# NEBRASKA NATURAL RESOURCES COMMISSION

## Water Sustainability Fund

Application for Funding

Section A.

## ADMINISTRATIVE

**PROJECT NAME:** Little Blue Public Water Project Construction of a New Water Supply

***SPONSOR'S*** *PRIMARY CONTACT INFORMATION* **(Not Consultant's)**

Sponsor Business Name: Little Blue Natural Resources District

Sponsor Contact's Name: Scott Nelson, General Manager

Sponsor Contact's Address: 100 E 6th Street

Sponsor Contact's Phone: 402-364-2145

Sponsor Contact's Email: snelson@littlebluenrd.org

1. **Funding** amount requested from the Water Sustainability Fund:

   **Grant** amount requested. $3,919,500

   - If requesting less than 60% cost share, what %? 50%

   **If a loan is requested** amount requested. $ N/A

   - How many years repayment period? N/A
   - Supply a complete year-by-year repayment schedule. N/A

2. **Neb. Rev. Stat. § 2-1507 (2)**

   Are you applying for a **combined sewer overflow project**? YES☐ NO☒

   **If yes:**

- Do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality? YES☐ NO☒
- Attach a copy to your application. N/A
- What is the population served by your project? N/A
- Provide a demonstration of need. N/A
- **Do not complete the remainder of the application.**

3. **Permits Required/Obtained** Attach a copy of each that has been obtained. For those needed, but not yet obtained (box **"NO"** checked), 1.) State when you will apply for the permit, 2.) When you anticipate receiving the permit, and 3.) Your estimated cost to obtain the permit.

(N/A = Not applicable/not asking for cost share to obtain)
(Yes = See attached)
(No = Might need, don't have & are asking for 60% cost share to obtain)

| | | | |
|---|---|---|---|
| G&P - T&E consultation (required) | N/A☐ | Obtained: YES☒ | NO☒ |
| DNR Surface Water Right | N/A☒ | Obtained: YES☐ | NO☐ |
| USACE (e.g., 404/other Permit) | N/A☐ | Obtained: YES☐ | NO☒ |
| FEMA (CLOMR) | N/A☒ | Obtained: YES☐ | NO☐ |
| Local Zoning/Construction | N/A☐ | Obtained: YES☐ | NO☒ |
| Cultural Resources Evaluation | N/A☐ | Obtained: YES☐ | NO☒ |
| Other (provide explanation below) | N/A☐ | Obtained: YES☐ | NO☒ |

No permits have been obtained by the LBNRD thus far.

- LBNRD has made consultation with Nebraska Game and Parks Commission (NGPC) for Threatened and Endangered species consultation for the wellfield site and route to Fairbury. Since then, the route has been modified to serve only the LBRND.
- A USACE 404 Permit will likely not be required based upon initial field evaluations. If a 404 Permit is needed, it would be a Nationwide Permit requiring minimal effort and would not delay the project. It is anticipated the water main will be directionally drilled to avoid wetland impacts.

- To apply for USDA-RD funding, LBNRD has completed one round of environmental review for the original wellfield site and route into Fairbury. A new environmental review will be completed for the new route. To date, contact has been made with the Cheyenne and Arapaho tribes, U.S. Army Corp of Engineers, Nebraska Department of Natural Resources (NeDNR), Nebraska Department of Environment and Energy (NDEE), Nebraska Department of Health and Human Services (NDHHS), NGPC, Pawnee tribe, History Nebraska State Historical Preservation Office (SHPO), United States Fish and Wildlife Service (USFWS), Apache tribe, and Nebraska Department of Aeronautics. These agencies will be contacted again. An archeological investigation will be required at the final selected well sites.
- NDEE reviewed and approved the proposed well sites and will provide a Title 179 construction permit.
- Well construction permits can be issued by the LBRND.
- A groundwater transfer permit can be issued by the LBNRD for the project.
- A right-of-way construction permit will be obtained from Jefferson County.
- A permit will be needed for a railroad crossing for the encasement piping.
- A NDEE Stormwater Pollution Prevention Permit (SWPPP) will be required, as the project will disturb more than one acre of land.
- Estimated cost to obtain all permits is $39,000.

An Environmental assessment will be completed as required by USDA-RD and the remaining permits will be obtained during the design phase of the process in 2023. Funding for the permitting process is included in the USDA-RD portion of the project.

4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:

**Little Blue Natural Resources District (LBNRD) – Sponsor**
The LBNRD is the manager and administrator of the Little Blue Public Water Projects (LBPWPs). The LBNRD was responsible for hiring an engineer to design and oversee construction of system maintenance and improvements. As the project sponsor, the LBNRD will be the lead agency for all legal and financial commitments. LBNRD will be the entity responsible for payment of all project components.

**Little Blue Public Water Projects (LBPWP) – Co-Sponsor**
There are two separate systems; one referred to as the LBPWP North and the other as the LBPWP South. The LBPWP is a separate public entity that owns and operates the rural water system, through the administration and management of the LBNRD. The system is funded by LBPWP through user fees.

Identify the roles and responsibilities of each Partner / Co-sponsor involved in the proposed project regardless of whether each is an additional funding source.

**Jefferson County**
Jefferson County is not a funding source. They will be responsible for working with LBNRD staff and their engineer through right-of-way land right negotiation and permitting.

**USDA Rural Development**
The USDA Rural Development (USDA-RD) supports rural prosperity in Nebraska by investing in modern infrastructure such as water and wastewater treatment systems. They boost economic development by funding technical assistance for clean and reliable drinking water systems. The USDA-RD is contributing grants and loans to help with the overall cost of the drinking water sourcing, storage, and distribution as a grant to the LBPWP wellfield project.

**Glenn Family**
The Glenn Family owns the property where the wellfield will be constructed. The family is donating easements and/or deeds necessary for the construction of a new wellfield including access roads, wells, and associated utilities as a good-will offering to the community.

5. **Other Sources of Funding**

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

There are three funding sources, as described in the following Table 1 – Project Cost Split by Major Category; including LBPWP (managed through LBNRD), USDA-RD, and the WSF. The USDA-RD has committed state allocation for the LBPWP project and will consider additional funding in the form of an additional grant and loan. Initial funding from USDA-RD and local match from LBNRD has been confirmed, as included in Appendix A - 2020 Letter of Conditions.

**Table 1 – Project Cost Split by Major Category**

| | Opinion of Probable Construction Cost | USDA-RD Grants[1] | Remaining Cost | WSF Request (50%) | Local Cost Share (50%) |
|---|---|---|---|---|---|
| **Survey, Design, Construction Administration** | $745,000 | $164,189 | $580,811 | $290,406 | $290,406 |
| **Construction** | $8,374,600 | $1,845,660 | $6,528,940 | $3,264,470 | $3,264,470 |
| **Stormwater & Permitting** | $39,000 | $8,595 | $30,405 | $15,202 | $15,202 |
| **Land Easements** | $50,000 | $11,019 | $38,981 | $19,490 | $19,490 |
| **Construction Contingencies** | $846,400 | $186,536 | $659,864 | $329,932 | $329,932 |
| **TOTAL** | **$10,055,000** | **$2,216,000** | **$7,839,000** | **$3,919,500** | **$3,919,500** |

6. **Overview**

In 1,000 words *or less*, provide a brief description of your project including the nature/purpose of the project and its objectives. Do not exceed one page!

Threats from nitrates and drought, limitations on supply capacity, an inability to provide new water hook-ups, and steadily increasing cost were major reasons that prompted the Little Blue Natural Resources District (LBNRD) decision to locate and construct an independent water supply for the Little Blue Public Water Projects (LBPWP) in July 2019. The LBPWP was established in 1975 to address public drinking water needs in Thayer and Jefferson Counties in Nebraska, including the communities of Gilead and Gladstone, along with a small portion of Washington County in Kansas. The system includes the North Project, serving 572 people; and the South Project, serving 879 people, totaling 400 connections, 313 residential, 67 livestock, 10 commercial, and 10 transient users (i.e., recreation areas, schools, etc.). This area has minimal to no saturated thickness of aquifer to support a water supply, thus individual private wells are not a sustainable alternative for drinking water or agricultural operations.

The LBPWP users fund the cost of the system improvements and maintenance, while the system is administered by the LBNRD, who has been purchasing water from the City of Fairbury since 1975, at a rate not to exceed 200 gallons per minute (GPM).

After the 2012 drought, extreme hot dry conditions created challenges to keep the LBPWP water towers full. Conservation orders were issued and LBNRD's engineer recommended no additional hookups until the assurance of additional water was

[1] Includes confirmed funding and potential funding for 2024.

provided. Since this time the LBNRD has received dozens of requests for water services. The inability to provide water to the new users was troublesome and is a hinderance on the economic development potential of this agricultural region.

1) Starting in 2012, efforts were initiated by LBNRD to evaluate project alternatives: Continue with status quo.
2) Implement a consistent and ongoing conservation program.
3) Install an additional storage facility.
4) Develop an independent wellfield.
5) Assist the City of Fairbury in finding an additional well.

Adding to the challenges was an increasing nitrate concentration in Fairbury's natural spring water supply, Crystal Springs, where since 2004, nitrates have trended from around 8 parts per million (ppm) and continue to hover close to the 10 ppm Maximum Contaminant Level (MCL). In 2021, another issue became apparent with Crystal Springs, when a biofilm began developing on the filters used to remove bacteriological matter from the water. The cost to change filters due to this biofilm was cost prohibitive, prompting Fairbury to only provide water from the East Wellfield, which was also experiencing elevated levels of nitrates.

Other significant attempts to acquire a new water supply included:

1) 2012 – 2022 – Discussions with the City of Fairbury to increase the capacity, negotiations on rates, and evaluation of new wells south of the City. The proposed south wellfield did not yield water.
2) June 2019 – LBNRD created a draft Cooperative Agreement with Alexandria to provide water. No action was taken.
3) August 2019 – LBNRD staff talked with Jansen to discuss a joint project. No action was taken.
4) July 2019 – McIntyre Consulting was hired to create a Preliminary Engineering Report (PER) to evaluate potential new water supplies.
5) March 2020 – Miller & Associates was hired after the retirement of McIntyre. An evaluation of potential new water sources, consolidation with other communities and six potential waterline routes was completed by Miller & Associates and presented to the LBNRD.
6) July 2021 – A wellfield north of Fairbury was selected, two miles southeast of Daykin and located partially within the Lower Big Blue NRD (LBBNRD). During a public landowner and informational meeting, the LBBNRD concluded water could not be transferred across NRD boundaries.
7) August 2021 – The Glenn wellfield site was selected and public meetings were held within the LBNRD district.
8) January 2022 - Formation of the Little Blue Valley Water System (LBVWS), a new public entity of Fairbury and LBNRD to manage a combined water system using the Glenn wellfield.
9) Test hole drilling, test pumping, state approvals and water quality testing was completed on the Glenn wellfield.

10) LBNRD retained the services of LRE to develop a three dimensional (3D) groundwater flow model (MODFLOW) to address long term pumping impacts of the proposed site.
11) October 2022 model results were presented to Fairbury City Council and LBNRD Board.
12) November 2022 – Fairbury voted not to proceed with LBVWS.
13) November 2022 – LBNRD terminated the LBVWS agreement.
14) December 2022 – LBNRD proposed the Jefferson Thayer County Water System (JTCWS) a new public entity with Alexandria.
15) February 2023 – The Alexandria did not proceed with the JTCWS, prompting the LBNRD to terminate negations.

A decision was made by the LBNRD in February 2023, to proceed with the water supply through the development of two new wells with generators at the Glenn wellfield. Project components include final design and construction of 16.2-miles of 10- and 8-inch water main, SCADA Integration and Controls, new water meters and other typical project elements such as electrical supply, permitting, and pipeline components.

LBNRD has completed five test wells, water level monitoring, three aquifer pump tests, water quality analysis, and a robust groundwater model (MODFLOW) in 2022 to evaluate the impact of new wells.

The funding requested as part of this project will go towards construction and will cost share the local responsibility 50/50 with LBNRD. The total project cost of $10,055,000. The land rights for the wellfield have been donated by the Glenn family.

Through various changes in the Board and staff representatives, the goal has remained the same - to build a permanent solution and provide a sustainable and safe water supply to its users. The project is shovel ready. The hardworking effort of the LBNRD, and support from its partners, will result in a plentiful water supply and improved water quality. The new water supply will allow for the approval of requests for new water connections, which will provide agricultural producers the opportunity to expand livestock operations, young families to return to the area, and businesses to expand.

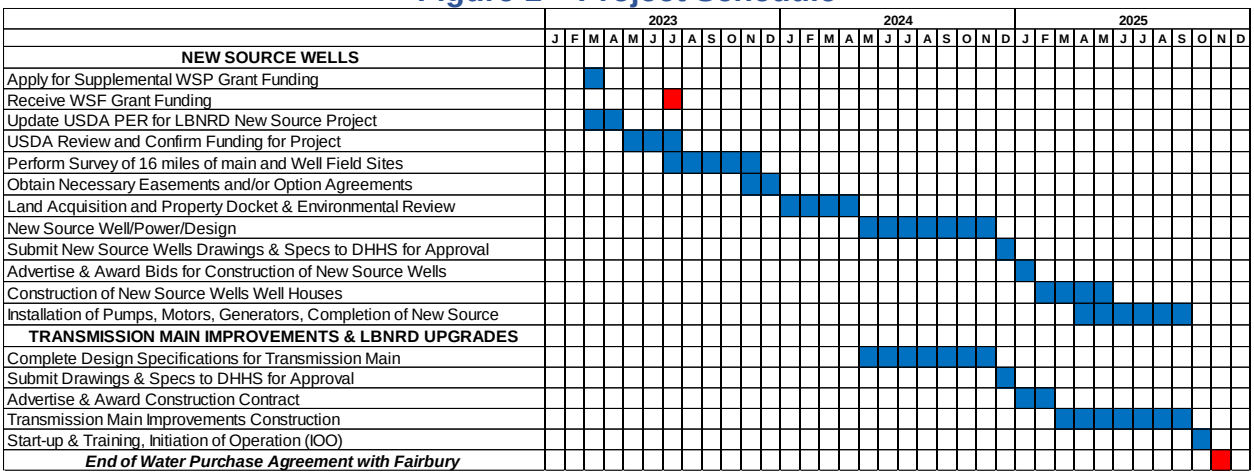
## 7. Project Tasks and Timeline

Identify what activities will be conducted to complete the project, and the anticipated completion date.

The LBNRD is requesting funds to construct a long-term water supply for the rural water district to serve its patrons. This project has been in the works for over 10 years. It is anticipated the new water source and distribution system improvements can be fully operational by November 2025 or before. Figure 1 – Project Schedule,

below describes the schedule of completion of the water project including survey, design, permitting, bidding, and construction. Table 2 – Estimated Project Cost by Year, displays the estimated cost to complete the project, per year. The project is shovel ready.

## Figure 1 – Project Schedule




## Table 2 – Estimated Project Cost by Year

| | Opinion of Probable Construction Cost | 2023 | 2024 | 2025 |
|---|---|---|---|---|
| **Survey, Design, Construction Administration** | $745,000 | $150,000 | $300,000 | $295,000 |
| **Construction** | $8,374,600 | $0 | $0 | $8,374,600 |
| **Stormwater/Permitting** | $39,000 | $30,000 | $9,000 | $0 |
| **Land Easements** | $50,000 | $50,000 | $0 | $0 |
| **Construction Contingencies[2]** | $846,400 | $ 0 | $46,400 | $800,000 |
| **TOTAL** | **$10,055,000** | **$230,000** | **$355,400** | **$9,469,600** |

[2] Contingency is added to the estimate to ensure resources are available to cover unexpected events, elevated material cost, unforeseen field conditions, and other uncertainties potentially encountered through design and construction.

8. **IMP**

Do you have an **Integrated Management Plan** in place, or have you initiated one?

YES☒ NO☐ Sponsor is not an NRD☐

The LBNRD completed an initial Integrated Management Plan with the Nebraska Department of Natural Resources in August 2019. Updates can be obtained by contacting the LBRND.

## Section B.

## DNR DIRECTOR'S FINDINGS

### Prove Engineering & Technical Feasibility
### (Applicant must demonstrate compliance with Title 261, CH 2 - 004)

1. Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?
YES☒ NO☐

**If you answered "YES" you must answer all questions in section 1.A.**
**If you answer "NO" you must answer all questions in section 1.B.**

**If "YES", it is considered mostly structural, so answer the following:**

1.A.1 Insert a feasibility report to comply with Title 261, Chapter 2, including engineering and technical data;

The Preliminary Engineering Report (PER) prepared by Miller & Associates (Miller) is provided in Appendix B. This report serves as the engineering guiding document and alternatives assessment process through September 4, 2020. This was used as the initial planning document and funding consideration by USDA-RD in 2020. Since this time, the wellfield has been relocated from the original location (partially in LBBNRD) to the Glenn wellfield in the LBNRD. Additionally, Fairbury has withdrawn from the project, and the LBRND has decided to pursue the new source on their own.

Prior to Fairbury withdrawing from the project, Olsson (Fairbury's engineer) provided updated treatment cost for nitrates on October 25, 2022 for Fairbury's water supply to evaluate if a new source or treating the existing source for would be more feasible. This report is also included in Appendix B. Based on improvements needed, treatment of Fairbury's existing water source, the cost could range from $11.2M to $15.87M with annual operation and maintenance cost from $408,000 to $567,000. Looking at the cost of the Glenn wellfield and LBNRD maintaining the system on their own, the annual O&M cost is estimated to be approximately $86,000 per year with $32,000 of additional labor and $20,000 in short-lived assets included in those figures. Technical data from the 2020 PER and the evaluation of the updated treatment cost was the basis of the project provided to USDA to continue with the project as presented in this application and supported by USDA.

1.A.2 Describe the plan of development **(004.01 A)**;

The LBNRD is responsible for the LBPWP to serve its customers water in an area that has little to no water available. The LBPWP serves approximately 400 connections and a population of approximately 1,450, the equivalent of a City the

size of Hebron or Ravenna. A copy of the service area map is provided below in Section 1.A.4. The LBPWP has over 220 miles of existing water mains. A breakdown of the approximate feet by size is provided below in Table 3 – Distribution System Summary.

