NOTICE OF INTENT TO MODIFY A PERMIT AUTHORIZING THE USE OF WATER FOR MUNICIPAL WATER SUPPLY IN BOONE COUNTY, IOWA

Notice is hereby given that pursuant to Iowa Code Chapter 455B, there is now on file with the Iowa Department of Natural Resources, Water Supply Engineering Section, 6200 Park Ave. Suite 200, Des Moines, IA 50321, an application as described below.

The City of Boone, Iowa DNR Log Number 34,533, requests to modify an existing water use permit (No. 6118-R5), authorizing to withdraw water from fifteen Des Moines River alluvial aquifer wells, approximately 48 to 67 feet deep, on land generally described as the W ½ of the SE ¼ of Section 13 lying east of the Des Moines River, T84N, R27W, Boone County, Iowa, in the maximum quantity of 1,552 million gallons per year, at a rate of 5,000 gallons per minute throughout each year for municipal type purposes within and without the corporate limits of said City of Boone, consistent with its municipal distribution system and other provisions of law.

This request represents the addition of one alluvial aquifer well, a total annual allocation increase of 255 million gallons per year (from 1,297 million gallons per year to 1,552 million gallons per year), and an increase in the total withdrawal rate by 450 gallons per minute (from 4,550 gallons per minute to 5,000 gallons per minute), all from one source, the Des Moines River alluvial aquifer.

The Department has determined that this use of water conforms to the relevant criteria (Iowa Code Chapter 455B and Iowa Administrative Code 567) and recommends the permit be granted. A copy of the summary report for the application is available upon request to the Department at the address listed above. Comments on the report and on this use of water must be received by June 24, 2026, and should be addressed “ATTN: Erik Day” and should specify the applicants log number (Log Number 34,533).

IOWA DEPARTMENT OF NATURAL RESOURCES
WATER USE PERMIT SUMMARY REPORT

Applicant: City of Boone
PO Box 550
Boone, IA 50036

Application Log No.: 34,553

Permit Request

The City of Boone, Log Number 34,553, requests to modify their water use permit (6118-R5) to increase the number of the Des Moines River alluvial aquifer wells approved for use in the permit by one well: from fourteen to fifteen wells; increase the maximum pumping rate from the alluvial aquifer source by 450 gallons per minute (GPM), from 4,550 GPM to 5,000 GPM, and increase the annual water allocation by 255 million gallons per year (MGY), from 1,247 MGY to 1,552 MGY from one distinct source: the Des Moines River alluvial aquifer, hereby referred to as alluvial aquifer.

