02 unit inches
From ____ ft. to ____ ft.
Slot size ____ unit ____
Gravel pack intervals:
Gravel pack not used: Gravel size .125 in
From 20 ft. to 245 ft.
Gravel pack not used: Gravel size ____ in
From ____ ft. to ____ ft.

WELL WATER USE

Environmental Remediation / Monitoring Mc

COMPLETION

Depth of completed well: 245 ft.
Depth(s) groundwater encountered:
(1) ____ ft.; (2) ____ ft.;
(3) ____ ft.; (4) dry well

Static water level in well: 115 ft.
× measured below land surface on (mm/dd/yy): 06/23/2025
measured above land surface on (mm/dd/yy): ____

Estimated yield: 5 gpm
Water level was: ____ ft. after ____ hours pumping ____ gpm
Pump installed? Yes × No

Water well disinfected? × Yes No
Date disinfected (mm/dd/yy): 06/23/2025

Aquifer, if known:

NEAREST SOURCE OF POTENTIAL CONTAMINATION

Source: ____
Distance from well: ____ Direction from well: ____
Source description: ____

Source: ____
Distance from well: ____ Direction from well: ____
Source description: ____

× No potential source of contamination within 100 feet.

PERMIT & ID NUMBERS (AS REQUIRED)

DWR Application No.: ____
KDHE / EPA Project Code: N/A
Site Name: Cheyenne County Index Well
KDHE UIC Class V Form Completed: Yes No
County Permit: Yes No Permit ID: ____
Lease Name & Well #: ____
# of boreholes: ____ # of dewatering wells: ____

LITHOLOGIC LOG

FROM	TO	LITHOLOGY INTERVALS
Attache	Attache	Attached

COMMENTS

CONTRACTOR'S OR LANDOWNERS CERTIFICATION

This water well was constructed × reconstructed pursuant to the stated water well contractor's license and was completed on 06/23/2025. I certify that this record is true to the best of my knowledge and belief. This water well record was completed on 07/24/2025 under the business name of Hydro Resources Mid Continent, Inc. #145, Kansas Water Well Contractor's License No. 145 under the authority of the designated person as defined in K.A.R. 28-30-2(j) and signed and certified by the electronic signature of the designated person at its submittal: Tony Wedel.

Send one copy to WATER WELL OWNER and retain one for your records. Fee of $5.00 for each constructed well.

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
Bureau of Water, Geology Section, 1000 SW Jackson St., Suite 420, Topeka KS 66612-1367
(785) 296-3565 | K.S.A. 82a-1212 | v2022c

Cheyenne Well (continued)

Form	WWC5.2 - Water Well Record
Doc ID	1852991
Well Owner	Kansas Geological Survey
Contractor	Hydro Resources Mid Continent, Inc. #145

Lithology

From	To	Lithology Intervals
0	2	topsoil
2	9	clay,silty
9	30	sand,fine,caliche stringers,moderately cemented
30	41	sand & gravel,fine to coarse,gravelly
41	72	sand,fine to medium,clayey
72	115	sand & gravel,fine to coarse,gravelly
115	119	sand,fine,strongly cemented
119	134	sand,fine to coarse,gravelly
134	149	sand,fine,strongly cemented
149	170	sand,very fine,silty
170	205	sand,fine,caliche stringers
205	247	sand,fine,silty
247	260	clay,yellowish,brown