**Table 3 – Distribution System Summary**

| LBNRD RURAL WATER DISTRICT | | | | |
|---|---|---|---|---|
| Pipe Size (in.) | Length In Feet | | | |
| | West | North | South | Total |
| 8 | 2,300 | 0 | 27,000 | **29,300** |
| 6 | 37,180 | 42,620 | 56,515 | **136,315** |
| 5 | 26,400 | 10,550 | 0 | **36,950** |
| 4 | 61,010 | 6,200 | 59,960 | **127,170** |
| 3 | 117,740 | 28,010 | 123,520 | **269,270** |
| 2.5 | 115,785 | 67,285 | 102,350 | **285,420** |
| 2 | 104,420 | 29,790 | 141,945 | **276,155** |
| 1.5 | 0 | 0 | 2,400 | **2,400** |
| **TOTALS** | **464,835** | **184,455** | **513,690** | **1,162,980** |
| | | | Miles of Main | 220.3 |

Water use was examined in the PER and Table 4 – Water Purchased 2017-2021, delineates water purchased from 2017 to 2021, which includes annual use and peak day use. The LBNRD has purchased water from Fairbury since its inception and is typically limited (on a contractual basis) on water flow of less than 200 GPM for both of their supply booster pump stations. Historically, during droughts, the west portion of the system, or Gladstone and Gilead towers, have had trouble keeping the towers full due to restrictions in pumping and capacity which are currently in place through the agreement with Fairbury. The development of this new source will provide LBRND with the capacity to keep the system fully operational and the water storage tanks at capacity during times of high demand. The maximum day reported does not account for peak hourly periods where the booster pump stations were both running at maximum capacity and have approached the 200 GPM. Only once in the history of the system, has the system exceeded the peak hourly rate of 200 GPM.

**Table 4 – Water Purchased 2017-2021**

| Year | Annual Gallons Purchased | Maximum Daily Gallons Reported |
|---|---|---|
| 2021 | 41,902,960 | 279,401 |
| 2020 | 51,294,100 | 167,280 |
| 2019 | 51,894,744 | 189,840 |
| 2018 | 47,049,630 | 235,454 |
| 2017 | 54,021,308 | 207,101 |
| **AVERAGE** | **49,232,548** | **215,815** |

With an average of 49,232,548 gallons per year, this is approximately 134,900 gallons per day, based on a population of 1,450, equating to 93 gallons per person per day, or approximately 151 AC-FT per year.

The Plan of Work focused on keeping the system viable, which to do so, needs to overcome two primary obstacles including water quantity and quality.

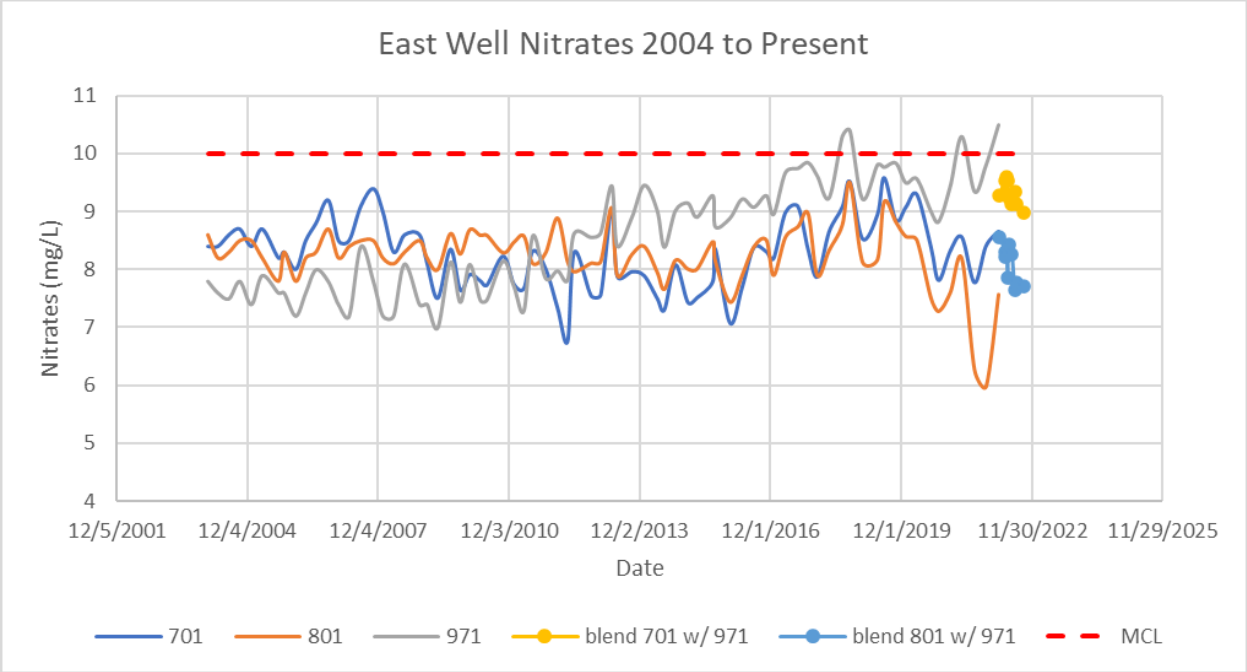
Water Quantity

The first obstacle is providing an adequate quantity of water. The quantity of water and a way to distribute it while keeping the towers full and supplying the system utilizing the new wells and proposed piping system. The LBNRD has evaluated and attempted to provide a consolidated water system with Hebron, Jansen, Alexandria, and Fairbury. After an exhaustive attempt to consolidate, the LBNRD believes its best option is to develop and maintain its own water supply for LBPWP.

Water Quality

The second obstacle addressed in the Plan of Work is the water quality. As the system is operated today, the LBNRD is entirely dependent on the City of Fairbury's supply and its declining water quality. Over the past several years, the Fairbury water supply has had issues with biological fouling of the Crystal Springs supply which has caused it to be shut down as the primary water source since 2021. This required the City of Fairbury to obtain water from the East Wellfield (three wells east of town). The pumping of these wells has elevated the nitrate values such that they must be blended to keep from exceeding the 10 ppm nitrate MCL with one of the wells. Thus, in order to meet demands during the summer months, if they don't blend, the nitrates most likely will exceed the drinking water standard. Figure 2 – East Wellfield Nitrates displays the concentrations of nitrate in the East Wells.

## Figure 2 – East Wellfield Nitrates




Fairbury initially looked at supply options in 2017 and as discussed, they revised treatment and system improvements needed in 2022. They are currently evaluating alternatives to overcome the biofilm problem at the Crystal Springs treatment facility to see if this source can be brought back online. The LBNRD, as a purchaser of this water supply, has no control over the solution or the rates that are imposed on the LBPWP system. Even without treatment in place, the last rate increases in February 2019 went from $1.91 per thousand gallons to $3.34 per thousand gallons. The Nebraska Rural Water Association (NWRA) reviewed the Fairbury water rates in September 2018 and at that time the cost to provide water was under $2 per thousand gallon. When the LBPWP was over 49M gallon per year, that increased the budget by approximately $70,000, which in-turn had to be passed on to the customer. Table 5 – LBNRD Cost per Gallon summarizes the LBNRD cost to purchase water since 2009.

## Table 5 – LBNRD Cost per Gallon

| Year | Cost per 1000 gallons | Annual Cost to LBNRD |
|---|---|---|
| 2009 | 1.06 | $52,300 |
| 2010 | 1.34 | $61,500 |
| 2011 | 1.54 | $61,400 |
| 2015 | 1.91 | $86,500 |
| 2019-Present | 3.42 | $178,400 |

If Fairbury decides to provide $11.2M to $15.87M in capital cost and potentially $408,000 to $567,000 in annual O&M cost, LBNRD rates are going to be significantly increased again.

1.A.3 Include a description of all field investigations made to substantiate the feasibility report **(004.01 B)**;

To support design, the initial PER was completed in 2020 and field evaluations occurred starting in February 2022 which included the following:

- The proposed wellfield site and initial transmission main routes were driven to observe possible construction issues with bedrock outcrops or areas where special considerations during construction would have to be made.
- Existing and abandoned wells were located, and those within the 1,000 feet setback of the new wells will be decommissioned.
- Proposed sites were examined for 100-year flood elevation and all proposed well sites were selected out of the identified flood plain.
- Proposed well sites were identified and NDEE evaluated the sites and provided approval prior to drilling test holes.
- Six 6-inch test holes were drilled at varying depths of 140- to 240-feet and included e-logs and geologic logs.
- Cross sections of geologic logs were created by Miller.
- New well water quality kits were collected and analyzed for over 200 parameters for public water supply. All parameters were acceptable for water supply wells.
- Nitrate samples were collected by LBNRD in February 2022 when the wells were drilled, and twice in October 2022 to look at the impact during the 2022 drought pumping conditions. The values did not significantly change from February 2022 to October 2022.
- Five of the test holes were selected to be completed as test wells, and test pumped for 24 hours. The initial water quality was collected in February 2022 after 24 hours of pumping.
- Preliminary environmental/wetland evaluation and cultural resource evaluations were completed per USDA-RD requirements.
- Several public hearings and meetings have been performed to present the project to the public.
- A 3D groundwater supply model (MODFLOW) was developed by LRE to model and demonstrate the wellfield's ability to produce 1,500 GPM for the joint Fairbury and LBNRD water supply. With the design change to only two wells and reduced pumping to 400 GPM, the site is more than adequate to provide the necessary quantity of water needed.

Additional field investigations will be completed as part of the final design and construction process that will include:

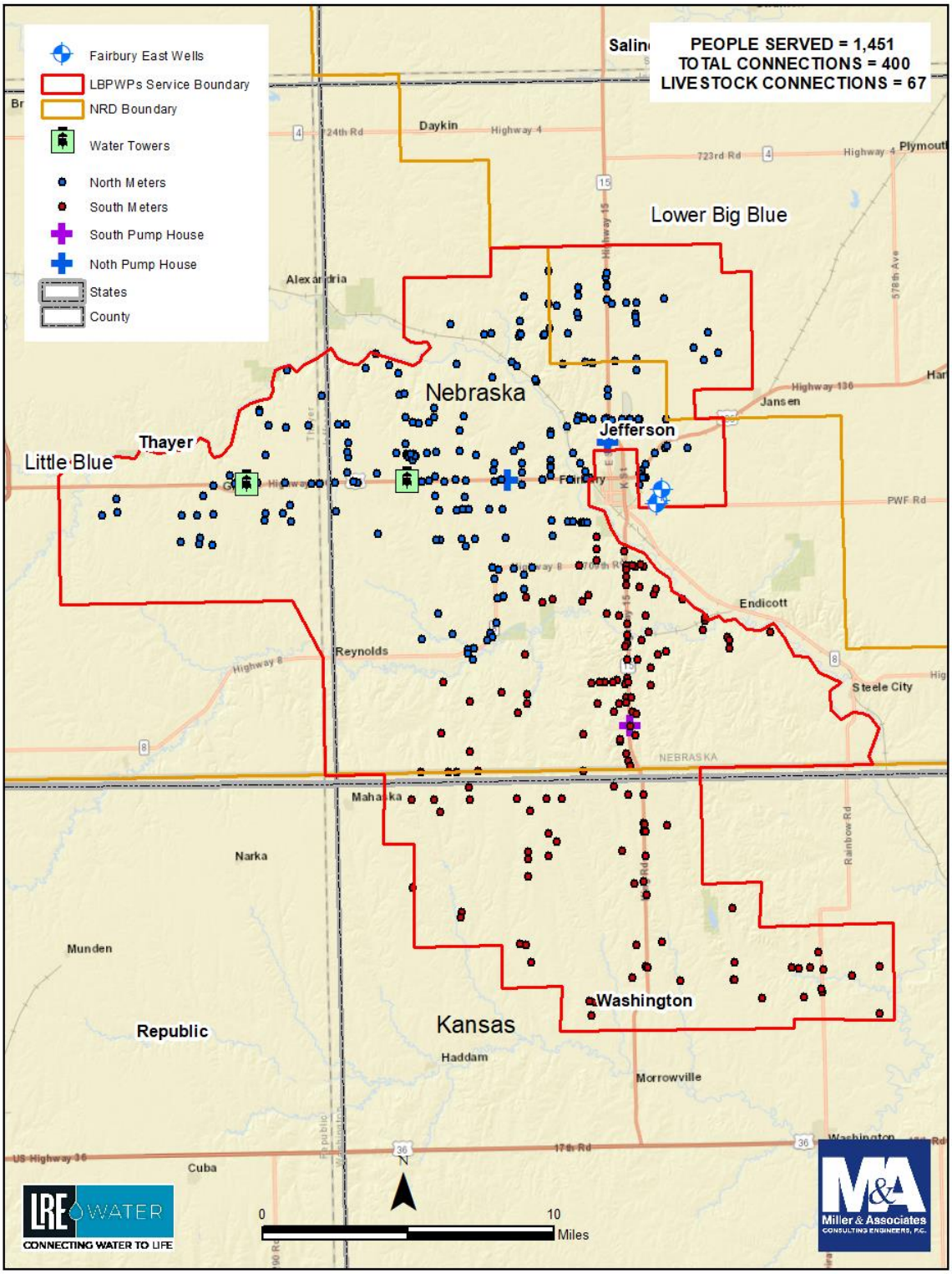
- Wetland delineations along the locations of water lines.
- Topographic survey along the proposed water line alignment.
- Final well installation and pump testing for the two public water supply well locations.
- Source water quality analysis will be confirmed with the final well construction.
- Archaeological investigation as needed will be completed.

1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report **(004.01 C)**;

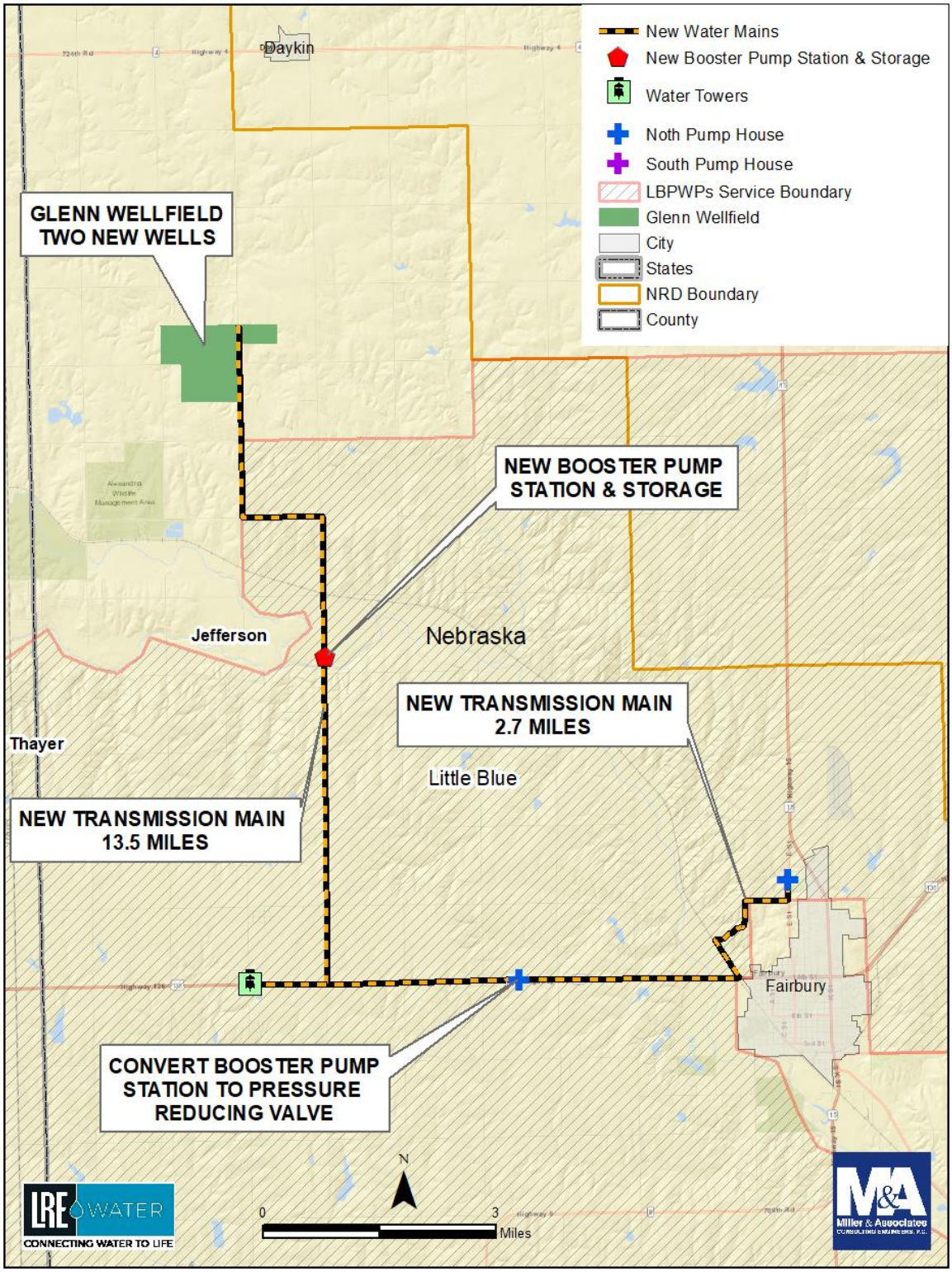
The following nine figures and one table are provided to provide an overview of the project location, existing infrastructure, proposed improvements, and hydrogeologic conditions:

- Figure 3 – LBPWP Service Area, illustrates the location of service connections, or meters, water towers, pump houses, Fairbury's East Wellfield, and the general service area.
- Figure 4 – Proposed Improvements, illustrates the Glenn wellfield and the location of the main transmission main and shorter segment needed to fill a gap that would become present in order to provide water to customers directly north of Fairbury from the new wellfield.
- Figure 5 – Regional Aquifer Conditions, illustrates the two distinct aquifers and area with very little or no groundwater between the Glenn wellfield and East Wellfield.
- Figure 6 – 2022 Nitrates, nitrate concentrations at the Glenn wellfield.
- Table 6 – Water Quality Results, water quality results at the Glenn wellfield.
- Figure 7 – Regional Nitrates, demonstrates LBNRD data collected in 2022.
- Figure 8 – Hydrogeologic Cross Section, was created as part of the LBVWS 3D Groundwater Model.
- Figure 9 – Saturated Sand Thickness, as defined by the LBVWS 3D Groundwater Model.
- Figure 10– Hydraulic Profile on Piping Alignment, provides a view of the topographic profile and pressures along the pipeline alignments.
- Figure 11– Water Level Change, a clip from a video animation that displays a transient model run showing the potential impact the five LBVWS wells pumping in the wellfield on the aquifer.