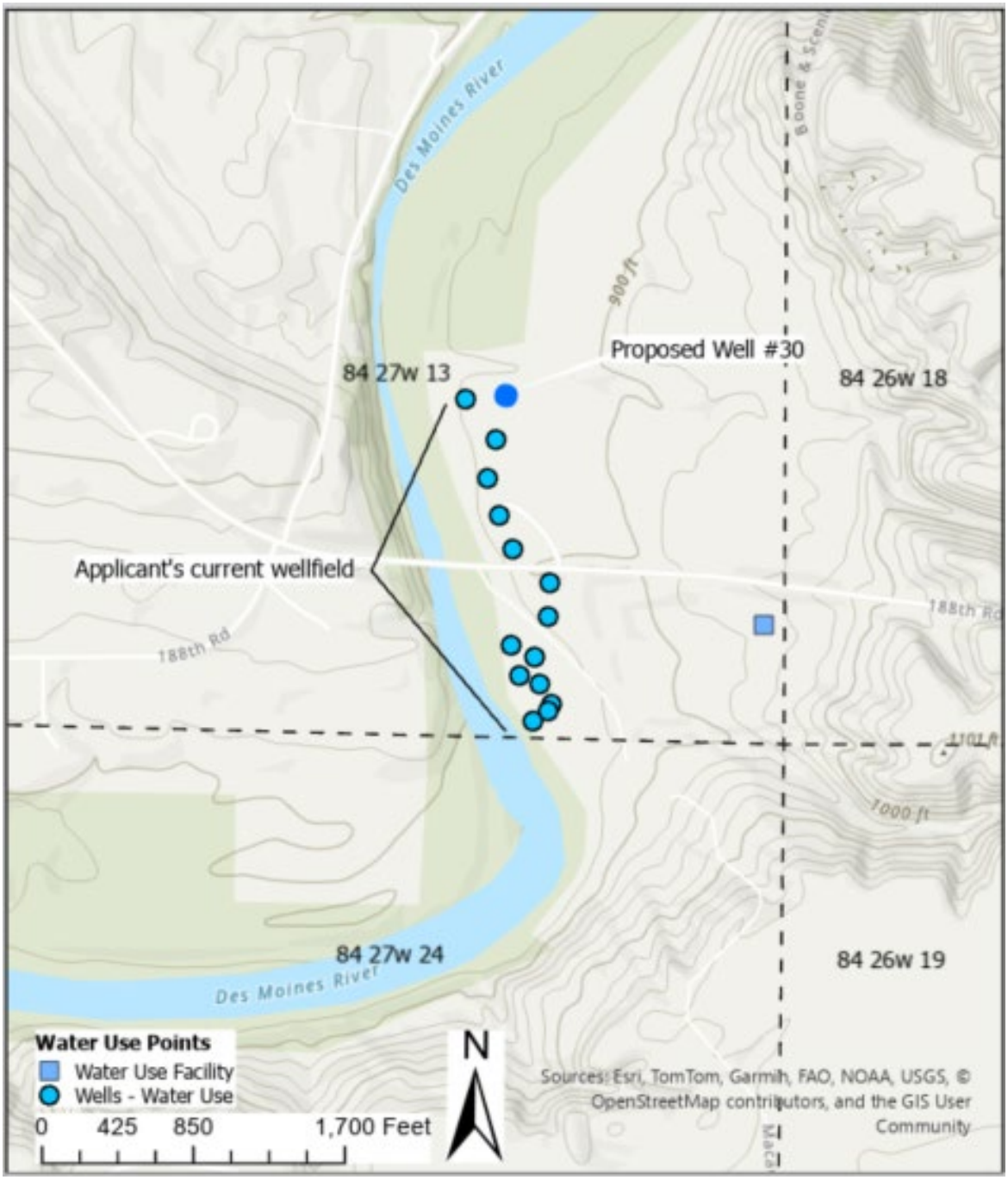
The public land survey system (PLSS) location of the 15 alluvial aquifer wells are:

- *The NW ¼ of the SE ¼ of T84N, R27W, S13 (proposed – well #30)*
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #28)
- The NW ¼ of the SE ¼ of T84N, R27W, S13 (well #26)
- The SE ¼ of the SE ¼ of T84N, R27W, S13 (well #24)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #21)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #12)
- The NW ¼ of the SE ¼ of T84N, R27W, S13 (well #27)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #22)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #29)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #13)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #19)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #16)
- The NW ¼ of the SE ¼ of T84N, R27W, S13 (well #25)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #23)
- The SW ¼ of the SE ¼ of T84N, R27W, S13 (well #20)

All wells are located in Boone County, Iowa (Map 1).

The proposed well depth is from 40 to 67 feet and has a maximum withdrawal rate of 450 GPM from the alluvial aquifer. The alluvial aquifer cumulative maximum pumping rate is 5,000 GPM from fifteen wells.

The total annual allocation from the alluvial aquifer is proposed to increase by 255 MGY to 1,552 MGY. Water in this permit is used for municipal and domestic purposes within and without the City of Boone and associated water distribution system.



Map 1. Map of Applicant's wellfield, proposed Well #30, and nearby private wells. Well data is derived from the Department's Water Allocation Compliance Online Permitting System (WACOP) and Iowa Well Information System (IWIS).

Beneficial Use

Water use for the permit, including the additional well, is for a municipal water supply for the citizens and customers of the municipality. Water utilized for municipal systems is for drinking, private household use, businesses, irrigation, and other institutions within their municipal distribution system. Municipal water supplies have jurisdiction on their distribution system and customers. Iowa Code 455B.266 identifies municipal water use as a priority beneficial use.

Source Details

The Des Moines River alluvial aquifer will be detailed in this summary report, because it is the only source of water authorized in the current permit and included in the proposed modification. The alluvial aquifer in the vicinity of the Applicant's wellfield is a shallow, unconfined aquifer in the Des Moines River floodplain. The aquifer consists of intermixed and bedded sand, gravel, and silt deposits laid by fluvial processes. Based on the Applicant's driller's logs, the upper 20 to 25 feet consists of fine-grained overbank deposits overlying 20-40 feet of coarsening downward sand and gravel deposits which is the primary water bearing source.

The aquifer is bounded laterally by the Des Moines River to the west, glacial till to the east, and bounded vertically by low permeability Pennsylvanian-age bedrock (shales and sandstones). The alluvial valley is approximately ¼ mile wide at the Applicant's well field, with the high terraced valley reaching nearly ½ mile wide. The Applicant's existing wells range in depth from 48 to 67 feet deep where they terminate at the bottom of the aquifer contact with Pennsylvanian shale. The saturated aquifer thickness ranges from 18 to 35 feet thick. The first bedrock aquifer in the area is the Mississippian aquifer, with low production wells at depths of 300 feet or deeper.

There are no historical pumping tests or aquifer studies for the alluvial aquifer at the Applicant's well field. However, many studies have been performed for the alluvial aquifer in the vicinity of Des Moines due to the large water demand for municipal water supplies. The alluvial aquifer is very productive with hydraulic conductivities for the alluvial aquifer have been estimated to range from approximately 25 m/d to 100 m/d (Bristow and Davis, 2024).

The aquifer is recharged by seepage from the Des Moines river and infiltration of precipitation. Water exits the aquifer through wells, inflow to the river, and evapotranspiration. The alluvial aquifer groundwater levels are highly dependent of river levels, responding quickly to hydrological changes such as drought, floods, and precipitation events.

Historic Water Use

From 2002 to 2025, the Applicant has relied on one main water source: the Des Moines River alluvial aquifer (see Figure 1). The average annual withdrawal was 686 million MGY, with the highest use in 2025 at approximately 768 million gallons, and the lowest use in 2011 at approximately 609 million gallons.

Since 2002, the Applicant's water use has gone through a few ebbs and flows (Figure 1) and is currently experiencing an upward trend in water use since 2015. Their current permit allows for a maximum of 1,247 MGY. During their highest water use year (2025) they used approximately 62 percent of their maximum allocation.

Although the Applicant has used much less than their current allocated amount, they requested to increase the total annual allocation because a new dairy production facility is currently being built in Boone County and will connect to the Applicant's water supply sometime between 2028 and 2030. The City of Boone anticipates that this future development and increased community needs will require an additional water use of 292 MGY by 2028 and 730 MGY by 2032, which supports the request for their request to increase their maximum annual allocation to 1,502 MGY.