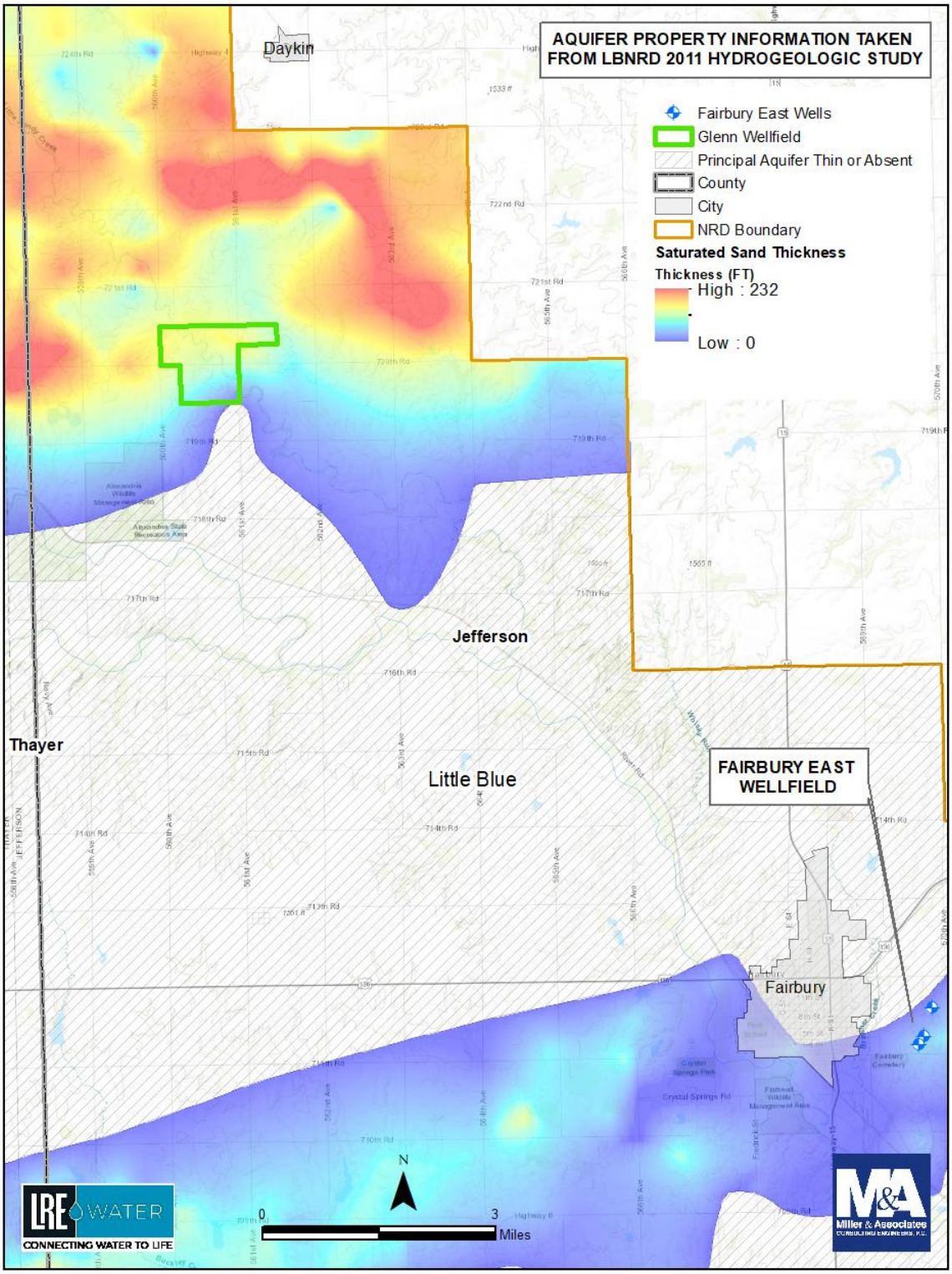
## Figure 3 – LBPWPs Service Area



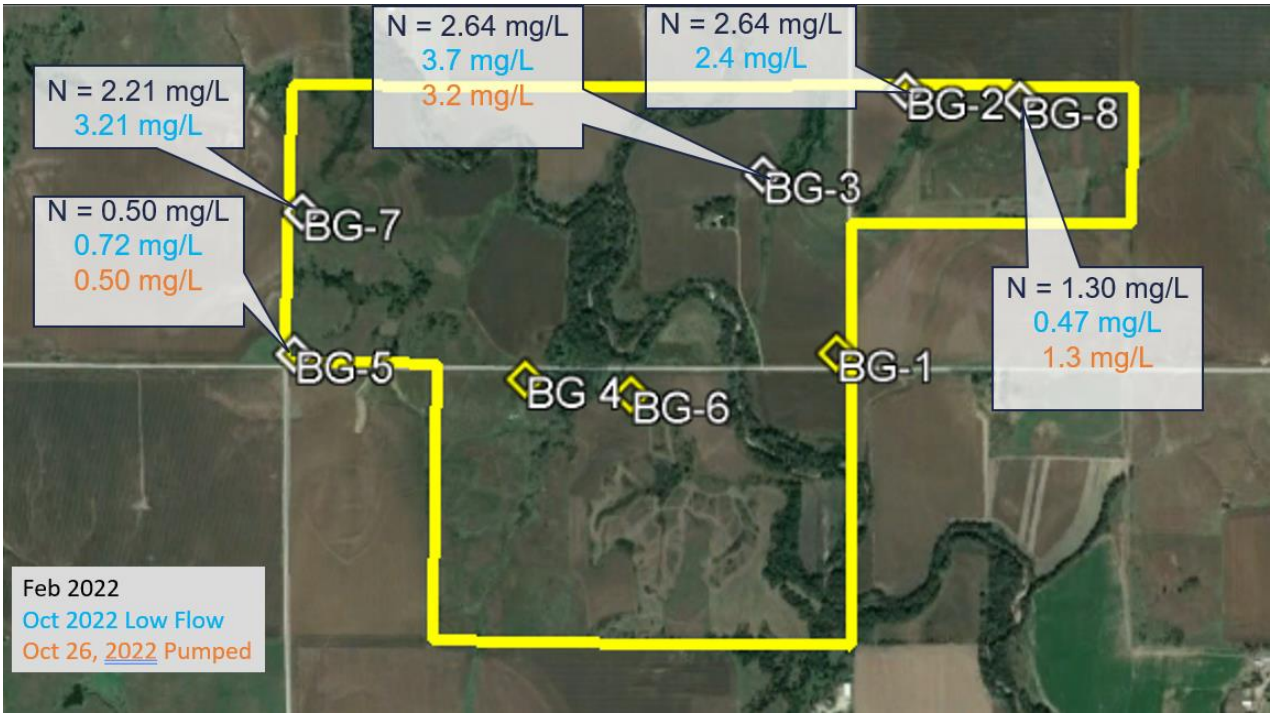
## Figure 4 – Proposed Improvements



## Figure 5 – Regional Aquifer Conditions



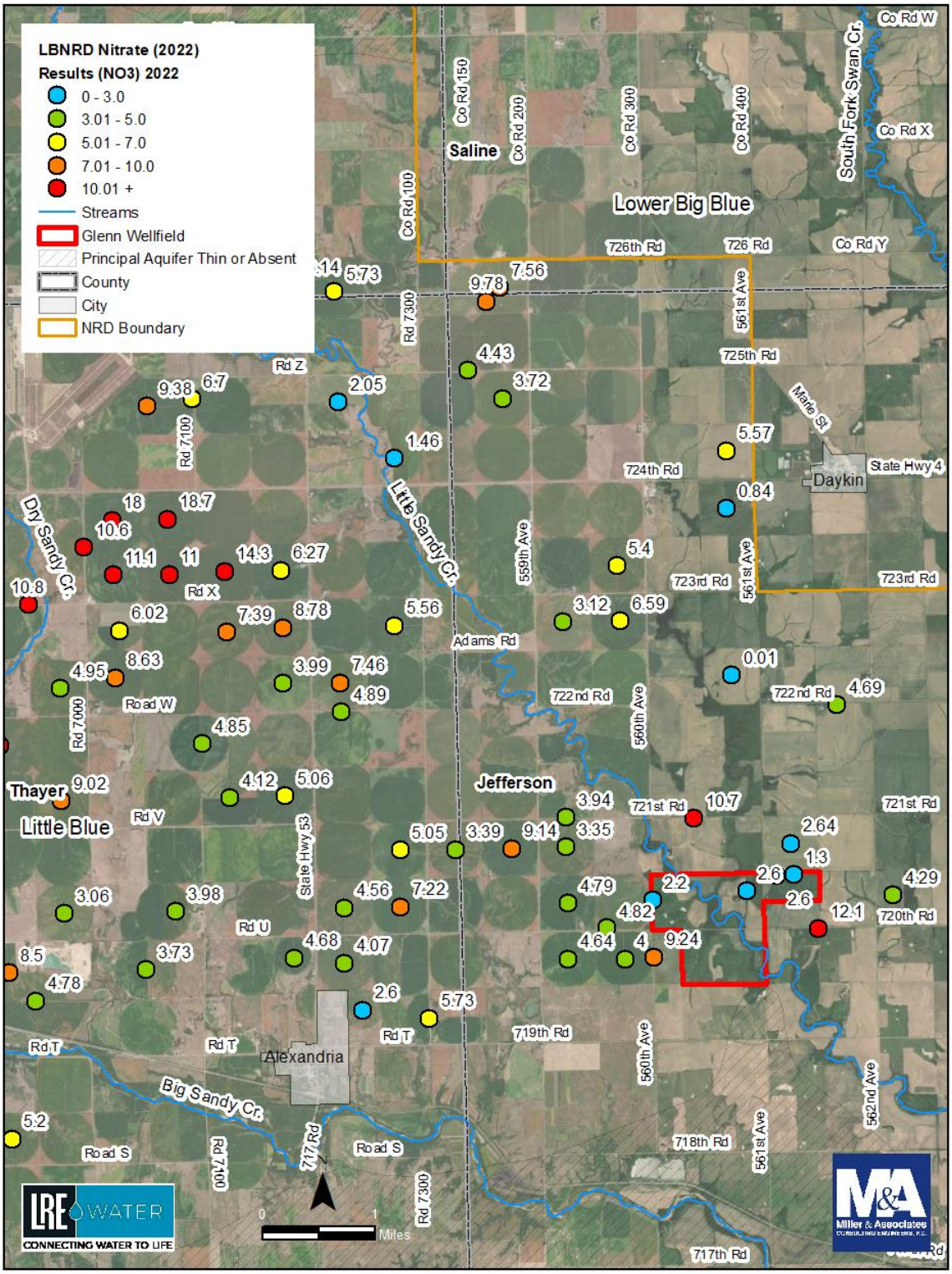
## Figure 6 – 2022 Nitrate Concentrations at Glenn Wellfield Test Holes



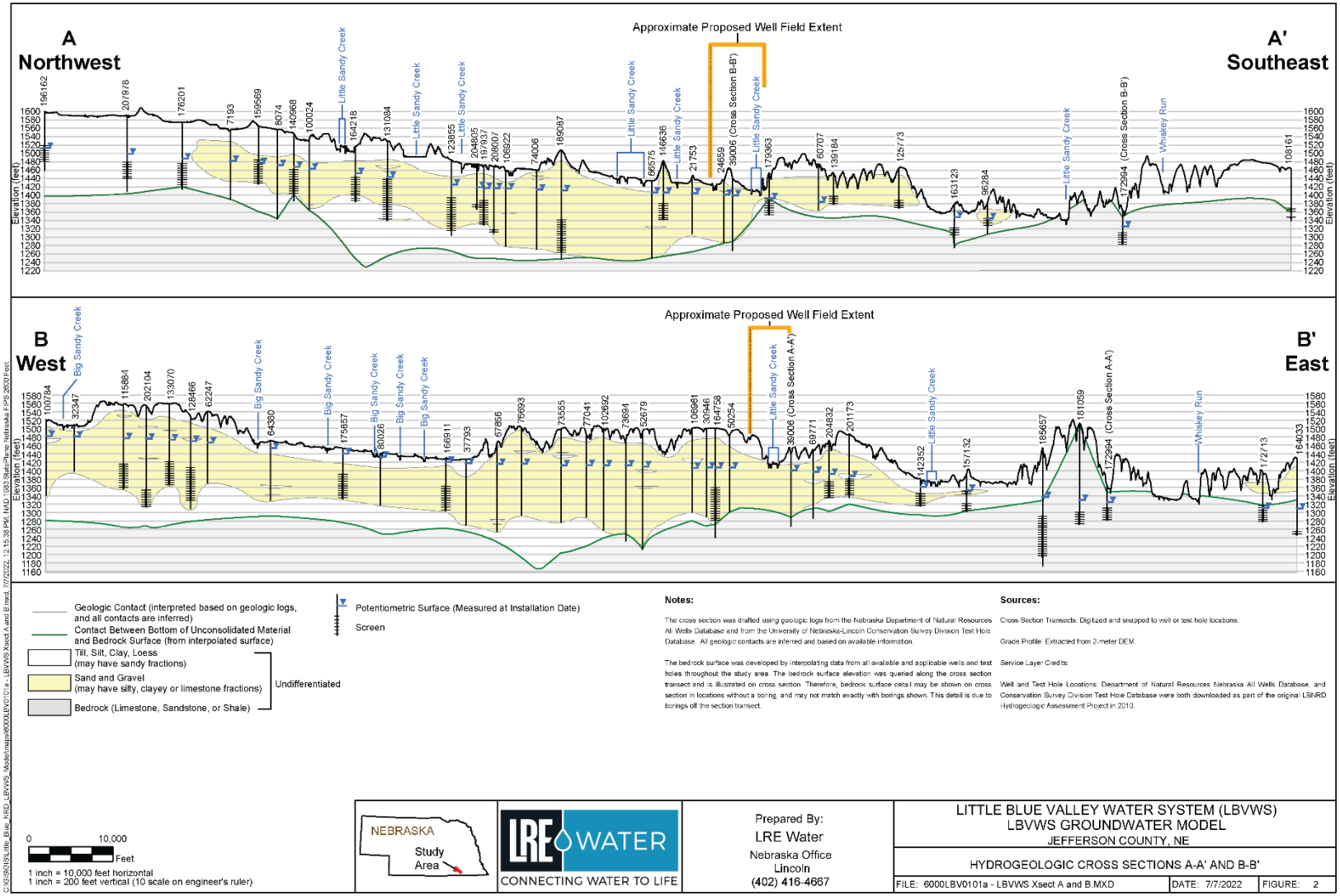

## Table 6 – Glenn Wellfield Water Qualiy Results (2022)

| Sample Parameter | BG-2 | BG-3 | BG-5 | BG-7 | BG-8 | SMCL or MCL |
|---|---|---|---|---|---|---|
| Nitrate (mg/L) | 2.64 | 2.64 | 0.502 | 2.21 | 1.3 | **10** |
| Arsenic (ug/L) | 3.76 | 3.5 | 3.71 | 3.98 | 4.08 | **10** |
| Uranium (ug/L) | <RL | <RL | <RL | <RL | <RL | **30** |
| Total Dissolved Solids (mg/L) | 202 | 204 | 183 | 210 | 170 | |
| Iron (mg/L) | <RL | <RL | <RL | <RL | <RL | **0.3** |
| Manganese (ug/L) | 1.57 | <RL | <RL | 0.647 | <RL | **50** |
| Sulfate (mg/L) | 10.8 | <RL | 11.7 | 12.2 | <RL | **50** |
| Total Organic Carbon (mg/L) | 0.533 | <RL | <RL | 0.554 | <RL | |
| Fluoride (mg/L) | 0.205 | 0.212 | 0.256 | 0.227 | <RL | **4** |
| Alkalinity (mg/L) | 118 | 120 | 112 | 126 | 102 | |
| Lead (ug/L) | <RL | <RL | <RL | <RL | <RL | **15** |
| Copper (ug/L) | <RL | <RL | <RL | <RL | <RL | **1300** |