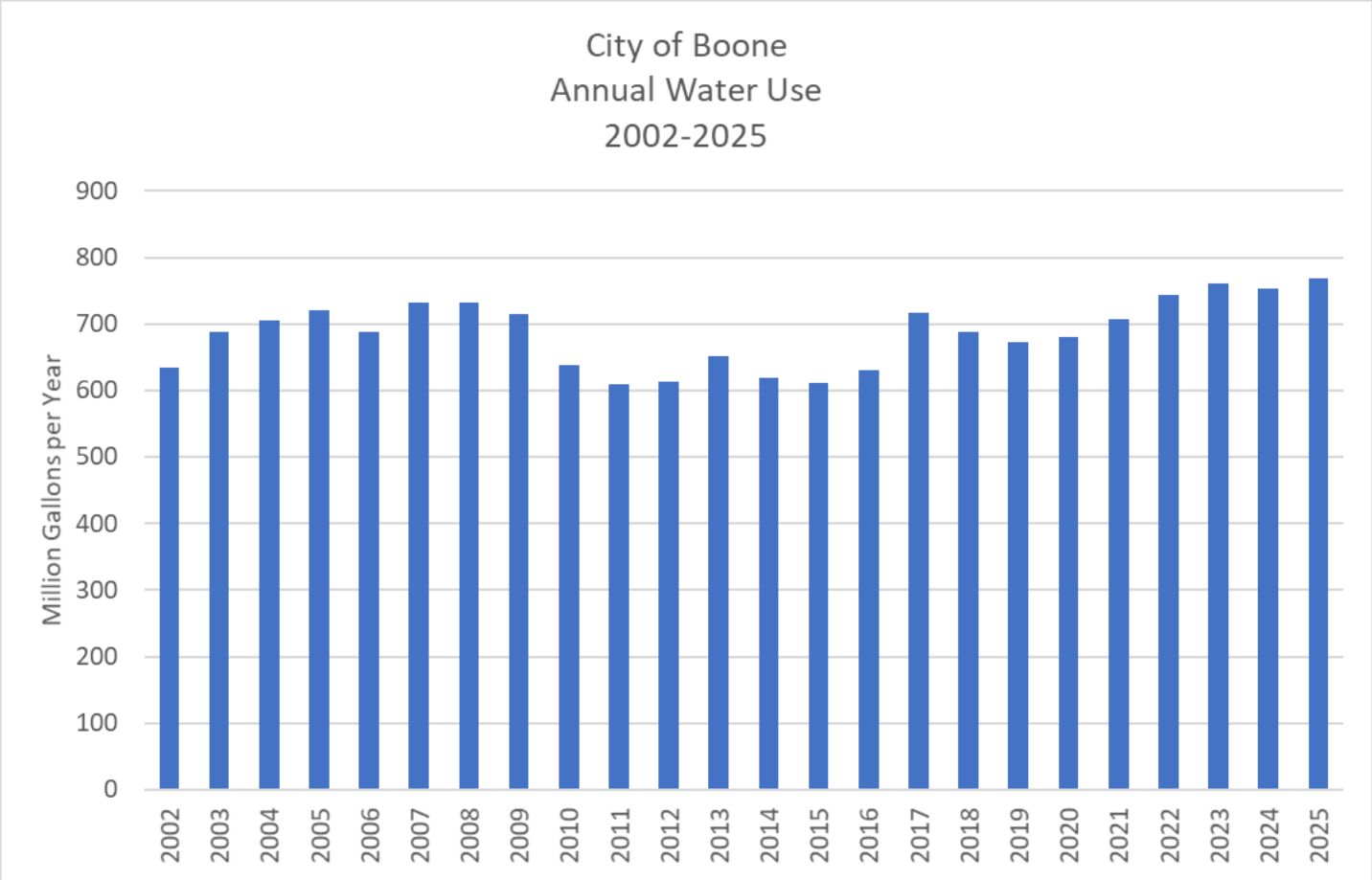


Figure 1. Annual water withdrawals in million gallons per year for the City of Boone from the Des Moines River alluvial aquifer from 2002-2025. Water use has increased steadily since 2015. The highest use was approximately 768 million gallons in 2025.

Nearby Wells and Potential Interference

There are no other permitted users within a one-mile radius. The nearest permitted user of the alluvial aquifer is Ogden Municipal Utilities, with three Des Moines River alluvial wells approximately 57 to 74 feet deep, located approximately seven miles downstream. They are allocated 145 MGY at a maximum pumping rate of 830 GPM. Given the distance downstream, this user is not expected to be impacted by the Applicant's proposed well and allocation increase.

The Department's Iowa Well Information System (IWIS) database shows 13 private wells within a one-mile radius, however only 10 wells are within the Des Moines River valley. Those outside of the valley are likely well over 300 feet deep, utilizing Mississippian aquifers that are hydraulically separated from the alluvial aquifer due to over 300 feet of confining layers. Of the 10 wells within the river valley, five are estimated to have depths of approximately 100 feet or shallower. The other five wells are estimated to be 300 feet or deeper, meaning they are using the deeper Mississippian aquifer. Of the remaining five wells, three of those are located about ¾ miles upstream, therefore, well interference is not anticipated. The remaining two are both on the west side of the river approximately 930 feet and 2,700 feet west of the Applicant's nearest wells. In alluvial aquifers, the river is generally considered a hydrological boundary, where the flow systems on either side are somewhat disconnected with the exception of river stage. Therefore, unless the Applicant's wells are significantly impacting river stage, it is highly unlikely that the addition of one well to an existing 13 well system would impact the private wells on the west side of the river. No impact is anticipated on nearby private wells.

The Iowa Geological Survey's GeoSam database shows numerous drill sampling points within a one-mile radius and within the alluvial aquifer setting. However, all but one well is owned by the City of Boone (test wells or active wells for their water supply), are exploration holes for mining, or are within the deeper bedrock aquifer. The only remaining household well is located about ¾ mile north of the Applicant's wellfield, therefore, well interference is not anticipated.

Aquifer Sustainability

Static water levels in the aquifer appear to be steady based on the Applicant's reported water levels from 2011- 2025. There is no apparent downward trend of aquifer water levels during that time period (Figure 2).

The Applicant's largest total annual use is only approximately ½ of the proposed use. It is possible that if the Applicant doubles their use that streamflow could be reduced. However, the nearest downstream stream gage that measures discharge is the Des Moines at Saylorville stream gage (USGS 05481650). This gage is downstream of the spillway so it cannot be used to assess the effects of the Applicant's increased use over time.