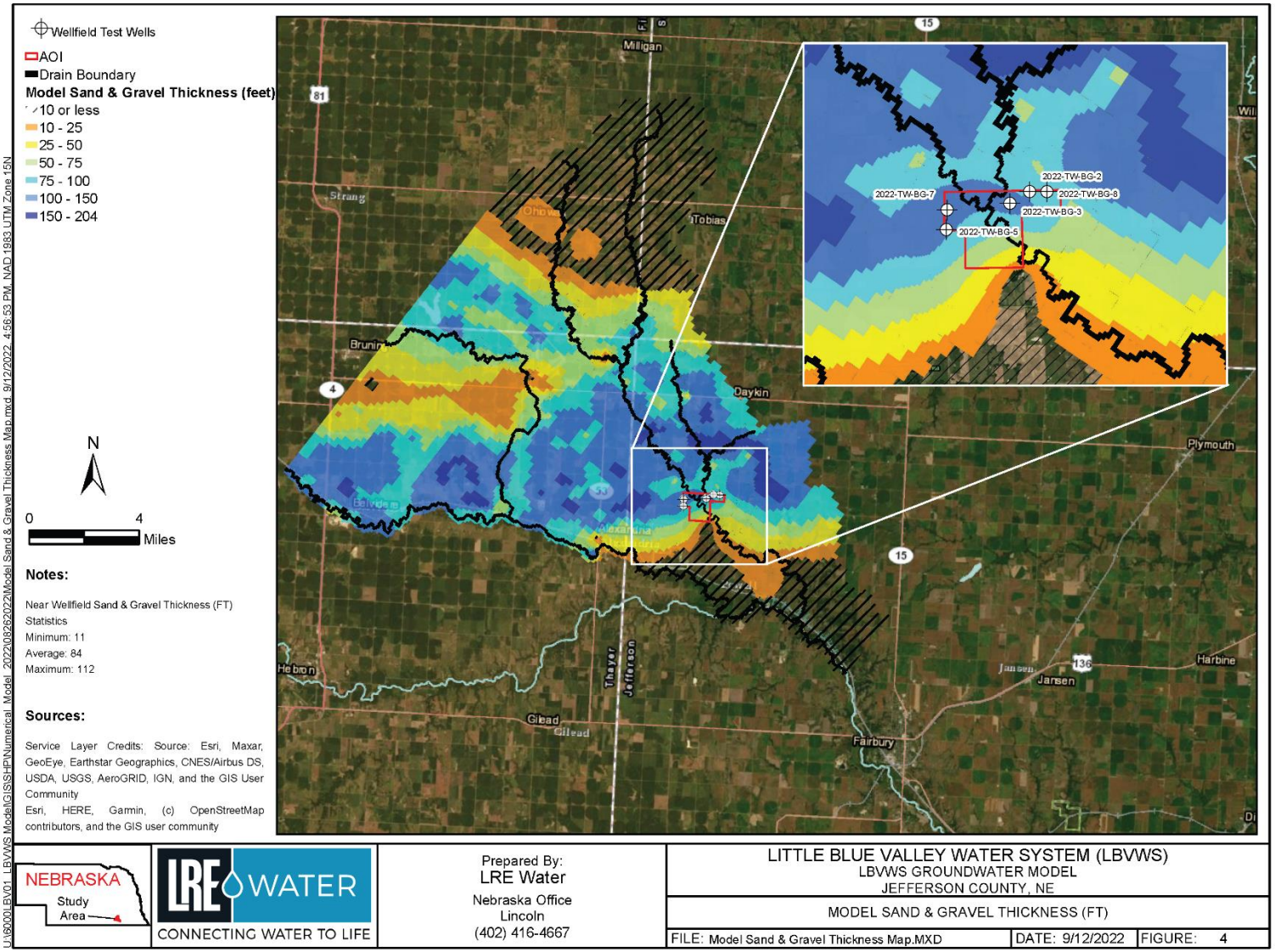
## Figure 7 – Regional Nitrate Concentrations



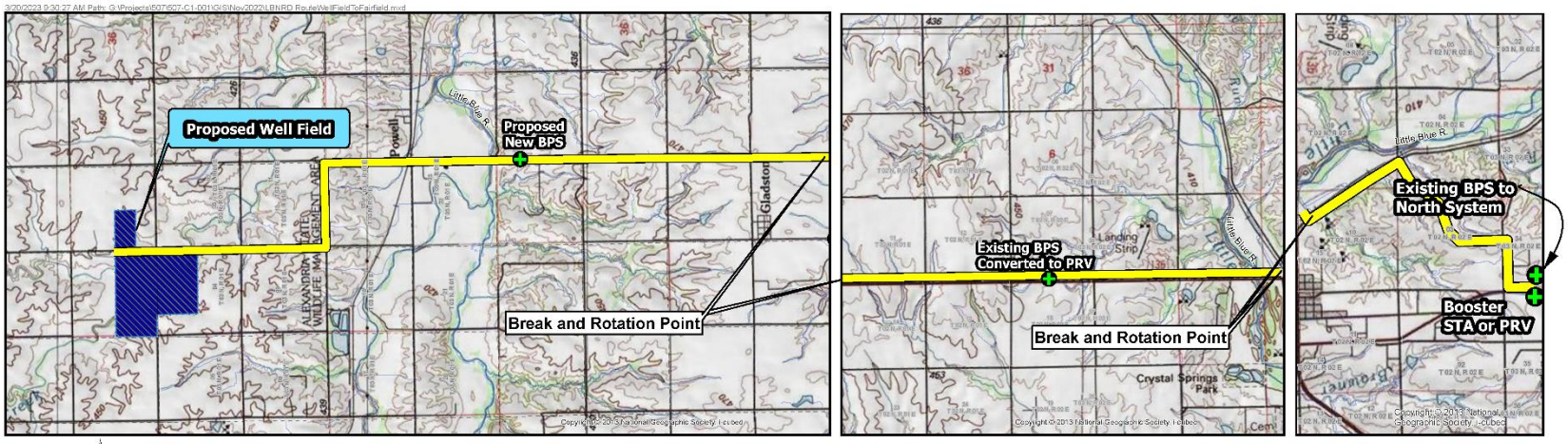
## Figure 8 – Hydrogeologic Cross Section LBVWS Model

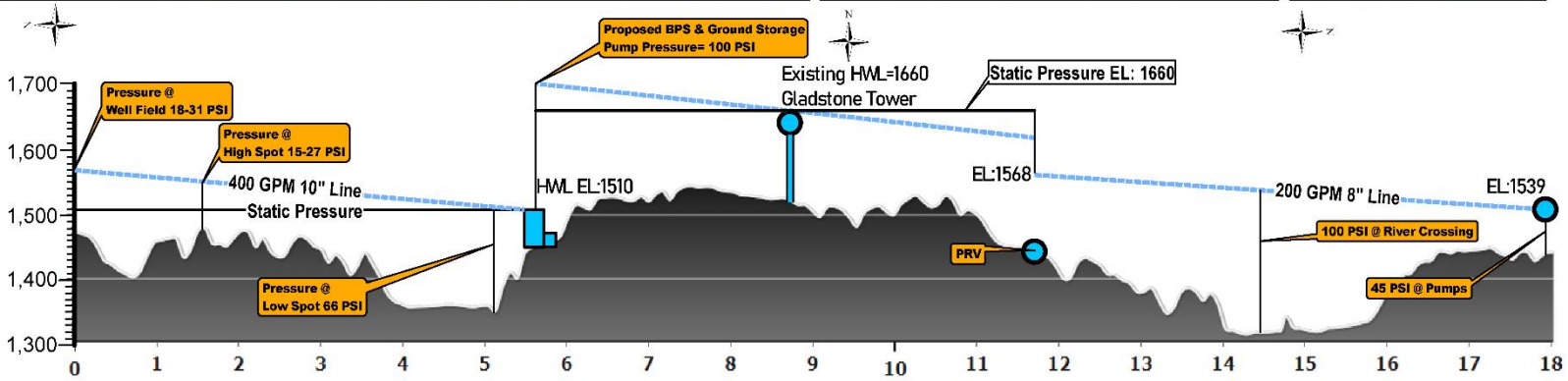


## Figure 9 – Saturated Sand Thickness (LBVWS Model)



## Figure 10 – Hydraulic Profile on Piping Alignment

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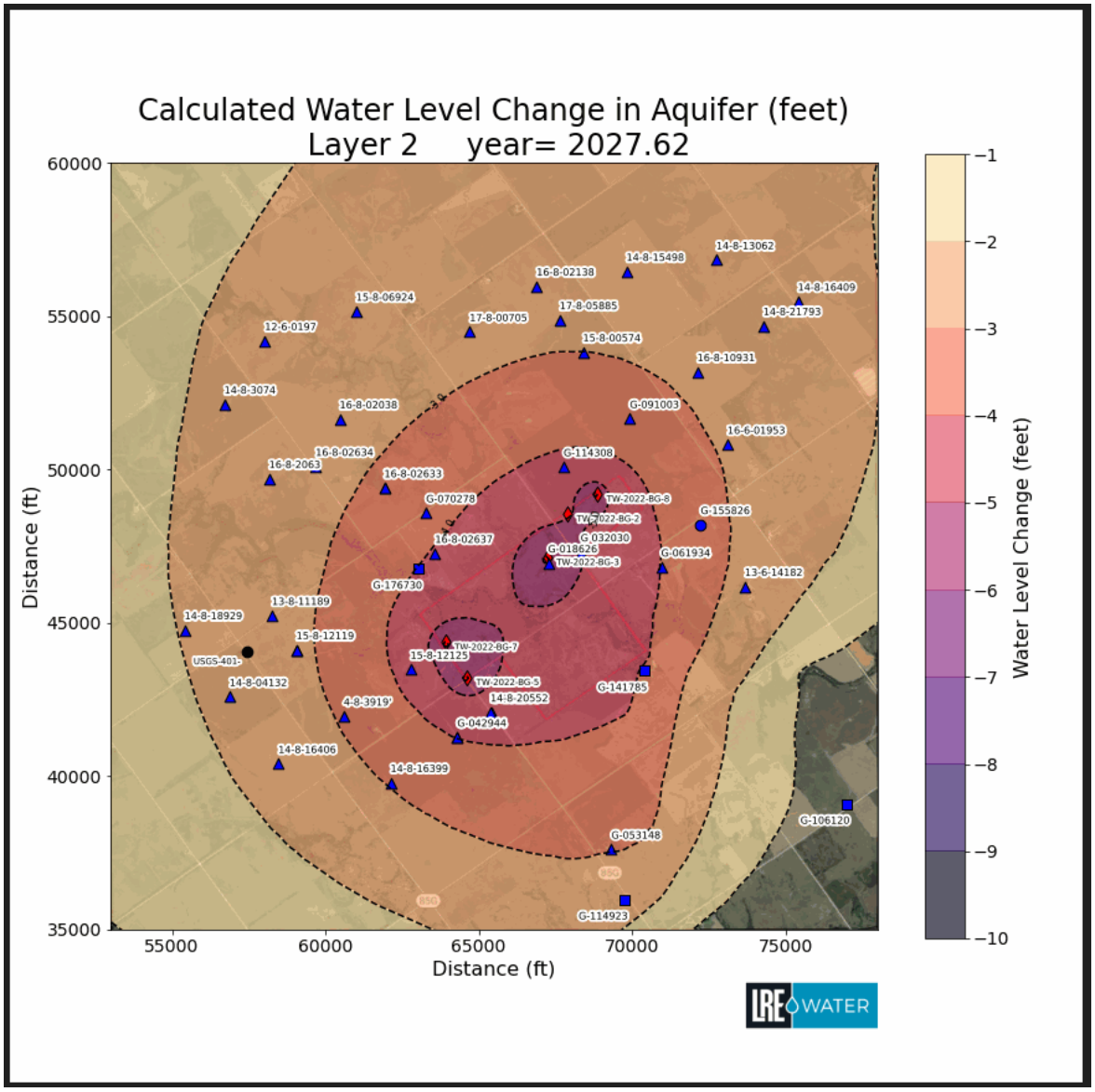
**New Wellfield Proposed Alignment**

**Figure 11 – Water Level Change (Original Five Proposed Wells), Transient Model**




1.A.5 Describe any necessary water and/or land rights including pertinent water supply and water quality information **(004.01 D)**;

The land rights for the wellfield have been donated by the Glenn family. A letter of support for this action is provided in Appendix A.

The vast majority of the land rights needed for the installation of water mains and associated infrastructure are located in Jefferson County, within County road right-of-ways. LBNRD and Miller will work though right-of-way permitting with Jefferson County to acquire the necessary land rights. Initial discussions on what roads will

need to be bored across and which ones can be open cut have taken place, and the LBNRD intends to follow the requirements of the County and State of Nebraska to minimize permitting issues.

The new pump station and ground storage tank will be located south of Powell on private property as shown in Figure 4 and Figure 10. Initial correspondence by LBNRD staff with the property owner indicated a likelihood of collaboration on the project.

The project will include legal surveys and production of documents to secure land rights to well sites, water lines, pumping station, and other infrastructure needs. LBNRD has the right to use condemnation through eminent domain, if necessary. The LBNRD does not anticipate a need for eminent domain. A summary of land ownership along the alignment of the water mains is as follows:

- Jefferson County and State Highway ROW – approximately 13.5 miles
- Glenn Property – 640 acres
- Private land – anticipated to be 1 acre or less for ground storage and booster pump station, and approximately 2.7 miles from the south Fairbury water supply line to the north booster pump station.
- LBNRD has filed and received an NeDNR wellfield protection order for the wellfield site
- Obtaining a permit to place the transmission main under the railroad.

1.A.6 Discuss each component of the final plan **(004.01 E)**;

The new wellfield major components include two wells, ground storage, booster pump station, water mains, survey, well decommissioning, and access roads:

**Two Municipal Wells**

The project includes two new water supply wells located on the proposed wellfield site with the following system characteristics:

- The 6-inch diameter casing test wells produced over 300 GPM each which was the maximum amount of water that could be pumped using a 6-inch submersible pump.
- Looking at the hydrologic properties and the remaining drawdown available the wells would produce over 500 GPM at each location.
- The final well design would include 16-inch diameter well casings with screen located at the bottom of the well with a bentonite seal to the top of the casing to minimize any potential contamination from the well annulus.
- Due to the water system needs, the wells will be designed for 400 GPM each (one supply and one redundant) providing more than sufficient water to keep the water towers full during peak demands.

- Each well will have a backup generator for emergency situations and power outages.
- The wells will be constructed with variable frequency drives so the flow rate could be lowered if desired.
- The wells will be controlled with a new SCADA control system and will alternate well pumping to keep both wells active.
- The wells have been designed to pump deep in the aquifer and slowly to help reduce the risk of higher nitrate water at the top of the aquifer not being pulled into the system.

### Ground Storage Tank and Booster Pump Stations

The proposed wells will be pumped to a ground storage tank that will feed a new booster pump station. This booster pump station will replace the 1978 booster pump station that currently feeds the elevated towers at Gladstone and Gilead. The ground storage tank serves two purposes: 1) Provide storage for the booster pump station, and 2) keep the line pressure lower across the Little Blue River. The new pump station will have increased capacity to provide water to the tower that the 1978 pump station cannot provide.

The 1978 booster pump station will still be used in the system. It will be converted to a pressure reducing station to feed water to the north pump station located north of Fairbury. This pump station has the ability or capacity to keep the system operational, but the feed is currently from the Fairbury tower. Much of the existing water supply line will be used. A 2.7-mile connecting line will be constructed to the north booster pump station for LBNRD supply.

### Legal Surveys and Documents to Secure Land Rights

As part of the design and permitting, Miller will assist with legal surveys and easement descriptions which will be provided and recorded at the courthouse to memorialize the land requirements.

### Access Road Construction to Wells

As part of the Glenn Family donation, they have allowed for all necessary roads, easements, and power lines to be constructed to serve the wells.

### Well Decommissioning

As part of the project some of the test wells and wells within 1,000 feet of the proposed wells sites will be abandoned in accordance with Title 178.

### Installation of 8 and 10-inch Diameter Water Mains

The water line consists of approximately 13.5 miles of 10-inch main and 2.7 miles of 8-inch main to serve the needs of the water supply. The 10-inch main is necessary to provide the desired 400 GPM peak flows to the towers and the 8-inch main will provide a peak of 200 GPM supply to the north booster pump station. The proposed route has been selected based on constructability and will include necessary air release valves, valves, fittings, boring of water ways, and miscellaneous improvements for a fully functioning water conveyance system.

1.A.7 When applicable include the geologic investigation required for the project **(004.01 E 1)**;

A majority of the geologic investigation has been conducted and is ready for design. The task which has been completed includes but is not limited to:

- Original LBNRD hydrological study completed in 2011 providing saturated sand thickness, groundwater elevation contours, etc.
- Desktop analysis of registered well data and hydrogeologic cross sections of the surrounding irrigation wells.
- Six 6-inch test holes drilled to the lowest water bearing formation at depths of 140 to 240-feet including e-logs and geologic logs.
- The test well data was used to develop a fencing diagram across the site including static water levels and pumping water levels placed on the logs to look at formation and pumping water levels.
- Five of the test holes were test pumped for 24 hours to collect hydrogeologic and water quality data.
- A 3D numerical groundwater model (MODFLOW) was developed by LRE Water for the LBVWS to evaluate groundwater pumping from the proposed public water supply wellfield (wellfield) to supply water for the City of Fairbury and LBPWP. The model was a useful tool to evaluate the potential drawdown effects that proposed wells will have on the Principal Aquifer and existing wells around the proposed municipal wellfield and to delineate a provisional wellhead protection boundary. The report (Appendix C), which evaluated the originally proposed five public water supply wells, concluded that wellfield pumping is not expected to substantially impact the production of nearby wells.
- The LRE report includes detailed hydrogeologic cross sections through the wellfield, modeled sand and gravel thickness, annual pumping rates of wells within the model boundary, modeled vs. pumping test water level changes, modeled transmissivity, and results of steady-state and transient model runs.
- A geotechnical investigation at the proposed ground water storage site will be required to properly size the foundation of the ground storage tank.

1.A.8 When applicable include the hydrologic data investigation required for the project **(004.01 E 2)**;

- The PER includes an evaluation of current and projected water demands for the LBPWP to determine the required pumping capacity of the new wellfield.
- Aquifer pump test were completed in five of the test wells, ranging from 300 to 320 GPM. Pump test information was used for siting and design of the public water supply wells.
- During the test well construction, formation samples were collected in the water bearing area. These samples will be used to properly size gravel pack and screen slot size for the final well designs. This data initially indicated the screen length in the test wells could be reduced by 25-50% and still provide the desired yield at 500 GPM. This is significant, as the deeper the well screens can be placed the more abundant the seal of the annulus can be, thus lowering the possibility for nitrates to enter the screened area. By pumping at a lower rate than the surrounding wells, the system will be encouraging lower horizontal flow to the screens while attempting to reduce the drawdown and nitrates from entering the well.
- The aquifer pump test information was also used to calibrate and check the 3D groundwater flow model. Overall, the model does well in simulating the aquifer response observed in the real hydrogeologic system. The model reproduced the drawdown response within the Principal Aquifer (or lack of drawdown response) at the measured observation wells, indicating good representation of the Principal Aquifer characteristics in the model.
- The aquifer test data allowed for storage parameter calibration for the model, which was primarily derived from the calibration of the model to the existing Glenn irrigation well (G-018626) used as an observation well during the BG-3 and BG-5 test. The model was also used to determine test well inefficiency of the test pumping wells through a skin factor.

1.A.9 When applicable include the criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria **(004.01 E 3)**.

The project will be designed per Nebraska Administrative Code (NAC) Title 179 and Great Lakes Mississippi River Board of State Health and Environment Recommended Standards for water works or commonly known as 10 State Standards. These guidelines followed by NDEE will cover all aspects of the design of the wells, storage, pumping, pressures, water supply, valve spacing, construction standards and final inspection for placement into service.

Along with NDEE review and approval, the USDA-RD State Engineer will review and approve all construction and design documents to meet the goals and guidelines of USDA.

Additional design criteria such as American Water Works Association (AWWA) for storge tank design, wells design and pipeline design and construction practices will be followed.

**If "NO", it is considered mostly non-structural, so answer the following:**

1.B.1 Insert data necessary to establish technical feasibility (004.02);

1.B.2 Discuss the plan of development (004.02 A);

1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B);

1.B.4 Describe any necessary water and/or land rights (004.02 C);

1.B.5 Discuss the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D).

## Prove Economic Feasibility
**(Applicant must demonstrate compliance with Title 261, CH 2 - 005)**

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

The LBNRD and its partners have exhausted all other feasible alternatives. Other significant attempts to acquire a new water supply included the following:

1) **2012–2022** – Numerous discussions with the City of Fairbury to increase the flow capacity to the LBPWPs, negotiations on rates, and evaluation of new wells south of Fairbury. The proposed south wellfield was test hole drilled and did not yield sufficient water for additional wells.
2) **June 2019** – LBNRD created a draft Cooperative Agreement with the Village of Alexandria to provide water. USDA-RD funded a water project to provide Alexandria a new well and 8-inch oversized main to the south edge of town for the possibility LBNRD would form an entity and purchase water from Alexandria. No action was taken.
3) **August 2019** – LBNRD staff conversed with Village of Jansen to discuss a joint project. No action was taken.
4) **July 2021** – A proposed wellfield northwest of Fairbury was proposed by Miller, east of the current site, two miles southeast of Daykin and located partially within the Lower Big Blue NRD (LBBNRD). At a public landowner meeting and joint public hearing, the LBBNRD representatives stated that water could not be pumped and delivered out of the LBBNRD district.

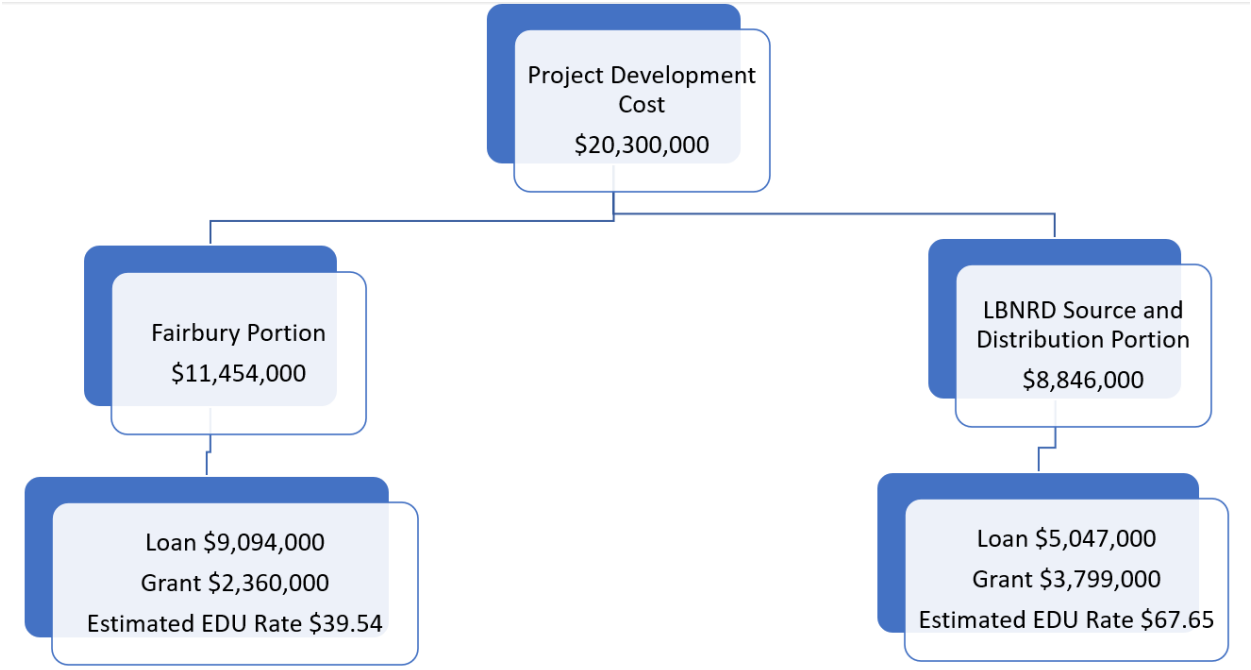
5) **January 2022** - Formation of the Little Blue Valley Water System (LBVWS). LBVWS was a new public entity of the City of Fairbury and LBNRD to manage a combined water system with a new wellfield, at the currently proposed location. USDA-RD reviewed and approved this agreement and began the funding process for the new entity.
6) **November 2022** – The Fairbury City Council voted not to proceed with the new water source as part of the LBVWS.
7) **November 2022** – LBNRD terminated the LBVWS agreement with the City.
8) **December 2022 -** USDA-RD approved engineering agreements for design and construction services for joint entity.
9) **December 2022** – LBNRD proposed the Jefferson Thayer Counites Water System (JTCWS) a new public entity with the Village of Alexandria.
10) **February 2023** – The Village of Alexandria did not proceed with the JTCWS, prompting the LBNRD to terminate negations.
11) **February 2023** – LBNRD Board of Directors approved development of the Glenn Wellfield.

Exhausting all possible alternatives, the LBNRD concluded the only feasible and cost-effective means to provide potable water for the LBPWP was to develop and manage a new water supply at the location selected through the process used for the LBVWS. This alternative would provide two wells to include a redundant supply, and the required transmission main to be able to keep water supplied to the existing water storge tanks and to the north booster pump station, and no longer purchase water from Fairbury. This option has better water quality than what they are currently being provided, has more than doubled the capacity needed at this time, and the LBNRD is 100% in control of the user rates and water supply.

3. Document all sources and report all **costs** and **benefit data** using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies is the project life. **(Title 261, CH 2 - 005)**.

Just prior to the City of Fairbury withdrawing their support for the LBVWS joint project, a public meeting was held on November 1, 2022. A presentation was made including updated water treatment cost prepared by Olsson and required system upgrades for the City of Fairbury. Due to the quantity of water required for the joint project, five wells were proposed at the current Glenn wellfield site, and larger water main was required to convey the water to Fairbury and LBNRD. A new source development cost in conjunction with Operation and Maintenance cost were provided for the new source vs. treatment cost. Figure 12 – LBVWS Water Source Development Cost is the cost splits for a new source development for the Joint venture.

## Figure 12 – LBVWS Water Source Development Cost




These new source development costs were compared against the Olsson revised treatment and improvement cost listed in Table 7 – Fairbury Nitrate Treatment and Improvement Cost (Olsson).

## Table 7 – Fairbury Nitrate Treatment and Improvement Cost (Olsson)

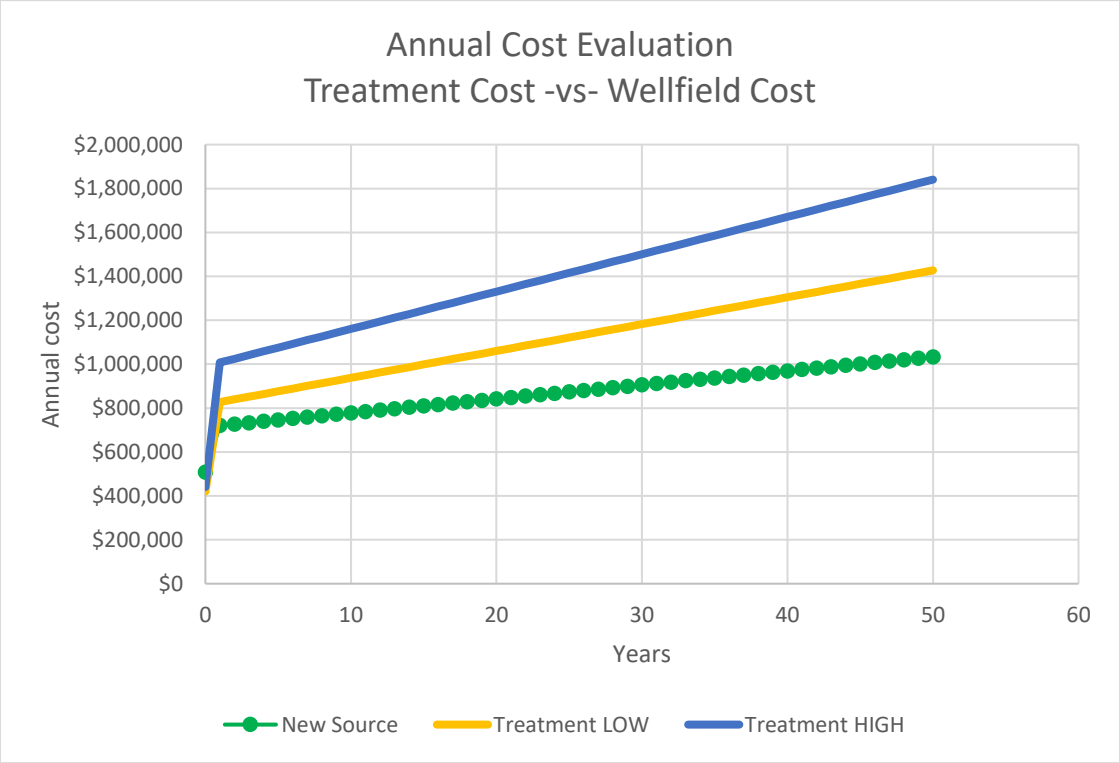
| | RO Facility | IX Facility |
|---|---|---|
| Treatment Cost | $11,370,000 | $9,024,000 |
| Operation and Maintenance Cost | $567,000 | $408,000 |
| If Treat Crystal Springs - Transmission Line Needed | $4,500,000 | $4,500,000 |
| If Use East Wells need additional supply well | $1,200,000 to $1,800,000 | $1,200,000 to $1,800,000 |
| Discharge Line to River for Disposal | $750,000 to $1,000,000 | $750,000 to $1,000,000 |

*Treatment Cost updated by Olsson from 2017 PER to Present EOPCC 10/26/22*

Putting the potential combinations for the treatment type and the location the following cost ranges were provided:
Treatment of East Wellfield 11.2-14.2 M
Treatment of Crystal Springs 13.5 to 15.87 M

Looking at the period of analysis for 20 years of capital (principal and interest payments) and operational cost on an equivalent annual cost, the new source project would save approximately $3M to $7M in 20 years over treatment of Fairbury's water. This was the cost benefit analysis presented at the November 1, 2022 meeting. For this funding application, using Title 261, CH 2 – 005 requiring up to 50 years analysis, would equate to a projected savings in the range of $12 to $27M. However, this option was not selected when Fairbury withdrew from the project. A graphic showing how Fairbury's treatment and necessary improvement cost compared to the new LBVWS water source (Glenn Wellfield, five wells) is shown in Figure 13 – Fairbury Treatment vs. Glenn Wellfield Cost. Since there were a low and high cost for treatment and operation and maintenance, both of the treatment ranges were compared.

**Figure 13 – Fairbury Treatment vs. Glenn Wellfield Cost**




## Alexandria Connection Economics

It was this cost benefit analysis that helped the LBNRD decide to return to Alexandria to pursue the new joint source water supply. The LBNRD and Alexandria asked the Nebraska Rural Water Association (NRWA) to consider this consolidation and provide a projected cost to produce water, based on the anticipated volume to be distributed each year. The NRWA system derived an estimated cost to provide water to the Jefferson Thayer County Water System (JTCWS) at $1.39/1000 gallons of water pumped (see Table 8 – Alexandria Cost of Water to LBNRD). This is considerably lower than the LBNRD cost of water from Fairbury ($3.42/1000 gallons).

## Table 8 –Alexandria Cost of Water to LBNRD

| | | | |
|---|---|---|---|
| **Little Blue NRD usage (gal)** | 51,000,000 | | |
| **Alexandria usage (gal)** | 5,700,000 | | |
| **Total Annual Water usage (gal)** | 56,700,000 | | |
| | | | |
| **Percentage of water used by NRD** | 89% | | |
| **Percentage of water used by Alexandria** | 11% | | **Annual Cost** |
| **Depreciation 2 Wells @ $400,000** | $800,000.00 | 30yrs | $26,666.67 |
| **Est. Annual Well Repair Expenses** | $14,000.00 | | $14,000.00 |
| **Est. Annual Electricity** | $18,000.00 | | $18,000.00 |
| **Annual Water Tower Maintenance** | $20,000.00 | | $20,000.00 |
| **Estimated Annual Cost of Production** | | | $78,666.67 |
| **Annual Water Pumped** | | | 56,700,000 |
| **Projected Cost per 1,000 gallons** | | | $1.387 |

Using the cost per 1,000 gallons produced, the LBNRD would be responsible for approximately $70,890 per year for water purchase cost. In addition to water purchase, LBNRD also needed to develop the infrastructure to deliver the water to the LBPWP system.

In order to obtain a cost benefit analysis for the Alexandria and new wellfield site, the capital cost for each option had to be developed and the annual O&M cost had to be included to compare an Annual Equivalent Cost (AEC) for each option.

One element adding to the cost of the Alexandria joint water supply was the need for approximately two additional miles of transmission main to make the connection to the existing LBPWP water system. Furthermore, due to the existing Alexanderia water tower elevation, to meet the equivalent demand of 400 GPM to the LBPWP system, a larger diameter pipe was needed from Alexandria to the booster pump station proposed on the south side of the Little Blue River.

In order to perform the AEC some assumptions were made to provide the evaluation. Since the USDA-RD funding could only provide a maximum of 45% grant funds according to their regulations, it was assumed the loan amounts for each project would be 55% for a 40-year term and an interest rate of 2.25%. It was later discovered USDA could not provide 45% grant due to the amount of funding the Nebraska Section receives, and in order to fund the project the user rates would have to increase from the initial rate of $67.65 per user (which was higher than the anticipated $50.50 per user). Regardless, the AEC assuming water purchase or cost sharing with Alexandria, and providing a new source managed by the LBNRD was slightly less expensive per year as shown in Table 9 – Cost Comparison of Alexandria Option vs. Glenn Wellfield. Please note that in the

wellfield option it allowed for added salaries/benefits of $32,000 per year for the new wellfield site.

**Table 9 – Cost Comparison of Alexandria Option vs. Glenn Wellfield (Annual Equivalent Cost Comparison)**

| CAPITAL COST FOR DEVELOPMENT | | |
|---|---|---|
| **Alexandria** | **Wellfield** | **Description** |
| $10,440,000 | $10,055,000 | Capital Cost |
| $5,742,000 | $5,530,250 | 55% Loan Funds |
| **$219,215** | **$211,130** | **P&I Payment** |
| **INCREASED O&M COST** | | |
| **Alexandria** | **Wellfield** | **Description** |
| | $14,000 | Utilities |
| $70,890 | | Water Purchase 1.39/1000 |
| | $7,000 | Other |
| | $1,600 | Legal |
| | $2,400 | Insurance |
| | $32,000 | Salaries/Benefits |
| | $11,840 | Repairs/Maintenance |
| | $5,750 | Administrative/Office |
| **$70,890** | **$74,590** | **Annual Cost** |
| | | |
| **$290,105** | **$285,720** | **AEC (Capital P&I + OM)** |

Although the cost per year is very similar and could even be considered "equivalent" for this analysis, the Village of Alexandria has declined to work with the LBNRD to provide a consolidated water system. Using the AEC as presented above and multiplying by 20 and 50 years respectively, the LBRND wellfield cost would save $87,600 in 20 years and approximately $219,000 in 50 years. This cost assumes the nitrates remain below the MCL for the life of the project. Although the AEC is similar, the LBNRD sees several benefits to owning and operating their own water supply for the system. This option will allow them to have control over rates and any future economic decisions, while not being dependent on other entities.

3.A Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life **(005.01)**.

Using the estimated construction cost presented for the wellfield and projecting the operation and maintenance cost to 50 years, Table 10 – LBPWP Cost by Year was developed for the life of the project assuming no inflation cost, and the assumption the nitrates would remain below the MCL for the life of the project. The LBNRD is

not requesting any cost for the operation and maintenance cost, only the cost for the development of the new source water project.

**Table 10 – LBPWP Cost by Year**

| | Year 1 (2023) | Year 2 (2024) | Year 3 (2025) | Year 4-50 (2026-2073) | Total Amount |
|---|---|---|---|---|---|
| **Survey, Design, and Construction Administration** | $150,000 | $300,000 | $295,000 | | $745,000 |
| **Construction** | $0 | $0 | $8,374,600 | | $8,374,600 |
| **Stormwater/Permitting** | $30,000 | $9,000 | $0 | | $39,000 |
| **Land Easements** | $50,000 | $ 0 | $0 | | $50,000 |
| **Construction Contingencies**[3] | $ 0 | $46,400 | $800,000 | | $846,400 |
| **TOTAL Capital** | **$230,000** | **$355,400** | **$9,469,600** | | **$10,055,000** |
| **Increase O&M Cost at $74,590 per year** | | | | $3,505,730 | $3,505,730 |
| **Short Term Asset Replacement at $20,333 per year** | | | | $955,651 | $955,651 |
| | | | | **Total 50-Year Cost** | **$14,516,381** |

Additional annual costs which are built into the USDA loan payments include short-term assets (see Table 10) that contain replacement cost items that do not have the full 40-year USDA loan life expectancy. The estimated short-term assets in Table 10 above for $20,333 include:

- Annual meter billing software at $3,000 per year
- Booster Pump replacement at $1,000 per year
- Tank painting at $8,333 per year
- Water meter replacement at $8,000 per year

3.B Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe intangible or secondary benefits (if any) separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, in a way that justifies economic feasibility of the project such that the finding can be approved by the Director and the Commission **(005.02)**.