The Applicant's proposed maximum withdrawal rate is an increase of 450 GPM (1 cubic foot per second (CFS)) for a total proposed withdrawal rate of 5,000 GPM (11 CFS). For comparison, the nearest upstream gage that measures discharge is the Des Moines River at Ft. Dodge (USGS 5480500) which has a protected flow of 220 CFS. The Applicant's maximum proposed withdrawal rate is approximately 5% of the total streamflow, but the increase maximum withdrawal rate is only 0.5% of the protected low flow. We do not have estimates for total aquifer storage and availability at this location, however, given the small increase in proposed use relative to protected low flow, and given the low density of alluvial aquifer wells near the Applicant, it is unlikely that the Applicant's proposed use will significantly affect aquifer sustainability or cause well interference.

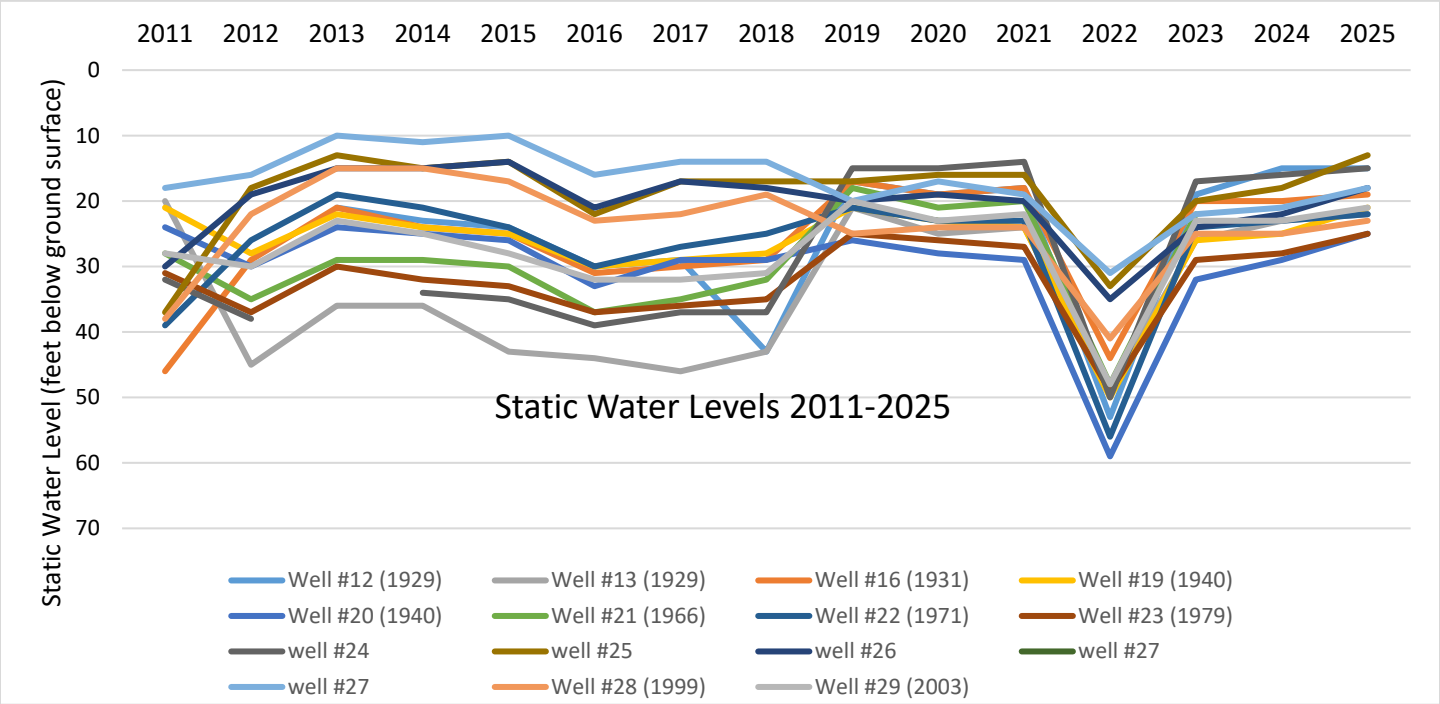


Figure 2: Static water levels from the City of Boone's alluvial aquifer wells do not reveal a declining trend in water levels from 2011 to 2025.

Findings

The Applicant has demonstrated the ability and intent to use a reasonable quantity of water for beneficial purposes from the proposed well. No evidence suggests the proposed use would:

- Waste water resources.
- Conflict with Iowa's comprehensive water resource plan.
- Interfere with pollution control laws.
- Directly harm public interests or property owners with prior or superior water use rights.