The primary tangible benefit would be a long-term, safe, and affordable water supply for the nearly 1,500 users of the LBPWP, including any future users who

[3] Contingency is added to the estimate to ensure resources are available to cover unexpected events, elevated material cost, unforeseen field conditions, and other uncertainties potentially encountered through design and construction.

would now be able to locate to this region. Benefits include the enhancement of a domestic beneficial use of water and sustainability of agriculture through a reliable water source. One way to monetize this benefit is by evaluating annual cost of purchasing water from Fairbury vs. the annual cost of the wellfield. Since consolidation has fallen through, the LBNRD has two options remaining: 1) develop their own source or 2) continue to purchase water from Fairbury. The LBVWS had an agreement based on water use that the LBNRD would be responsible for 28% of development cost of the joint project when they were consolidating. As reflected in Table 11 – Annual Cost Benefit Fairbury Purchase vs. Glenn Wellfield, the Glenn wellfield is a positive benefit to cost, at 1.88 compared to funding 28% of future cost for Fairbury treatment and improvements. Furthermore, the LBPWP would have had no control over future cost associated with treatment of either the East Wellfield and/or Crystal Springs. Having a vision of what the future cost will be for the LBPWP users is another benefit of the project.

**Table 11 – Annual Cost Benefit Fairbury Purchase vs. Glenn Wellfield**

| Cost Benefit Analysis | Fairbury | Wellfield |
|---|---|---|
| Water Purchase[1] | $180,540.00 | |
| O&M | | $74,590.00 |
| P&I Payments[2] | | $149,636.00 |
| Future 20% cost share of Fairbury WTP P&I payments[3] | $128,276.00 | |
| Future 20% WTP O&M[4] | $112,000.00 | |
| | | |
| Annual Cost | $420,816.00 | $224,226.00 |
| | | |
| Tangible Benefit Ratio | | 1.88 |

1. *Assumes NO increase in cost per 1000/gallon*
2. *Payment based on $3,919,500 for 40 years at 2.25% interest.*
3. *Assumed 28% of P&I payment on $12,000,000 for 40 years at 2.25% (Range of cost was $11.2M to $15.87M)*
4. *Assumed 28% of lower annual O&M cost of $408,000*

3.C Present all cost and benefit data in a table to indicate the annual cash flow for the life of the project (005.03).

Using the estimated construction cost presented and projecting the operation and maintenance cost out to 50 years Table 12 – LBPWP Cost by Year, was developed for the life of the project assuming no inflation cost, and that nitrates remain below the MCL for the life of the project. The LBNRD is not requesting funding for the operation and maintenance cost, only funding for the development of the new source water project.

**Table 12 – LBPWP Cost by Year**

| | Year 1 2023 | Year 2 2024 | Year 3 2025 | Year 4-50 2026-2073 | Total Amount |
|---|---|---|---|---|---|
| **Survey, Design, Construction Administration** | $150,000 | $300,000 | $295,000 | | $745,000 |
| **Construction** | $0 | $0 | $8,374,600 | | $8,374,600 |
| **Stormwater/Permitting** | $30,000 | $9,000 | $0 | | $39,000 |
| **Land Easements** | $50,000 | $0 | $0 | | $50,000 |
| **Construction Contingencies**[4] | $ 0 | $46,400 | $800,000 | | $846,400 |
| **TOTAL Capital** | **$230,000** | **$355,400** | **$9,469,600** | | **$10,055,000** |
| **Increased O&M Cost at $74,590 per year** | | | | $3,505,730 | $3,505,730 |
| **Short Term Asset Replacement at $20,333 per year** | | | | $955,651 | $955,651 |
| | | | | **Total 50-Year Cost** | **$14,516,381** |

3.D In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, demonstrate the economic feasibility of such proposal by such method as the Director and the Commission deem appropriate **(005.04)**. (For example, show costs of and describe the next best alternative.)

Providing a new water supply is a tangible benefit, and the value of the water supply can be documented in many ways including construction and design cost, and operation and maintenance. What is challenging to document is the value that the new reliable water source will have on rural economic development. For over a decade the LBNRD has been forced to deny request for new homes, connections to agricultural operations, businesses, and other potential users. Project stakeholders, including the USDA-RD, are optimistic that their investment will far exceed a +1.0 BCA when accounting all the potential growth anticipated to occur when the LBPWP Glenn wellfield is completed.

Some intangible benefits are the City of Fairbury will have reduced demand with the development of the Glenn wellfield and thus reduce pumping on the East Wellfield aquifer. This reduced pumping might maintain or prolong Fairbury's nitrate treatment for their east source. Fairbury has not been using the Crystal Springs source water due to biological issues, and with the reduced demand from

[4] Contingency is added to the estimate to ensure resources are available to cover unexpected events, elevated material cost, unforeseen field conditions, and other uncertainties potentially encountered through design and construction.

the LBPWPs, they may be able to delay improvements to the Crystal Springs source water saving them cost.

## Prove Financial Feasibility
## (Applicant must demonstrate compliance with Title 261, CH 2 - 006)

4. Provide evidence that sufficient funds are available to complete the proposal.

   The USDA-RD has provided an initial letter of conditions discussing their commitment to provide grant funding and a loan to LBNRD for their local share. Based upon their commitment, they are willing to provide additional funding to make this project work, in addition to their already committed level of funding. The USDA-RD has tentatively evaluated LBNRDs potential additional funding. These initial funding estimates were utilized to establish the request in this application.

   The LBNRD has also provided a letter of support documenting their commitment to funding the project through repayment of USDA-RD loans through user fee income for both the North and South LBPWP systems. Both letters can be found in Appendix A.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).

   There is sufficient annual revenue within the LBPWP's annual budget, specifically user fee revenues obtained by the district which is allowable through state law. User income fee for the North System is $180,000 with a total budget of $364,332, (which includes possible income of $193,364 from other grants/loans). The South System user income is projected at $160,000 with total budget of $343,980 including possible income of $193,364 from other grants/loans. For both projects $42,750 is budgeted for salaries for two part-time employees. Budget details and cash flow for the LBPWPs have been provided in Appendix D.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.

   The LBNRD is not requesting a loan from WSF. The LBNRD is working with USDA-RD to receive a series of loans to cover the local match of $3,919,500. The loans will be repaid by the LBPWPs through water user rates. The estimated monthly user fee will be increased to repay the loan over 40 years.

7. Describe how the plan of development minimizes impacts on the natural environment (i.e. timing vs nesting/migration, etc.).

   There will be minimal physical impact to the natural environment because of the project. The water main alignment is mostly within County road right-of-ways void of significant wildlife habitat, including wetlands. The water main will be bored under waterways to avoid disturbances to aquatic habitat and to lessen the

restraints of permitting. Overall, the project will not require significant clearing and grubbing of trees and shrubs. Should any occur, it will be during a time recommended by the NGPC that will not disrupt endangered species, migratory birds, or other sensitive species.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

In 1972, NRDs were granted statutory authority (2-3229) by the Nebraska Legislature to receive local property taxing authority to carry out the development, protection, and management of the resources in their respective areas. Some of the specific purposes granted by law includes:

- Water supply for any beneficial uses
- Development, management, utilization, and conservation of groundwater and surface water

The LBPWP is operated under Rules and Regulations issued in compliance with Sections 2-3201 to 2-3262 R.R.S., Nebraska 1943, as amended, and authorized by the LBNRD and are designed to govern the supplying and taking of water service in a uniform manner for the benefit of the Project and its members. Changes to the Rules and Regulations must be approved by the USDA-RD until all loans are retired.

The LBPWP is operated by an Advisory Board, appointed by the LBNRD for the purpose of making recommendations to the district on all phases of operation of the LBPWP. A copy of the Rules and Regulations can be obtained from the LBNRD website, https://littlebluenrd.org/rural-water/.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

The LBNRD Master Plan, revised in 2019, states the following goal that is achieved through the LBPWP wellfield project.

**GOAL 1: MAINTAIN AND PROTECT GROUNDWATER RESOURCES AND PUBLIC WATER SUPPLIES FOR BENEFICIAL USES**

**Objectives**

- Ongoing development and implementation of a comprehensive water management plan.
- *Operate and maintain existing rural water supply projects*
- *Develop a systematic process for evaluating the feasibility of potential water supply projects*
- *Assist communities with wellhead protection*
- *Identify potential sites for new developments*

- Maintain integrity and functionality of existing structures
- Strive toward Compact compliance concerning the Blue River Compact

**Activities**

- *Groundwater level monitoring and data collection*
- *Initiate comprehensive hydrogeologic investigations to fill data gaps*
- Develop a dedicated monitoring network
- *Conduct groundwater quality monitoring and track trends*
- *Promote new water resources technologies and tools*
- Offer education and technical assistance
- Assist with proper decommissioning of water wells
- Enforce irrigation runoff rules and regulations
- Investigate opportunities for enhancing groundwater recharge
- *Management staff will oversee rural water systems*
- *Develop and implement standard operating procedures*
- Complete GPS locations of all facilities
- Develop GIS databases for all facilities linked to GPS locations
- Change out 10% of existing meters per year on old system

The LBNRD Integrated Management Plan (IMP), dated August 2019, states the following goal, “Goal 2: Scientifically sound, locally-based management actions to protect interconnected groundwater and surface water”, Objective 2.2, “Manage expansion of water uses”, Action Item 2.2.3 “Investigate and development water storage, groundwater recharge, and augmentation projects in areas where long-term groundwater level declines exist.

The LBNRD achieved this goal through its thoughtful and detailed scientific evaluation of the new water supply source. A numerical flow model (MODFLOW) was established to demonstrate the new wellfield was in an area with sufficient water supply.

10. Are land rights necessary to complete your project? YES☒ NO☐

**If yes:**

10.A Provide a complete listing of all lands involved in the project.

A summary of land ownership along the alignment of the water mains or wellfield are as follows:

- Jefferson County and State of Nebraska ROW – 13.5 miles
- Glenn Property – 640 acres through an easement or deed, donated by the Glenn family.

- Private land – anticipated to be 1 acre or less for tower and booster pump station, and approximately 2.7 miles from the south Fairbury water supply line to the north booster pump station.
- LBNRD has filed and received a NeDNR wellfield protection order.
- Obtaining a permit to place the transmission main under the railroad.

10.B Attach proof of ownership for each easements, rights-of-way and fee title currently held.

The LBNRD staff is currently working with the Glenn Family, Jefferson County, State of Nebraska, and a private property owner to secure easements or fee title for land along the alignment of the transmission main. The LBNRD and the LBPWPs have legal authority to install infrastructure, per Nebraska Revised Statute 18-413, for public benefit including conveyance of water. Based upon the confirmed donation by the Glenn Family, previous meetings with Jefferson County, and correspondence in March 2023 with the private property owner, there appears to be no conflict with obtaining ownership or easements during the project.

10.C Provide assurance that you can hold or can acquire title to all lands not currently held.

The LBNRD staff are familiar with the process to obtain and hold land for a variety of projects ranging from flood control, groundwater recharge, recreation areas, and public water supply efforts. As stated above, the LBNRD and LBPWP have legal authority to hold and acquire title, easements, or deeds for land not currently held.

11. Identify how you possess all necessary authority to undertake or participate in the project.

In 1972, NRDs were granted statutory authority (2-3229) by the Nebraska Legislature to receive local property taxing authority to carry out the development, protection, and management of the resources in their respective areas. Some of the specific purposes granted by law includes:

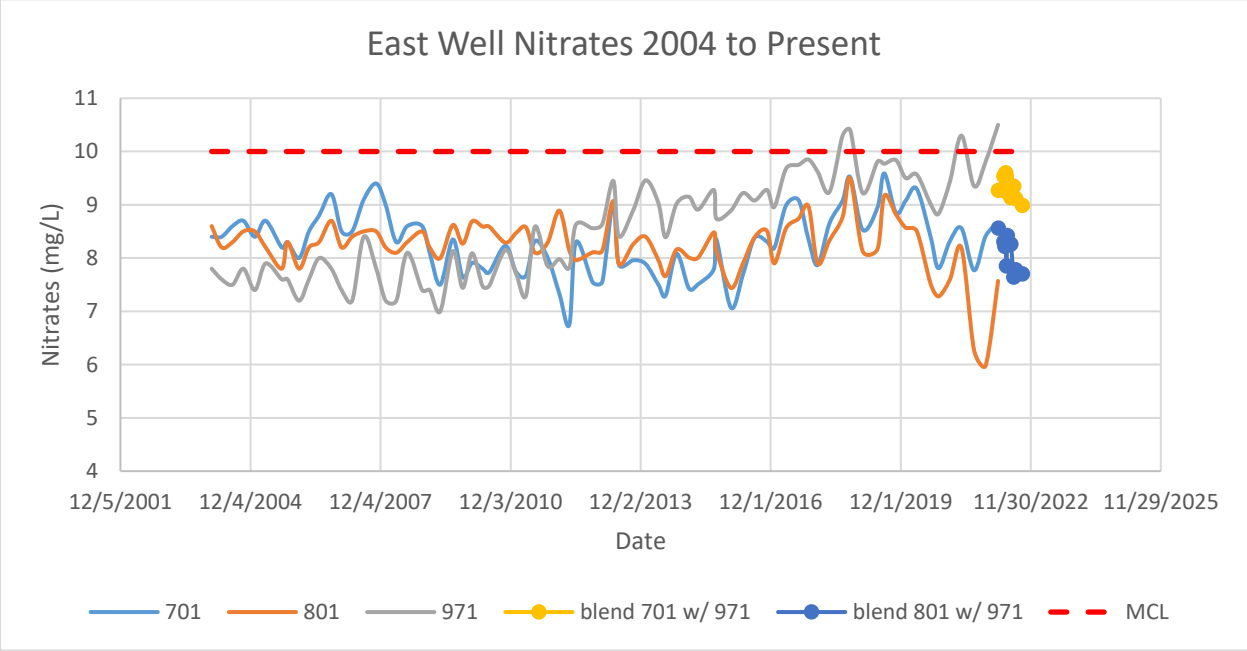
- Water supply for any beneficial uses
- Development, management, utilization, and conservation of groundwater and surface water

The LBNRD is technically and legally capable of undertaking the development of the new wellfield for the LBPWP project. The LBNRD has been successfully managing the LBPWP since 1975.

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed.

Currently, the LBPWP receives source water from the City of Fairbury's East Wellfield, which includes Well 701, 801, and 971. The aquifer supplying the East Wellfield is experiencing elevated levels of nitrate nearing the EPA's MCL of 10 ppm. Specific environmental consequences should the project not be built, would be exposure to nitrates within the public water supply of the LBPWP at or potentially over EPA's MCL. The trend of nitrates from 2004 to present is shown in Figure 14 – East Wellfield Nitrates.

**Figure 14 – East Wellfield Nitrates**



## Section C.

## NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

**Notes:**

- The responses to one criterion *will not* be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.

- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted above. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.

- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

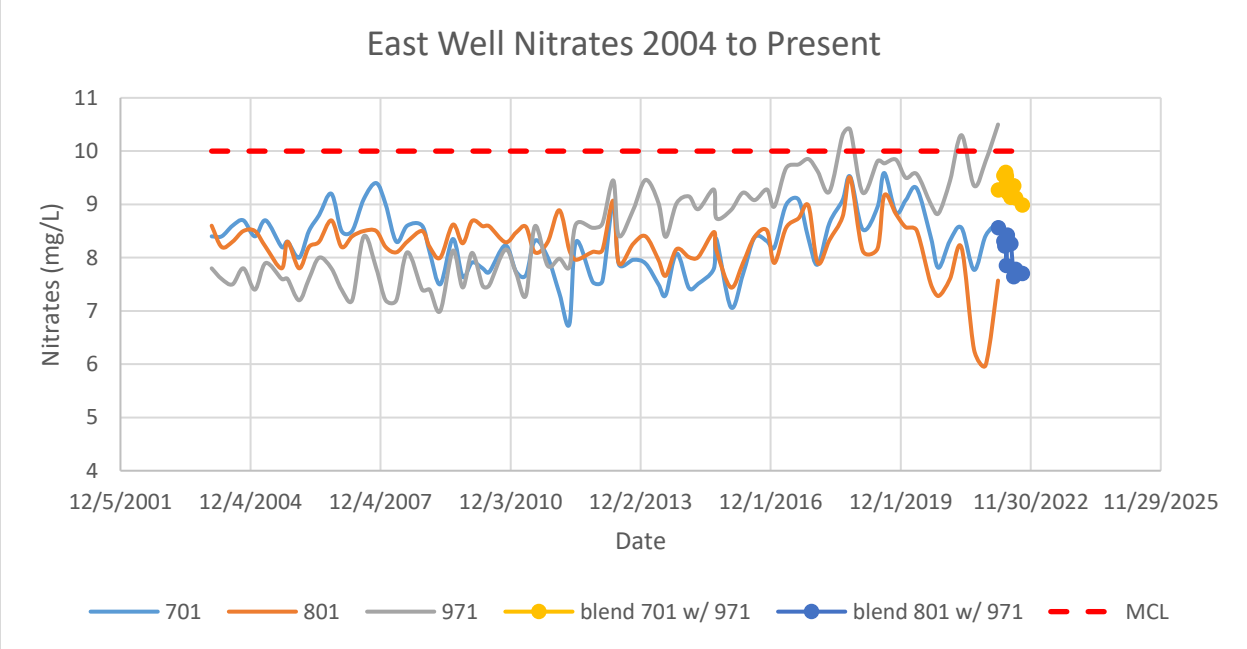
1. Remediates or mitigates threats to drinking water;

   - **Describe the specific threats to drinking water the project will address.**
   - **Identify whose drinking water, how many people are affected, how will project remediate or mitigate.**
   - **Provide a history of issues and tried solutions.**
   - **Provide detail regarding long-range impacts if issues are not resolved.**

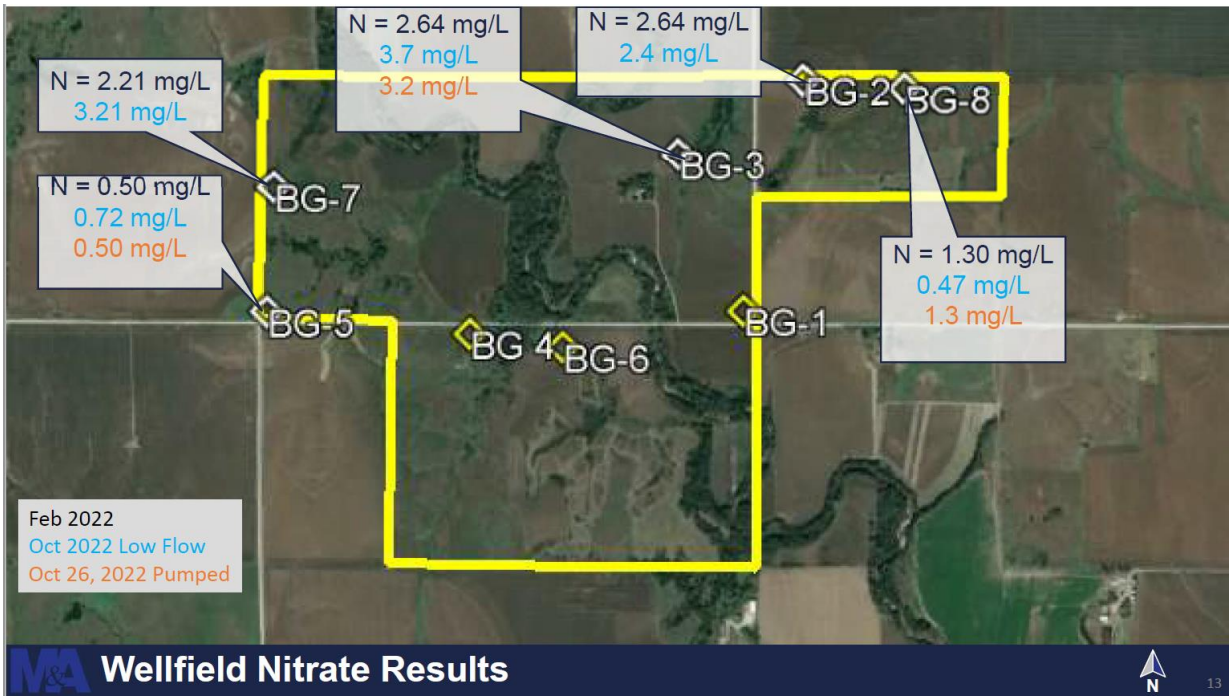
   The primary goal of the project is to remediate and mitigate threats that are currently present with the existing drinking water supply provided by the City of Fairbury.

Nitrates are a major public health threat, as recently documented across Nebraska in news publications. The aquifer supplying the LBPWP rural water district is Fairbury's East Wellfield which is experiencing elevated levels of nitrate nearing the EPA's Federal MCL of 10 ppm. The trend of nitrates from 2004 to present is shown in Figure 15 – Fairbury East Wellfield Nitrate Trends while the nitrate concentrations at the Glenn Wellfield are shown in Figure 16 – Glenn Wellfield Nitrate Results 2022. The Fairbury East Wellfield has to be blended during production to meet the federal Maximum Contaminant Level of 10 mg/L nitrates. Based upon these results, the water quality provided by screening the lowest part of the aquifer and pumping at lower withdrawal rates for supply at the Glenn wellfield (as the system will be designed), yields higher quality water than the existing supply.

**Figure 15 – Fairbury East Wellfield Nitrate Trends**



## Figure 16 – Glenn Wellfield Nitrate Results 2022

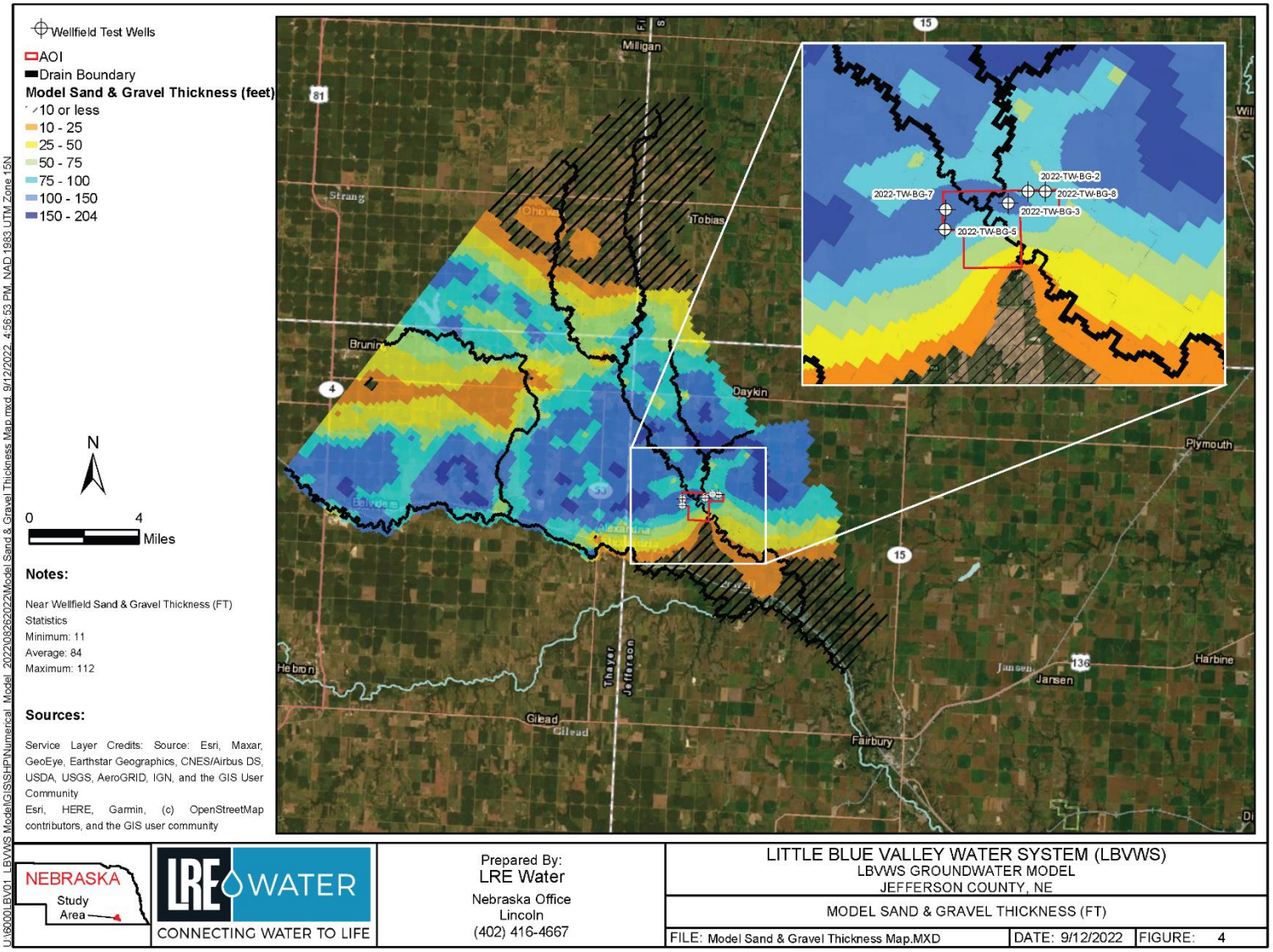



Drought is another threat to the existing water supply. After the 2012 drought, extreme hot dry conditions created challenges to keep the LBPWP water towers full. Conservation orders were issued during this period to LBPWP customers. Due to the issues, the LBNRD's engineer at that time recommended no additional hookups until the assurance of additional water was provided by Fairbury.

After the drought receded, the capacity issue remained. The aged Fairbury water mains under the Little Blue River created a limitation on the capacity of water Fairbury could provide the LBPWP. Since this time, almost 14 years later, the LBNRD has received nearly two dozen or more requests for water services including new homes, agricultural uses, and businesses, that they haven't been able to approve due to restrictions.

The inability to provide water to the new users was troublesome and a hinderance on the economic development potential of this agricultural region. Furthermore, the available aquifer, described through mapping saturated sand thickness, is limited near Fairbury, as shown in Figure 17 – Saturated Sand Thickness (LBVWS Model). In 2022, the Little Blue Valley Water System (LBVWS) created a 3D numerical groundwater flow model to analyze potential impacts of wellfield development to surrounding wells. The Glenn wellfield is located in a separate aquifer, as shown in Figure 17 – Saturated Sand Thickness (LBVWS Model) from the modeling, with significant available saturated thickness. The new project will alleviate concerns from drought and capacity deficiency, without creating significant impacts to surrounding agricultural producers and private landowners.

## Figure 17 – Saturated Sand Thickness (LBVWS Model)



In 2021, yet another issue became apparent with Crystal Springs, a natural spring used for decades by Fairbury as a primary water source. Biological fouling began developing on the filters used to remove biological matter from the water. The City conducted filter plugging every two weeks. Based on the filter change out cost, the continued annual maintenance would be over $600,000/year for filter replacements, not including the cost of labor. The cost to change filters was cost prohibitive, prompting the City to discontinue the Crystal Springs water supply and rely on the elevated nitrate laden East Wellfield as the primary source.

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;

- **Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.**
- **Provide the history of work completed to achieve the goals of this plan.**
- **List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.**

The **2017 LBNRD Groundwater Management Plan** (GWMP) acknowledges that "nitrates are the most common groundwater contaminant which pose public health concerns for residents of the LBNRD". This project meets the goal of the GWMP to protect public health by assisting public water suppliers in locating safe and reliable water sources. The GWMP also acknowledges the action taken to construct and maintain the LBPWP to mitigate poor quantity and quality in the region. The following is taken from the 2017 GWMP, Section 3.7:

*"Additional evidence of the value of water can be attested to in the southeast part of the LBNRD where the Little Blue Public Water Systems were constructed as early as 1975, 1978 and 1998 to mitigate a poor quantity and quality water in that region of the District. Because rural water became available to areas with limited supply, it provided opportunity for modern rural farmsteads, better livestock production and even business growth and expansion. All these factors demonstrate the tremendous value that groundwater provides in a thriving local economy. As competing water interests continue to grow, the proper management and development of our water resources is critical to supply water uses and meet the various groundwater demands."*

The **2019 LBNRD Master Plan** states the following goal, which is achieved through the LBPWP wellfield project.

GOAL 1: MAINTAIN AND PROTECT GROUNDWATER RESOURCES AND PUBLIC WATER SUPPLIES FOR BENEFICIAL USES

Objectives

- Ongoing development and implementation of a comprehensive water management plan.
- *Operate and maintain existing rural water supply projects*

- *Develop a systematic process for evaluating the feasibility of potential water supply projects*
- *Assist communities with wellhead protection*
- *Identify potential sites for new developments*
- Maintain integrity and functionality of existing structures
- Strive toward Compact compliance concerning the Blue River Compact

Activities

- *Groundwater level monitoring and data collection*
- *Initiate comprehensive hydrogeologic investigations to fill data gaps*
- Develop a dedicated monitoring network
- *Conduct groundwater quality monitoring and track trends*
- *Promote new water resources technologies and tools*
- Offer education and technical assistance
- Assist with proper decommissioning of water wells
- Enforce irrigation runoff rules and regulations
- Investigate opportunities for enhancing groundwater recharge
- *Management staff will oversee rural water systems*
- *Develop and implement standard operating procedures*
- Complete GPS locations of all facilities
- Develop GIS databases for all facilities linked to GPS locations
- Change out 10% of existing meters per year on old system

The **LBNRD Integrated Management Plan** (IMP), dated **August 2019**, states the following goal, “Goal 2: Scientifically sound, locally based management actions to protect interconnected groundwater and surface water”, Objective 2.2, “Manage expansion of water uses”, Action Item 2.2.3 “Investigate and development water storage, groundwater recharge, and augmentation projects in areas where long-term groundwater level declines exist.

The LBNRD achieved this goal through its thoughtful and detailed scientific evaluation of the new water supply source. A 3D numerical groundwater flow model (MODFLOW) was established to demonstrate the new wellfield was in an area with sufficient water supply.

The **LBNRD Little Blue River Basin Water Management Plan (WMP)**, completed in 2015, addressed water quality and quantity issues district wide. The WMP was driven by a diverse group of stakeholders who identified ‘nitrate contamination of groundwater’ as the second highest priority. The WMP outlined actions to provide resources to public water systems that would reduce the threat from nitrates. At that time, Fairbury was listed as a ‘high’ priority level for wellhead protection area concerns due to having nitrate concentrations over 7 ppm.

Project stakeholders include the users of the LBPWPs including the Villages of Gladstone and Gilead, LBNRD, and the USDA-RD. The citizens obtaining drinking water and/or water for livestock operations will benefit from this project.

Also benefiting are the rural economies of south central Nebraska. Dozens of potential property owners seeking new homes, businesses, and industries have put plans on hold for over a decade since the LBNRD was restricted from approving any new increases in supply due to capacity issues with Fairbury's water supply. With the addition of Glenn Wellfield, the LBPWP will discontinue purchasing water from Fairbury and after a decade, will be able to say 'yes' to these requests. The agricultural economy will benefit.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

   List the following information that is applicable:

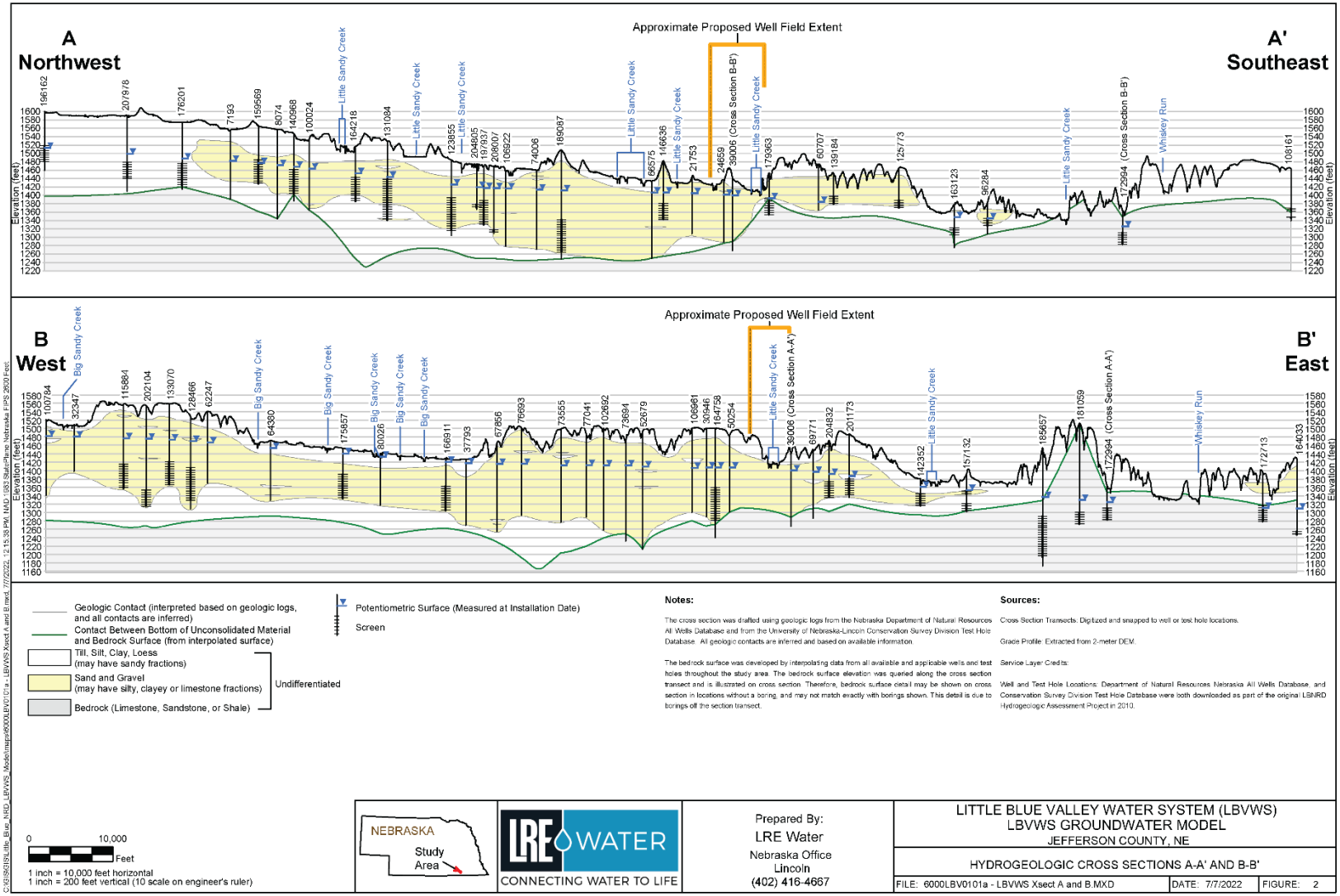
   - **The location, area and amount of recharge;**
   - **The location, area and amount that aquifer depletion will be reduced;**
   - **The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;**
   - **Provide a detailed listing of cross basin benefits, if any.**

   The current water supply is in a limited aquifer running southwest to northeast through Fairbury. The aquifer has a saturated thickness ranging from 15 to 55 feet. During times of drought, there have been limitations on this supply prompting water conservation requirements. With the development of the new Glenn wellfield, there will be a reduction in pumping from this aquifer by over 50 million gallons per year. Not only will the withdrawal be in an area of thicker aquifer, but it will also be a greater distance from the alluvial aquifer and will delay stream depletion responses which could provide increased stream flow during times of drought.