THEREFORE:

The requested water use conforms to Division III, Part 4, Chapter 455B of the Iowa Code and Chapter 50 of Part 567 of the Iowa Administrative Code. No adverse impacts on other water users are anticipated at this time. Subject to pump test results, public notice and potential revisions based on comments received, a draft permit should be issued for a term of ten years.

Water Supply Engineering
Date: June 2, 2026

IOWA DEPARTMENT OF NATURAL RESOURCES

WATER USE PERMIT

Permit issued to:

CITY OF BOONE
PO BOX 550
BOONE IA 50036-0550

Permit Number: 6118-M6

Effective: XX/XX/2026

Expires: XX/XX/2036

The Permittee is authorized to:

withdraw water from fifteen Des Moines River alluvial aquifer wells, approximately 48 to 67 feet deep, on land generally described as the W ½ of the SE ¼ of Section 13 lying east of the Des Moines River, T84N, R27W, Boone County, Iowa, in the maximum quantity of 1,552 million gallons per year, at a rate of 5,000 gallons per minute throughout each year for municipal type purposes within and without the corporate limits of said City of Boone, consistent with its municipal distribution system and other provisions of law.

This authorization to withdraw water has been granted pursuant to the provisions of Part 4 of Division III of Chapter 455B, Code of Iowa, and Chapter 50, Part 567, Iowa Administrative Code, and is further subject to the general permit conditions within this permit.

Conditions of this permit may be appealed as provided in rule 567--50.8(3), Iowa Administrative Code. Appeal must be in writing and must be received at the Iowa Department of Natural Resources, Water Supply Engineering Section, 6200 Park Ave. Suite 200, Des Moines, Iowa 50321-1371 within thirty days of the date of the certification of the mailing of the permit.

FOR THE DIRECTOR:

By: _____ Date Executed: XXXXX, 2026

cc: Permit File

CERTIFICATE OF MAILING

On the date shown below, a copy of the foregoing permit was mailed to the Permittee and to each person entitled to receive a copy as provided by rule 567--50.8(2), Iowa Administrative Code.

Certified by (initials): _____ Date: _____

GENERAL PERMIT CONDITIONS

1. Permittee shall maintain accurate and up-to-date records of monthly water use from each authorized source and submit them annually to the Department.

2. Permittee may be required to submit other information related to the regulation of this use of water as directed by the Department.

3. This Permit is issued pursuant to Iowa Code chapter 455B.265(1) to authorize the withdrawal and use of water by the permittee, subject to the terms contained herein and to the laws and rules of the Department that regulate the withdrawal and use of water. Issuance of this permit does not relieve the permittee of the responsibility to comply with applicable local, state and federal laws, ordinances, regulations or other legal requirements.

4. Permittee shall be responsible for notifying the Department when there are changes to any conditions and authorizations given in this permit, including additional water source(s), well(s), intake(s), an expansion of the facility, or any other listed condition.

5. Permittee shall construct, maintain, and monitor observation wells as directed by the Department to define the effects of Permittee's water withdrawals on groundwater resources or on other water users who might be affected by the withdrawals authorized herein.

6. Each well authorized as a source of water in this permit must be constructed to allow for accurate measurement of water levels.

7. Withdrawals from permitted wells may be made only after the Permittee has made the following information available to the Department: well location(s), well log(s), and results of yield tests. Required chip samples shall be submitted to the Iowa Geological Survey.

8. Permittee shall be responsible for accurately measuring depth to water under non-pumping (static) conditions, depth to water under pumping conditions, and pumping rate(s) for all active wells listed in this permit, at a minimum of one measurement per year. These records shall be submitted annually to the Department.

9. Permittee must apply to renew this water use permit using the appropriate DNR form prior to the expiration date of the current permit version.

10. Permittee shall submit to the Department within 90 days of being notified by the Department or no later than the expiration date of this permit, whichever first occurs, a plan for implementing routine day-to-day water conservation measures and for implementing emergency water conservation measures during periods of water shortage. Until such a plan has been submitted to and approved by the Department, Permittee shall implement those emergency water conservation measures determined to be necessary by the Department pursuant to Iowa Code Sections 455B.265 and 455B.266.

11. This permit supersedes Water Use Permit No. 6118-R5.

CAVEAT

Permittee is advised that pursuant to Section 455B.271, Code of Iowa, the authority to withdraw water provided by this permit may be modified, canceled or suspended in case of any breach of the terms or conditions herein, in case of any violation of state law pertaining to the permit, or if found necessary to prevent substantial injury to private or public interests.