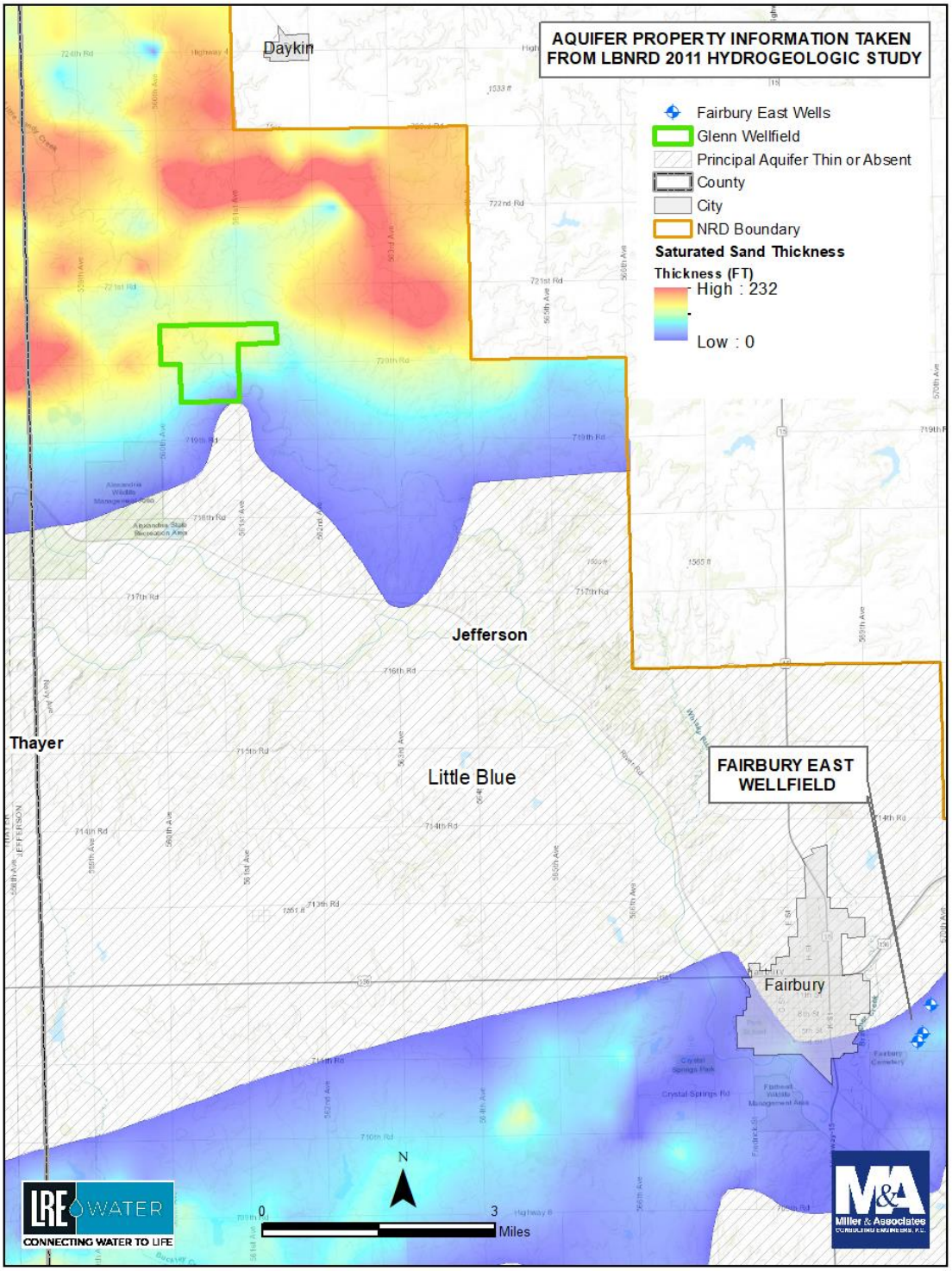
   The LBPWP wellfield is located in a hydrologically separated paleovalley aquifer known to produce a high supply of groundwater for irrigation and private domestic uses, as shown in the hydrogeologic cross sections depicted in Figure 18 – Hydrogeologic Cross Section LBVWS Model. The saturated thickness at the Glenn wellfield is between 100 and 110-feet and is thicker as you move toward the north end of the property as shown in Figure 19 - Saturated Sand Thickness (LBNRD 2011 Hydrogeologic Report).

   This project essentially reduces consumption in a 'water poor' aquifer near Fairbury and taps into a 'water sufficient' aquifer eight miles north, thus supporting efforts to make both the Fairbury and LBPWPs more sustainable for the long-term. Drought concerns for both entities will be mitigated.

## Figure 18 – Hydrogeologic Cross Section LBVWS Model



## Figure 19 – Saturated Sand Thickness (LBNRD 2011 Hydrogeologic Report)



To demonstrate the new wellfield would not negatively affect water sustainability goals, the LBNRD hired LRE Water in September 2022 to develop a numerical groundwater model (MODFLOW). The model is a useful tool to evaluate the potential drawdown effects that proposed wells will have on the Principal Aquifer and existing wells around the proposed municipal wellfield. The model, which was ran for five wells and a total capacity of 1,400 GPM, concluded there would not be a significant impact to the capacity of nearby wells. Since preparation of that report and the withdrawal of Fairbury from the water source project, Miller revised the wellfield pumping which was then reduced to only two wells with a maximum capacity of 400 GPM (28% of original modeling). Therefore, it is assumed that the development will have significantly less impact on the aquifer and surrounding wells, than previously reported.

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;

   - **List the goals the project provides benefits.**
   - **Describe how the project will provide these benefits**
   - **Provide a long range forecast of the expected benefits this project could have versus continuing on current path.**

   Through various changes in the Board and staff representatives since 2012, the goal has remained the same - to build a permanent solution and provide a sustainable and safe water supply to the LBPWP users for domestic, agricultural, commercial, industrial, and recreation uses (Crystal Springs campground). This project is ready to proceed; building a new independent water source for the LBPWPs is still a major goal for the LBNRD staff and Board of Directors. At the time of the application, this project is not contingent on any plan approvals, the design is complete, and construction would start immediately.

   With a limited quantity of water and difficulties of keeping water in the system during the 2012 drought, the new source will provide existing customers and potential customers with potable water.

   As stated in the GWMP, “Additional evidence of the value of water can be attested to in the southeast part of the LBNRD where the LBPWPs were constructed as early as 1975, 1978, and 1998 to mitigate a poor quantity and quality water in that region of the District. Because rural water became available to areas with limited supply, it provided opportunity for modern rural farmsteads, better livestock production and even business growth and expansion. All these factors demonstrate the tremendous value that groundwater provides in a thriving local economy. As competing water interests continue to grow, the proper management and development of our water resources is critical to supply water uses and meet the various groundwater demands”.

Considering long-term effects, the new water supply will spur economic growth and bring people back to an area that is currently experiencing population decline. Agricultural producers in the area who are currently limited in opportunities to expand livestock operations, will now be able to grow. Water quantity will no longer be a limiting factor to the area served by the LBPWPs.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

- **Describe how the project will maximize the increased beneficial use of Nebraska's water resources.**
- **Describe the beneficial uses that will be reduced, if any.**
- **Describe how the project provides a beneficial impact to the state's residents.**

The project will enhance the beneficial use of Nebraska's water resources by providing a long-term supply of safe, and reliable water to rural areas including the Villages of Gilead and Gladstone. Table 13 – Connection Report Summary (2019) displays the breakdown of connections for both the North and South LBPWP system.

**Table 13 – Connection Report Summary (2019)**

| | **North Water Project** | | | | |
|---|---|---|---|---|---|
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 204 | 41 | 3 | 9 | **257** |
| **People Served** | 418 | 0 | 13 | 141 | **572** |
| | **South Water Project** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 109 | 26 | 7 | 1 | **143** |
| **People Served** | 233 | 0 | 346 | 300 | **879** |
| | **North/South Project Combined** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 313 | 67 | 10 | 10 | **400** |
| **People Served** | 651 | 0 | 359 | 441 | **1,451** |

The State of Nebraska has established a preference for use, as referenced in Nebraska Revised Statute 46-613. Ground water; declaration of policy; preference in use.

*"Preference in the use of groundwater shall be given to those using the water for domestic purposes. They shall have preference over those claiming it for any other purpose. Those using the water for agricultural purposes shall have the preference over those using the same for manufacturing or industrial purposes.*

*As used in this section, (1) domestic use of groundwater shall mean all uses of groundwater required for human needs as it relates to health, fire control, and sanitation and shall include the use of ground water for domestic livestock as related to normal farm and ranch operations and (2) agricultural purposes shall include, but not be limited to, aquaculture as defined in section 2-3804.01."*

Furthermore, the LBNRD completed a robust groundwater model to ensure the project would not have a significant impact on the beneficial use of agricultural producers and private well owners around the new wellfield.

6. Is cost-effective;

- **List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.**
- **Compare these costs to other methods of achieving the same benefits.**
- **List the costs of the project.**
- **Describe how it is a cost effective project or alternative.**

The total project construction cost is $10,055,000, as provided by the project engineer, Miller & Associates. A detailed construction project cost breakdown is provided in Table 14 – Engineer's Opinion of Probable Construction Cost, the estimated Operation and Maintenance cost for the new wellfield is provided in Table 15 – Increased O&M for New Wellfield Development and a benefit-cost analysis, showing the comparison of long-term cost for purchasing water from Fairbury with anticipated treatment and improvement cost vs. the Glenn wellfield, is shown in Table 16 – Annual Cost Benefit Fairbury Purchase vs. Glenn Wellfield.

**Table 14 – Engineer's Opinion of Probable Construction Cost**

| Item No. | Description | Quantity | Unit | Unit Price | Total |
|---|---|---|---|---|---|
| 1 | Mobilization | 1 | L.S. | $90,000.00 | $90,000.00 |
| 2 | Well, Water Quality, Well Construction, Standby Generator | 2 | Each | $450,000.00 | $900,000.00 |
| 3 | Furnish & Install PVC Water Main with Tracer Wire | | | | |
| | a. 8" Diameter (2.7 Miles) | 14,256 | L.F. | $55.00 | $784,100.00 |
| | b. 10" Diameter (13.5 Miles) | 71,280 | L.F. | $60.00 | $4,276,800.00 |
| 4 | Water Main Connection to Existing Little Blue River Water Main Crossing | 1 | L.S. | $4,000.00 | $4,000.00 |
| 5 | Water Main Connection to Existing UPRR Water Main Crossing | 1 | L.S. | $4,000.00 | $4,000.00 |
| 6 | Furnish & Install Fittings, complete in place | 15 | Miles | $500.00 | $7,500.00 |
| 7 | Furnish & Install Gate Valve & Box, complete in place | | | | |
| | a. 8" Diameter | 4 | Each | $2,500.00 | $10,000.00 |
| | b. 10" Diameter | 10 | Each | $3,500.00 | $35,000.00 |

| Item No. | Description | Quantity | Unit | Unit Price | Total |
|---|---|---|---|---|---|
| 8 | Furnish & Install Air Release Assembly | 25 | Each | $5,000.00 | $125,000.00 |
| 9 | Furnish & Install Fire Hydrant Assembly | 6 | Each | $4,500.00 | $27,000.00 |
| 10 | Furnish & Install Sampling Manholes | 2 | Each | $12,000.00 | $24,000.00 |
| 11 | Furnish & Install Type 'B' Seeding | 49 | Acres | $3,000.00 | $147,000.00 |
| 12 | Jack & Bore Casing, 16" Diameter, 0.375" Steel Casing, complete in place<br>a. Union Pacific RR Crossing | 1 | L.S. | $250,000.00 | $250,000.00 |
| 13 | Directional Drilling of Creek/River Crossing, complete in place | 1 | L.S. | $250,000.00 | $250,000.00 |
| 14 | County Road<br>a. Replace Aggregate Surfacing | 13 | Miles | $12,000.00 | $156,000.00 |
| | b. Drive Crossing Replacement/Gravel | 22 | Each | $500.00 | $11,000.00 |
| | c. Drive Crossing Replacement/Paving | 10 | Each | $2,500.00 | $25,000.00 |
| | d. Hwy Return Crossing/Pavement Replacement | 8 | Each | $3,500.00 | $28,000.00 |
| 15 | 50,000-Gallon Ground Water Storage Facility | 1 | L.S. | $275,000.00 | $275,000.00 |
| 16 | Pressure Relief Valve Manhole, complete in place | 1 | L.S. | $35,000.00 | $35,000.00 |
| 17 | Booster Station, complete in place | 1 | L.S. | $300,000.00 | $300,000.00 |
| 18 | Construction Staking | 1 | L.S. | $30,400.00 | $30,400.00 |
| 19 | Meter, Radio and Installation | 400 | Each | $600.00 | $240,000.00 |
| 20 | Fixed Base Network | 3 | Each | $35,000.00 | $105,000.00 |
| 21 | Meter Reading and Billing Software | 1 | LS | $15,000.00 | $15,000.00 |
| 22 | Legal Surveys & Documents to Secure Land Rights to Well Sites | 1 | LS | $5,000.00 | $5,000.00 |
| 23 | Access Road Construction to Wells | 1 | LS | $5,000.00 | $5,000.00 |
| 24 | SCADA Integration and Controls | 1 | LS | $100,000.00 | $100,000.00 |
| 25 | Furnish Power Supply to Wells | 1 | LS | $60,000.00 | $60,000.00 |
| 26 | RR Permitting and Site Observation | 1 | LS | $15,000.00 | $15,000.00 |
| 27 | Furnish & Install Type 'B' Seeding | 35 | Acres | $2,000.00 | $70,000.00 |
| 28 | Water Main Marker Post | 60 | Each | $80.00 | $4,800.00 |
| 29 | Brush and Shrub Removal | 1 | LS | $10,000.00 | $10,000.00 |
| 30 | Sediment and Erosion Control, Recordkeeping and Inspections | 1 | L.S. | $39,000.00 | $39,000.00 |
| 31 | Land Rights | 1 | L.S. | $50,000.00 | $50,000.00 |
| | | | | Construction Contingencies (10%) | $796,400.00 |
| | | | | Survey, Design and Construction Observation (8%) | $745,000.00 |
| | **TOTAL** | | | | **$10,055,000.00** |

### Table 15 – Increased O&M for New Wellfield Development

| Cost | Description |
|---|---|
| $14,000 | Utilities |
| $7,000 | Other |
| $1,600 | Legal |
| $2,400 | Insurance |
| $32,000 | Salaries/Benefits |
| $11,840 | Repairs/Maintenance |
| $5,750 | Administrative/Office |
| **$74,590** | **Annual O&M Cost** |

Please note that the wellfield option allowed for added salaries/benefits of $32,000 per year for the new wellfield site.

When looking at cost and benefit, the new wellfield development was still the selected option based on annual equivalent cost when compared to consolidation with Alexandria as presented in Section 3, Table 9. However, this consolation effort did not proceed, so the remaining options were to develop a new wellfield or continue with purchasing water from Fairbury. The benefit of a new wellfield development far outweighed the cost of wellfield development in lieu of purchasing water from Fairbury as represented in Table 16 – Annual Cost Benefit Fairbury Purchase vs. Glenn Wellfield.

### Table 16 – Annual Cost Benefit Fairbury Purchase vs. Glenn Wellfield

| Cost Benefit Analysis | Fairbury | Wellfield |
|---|---|---|
| Water Purchase[1] | $180,540.00 | |
| O&M (from Table 9) | | $ 74,590.00 |
| P&I Payments[2] | | $149,636.00 |
| Future 20% Cost Share of Fairbury WTP P&I payments[3] | $128,276.00 | |
| Future 20% WTP O&M[4] | $112,000.00 | |
| **TOTAL** | **$420,816.00** | **$224,226.00** |
| | | |
| Tangible Benefit Ratio | | 1.88 |

1. *Assumes NO increase in cost per 1000/gallon*
2. *Payment based on $3,919,500 for 40 years at 2.25% interest.*
3. *Assumed 28% of P&I payment on $12,000,000 for 40 years at 2.25% (Range of cost was $11.2M to $15.87M)*
4. *Assumed 28% of lower annual O&M cost of $408,000*

Other options considered included:

1) Establishment of a new wellfield, also at the Glenn site, which included a total of five public water supply wells. This system was formerly referred to as the Little Blue Valley Water System (LBVWS). The total estimated cost was $20,300,000. The LBVWS was not successful after the City of Fairbury opted to not proceed.
2) Establishment of the Jefferson Thayer County Water System (JTCWS), a new public entity created jointly with the Village of Alexandria. The total estimated cost was $9,561,000. The JTCWS failed after the Village of Alexandria opted not to proceed. The annual equivalent cost was less for development of the LBNRD wellfield than consolidation with Alexandria.

When USDA-RD is funding projects, they look at two specific criteria. One is it must be modest in size and design. USDA has provided an initial round of funding commitment demonstrating the project meets this criterion of modest in design. The second factor they consider is similar system cost or user rates. The USDA-RD after evaluating similar system cost then allocates grant funds to keep the project under similar system cost. At the start of this project the LBNRD was looking at a similar system cost of 1.2% of the median household income (MHI), or approximately $50.50 per equivalent residential user. Due to project cost and maximum grant allocation, USDA cannot provide enough grant funds to make the project affordable. An influx of additional grant funding is required to lower the projected per user rate of $62.50. Prior to submitting this application, preliminary calculations were performed to see if the cost could be lowered to that user rate to get closer to the initial 1.2% MHI. With the request of $3,319,500 from WSF, the LBNRD is still looking at an equivalent user rate of $58.25/month. This rate saves the average customer $51/year over the 40-year loan. The LBNRD and its engineer strived to achieve this monthly cost through a combination of USDA-RD grants, low-interest loans taken by LBNRD, and the WSF.

As shown in the benefit cost analysis, if LBNRD was required to fund 28% of the Fairbury source improvements, the equivalent rate could be equivalent to 1.88 times higher, or approximately $110/month for a domestic user.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

- **Identify the interstate compact, decree, state contract or agreement or federal law.**
- **Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.**
- **Describe current deficiencies and document how the project will reduce deficiencies.**

Recently, the State of Nebraska has invested $4.0 million of Coronavirus State Fiscal Recovery Funds through the Drinking Water State Revolving Fund,

administered by the Nebraska Department of Environment & Energy (NDEE), to provide reverse osmosis systems to small public water systems ($2.8 million) and private well owners ($1.2 million) to remove nitrate from drinking water. Nitrates are a major concern in Nebraska and momentum is building to ensure drinking water is safe through the state. Countless other efforts are underway to obtain safe drinking water in the state.

The LBNRD is acting now, through the construction of the LBPWP wellfield, a new, lower-nitrate source of drinking water will be provided for nearly 1,450 people, the equivalent of communities the size of Hebron and Ravenna. This project marks another strong and sustained effort of the state-wide priority to combat nitrate contamination through the establishment or improvement of rural/regional water systems. This project will reduce the obligation of the State of Nebraska to intervene with its ongoing state contracts and agreements with public water suppliers and agencies responsible for overseeing water systems.

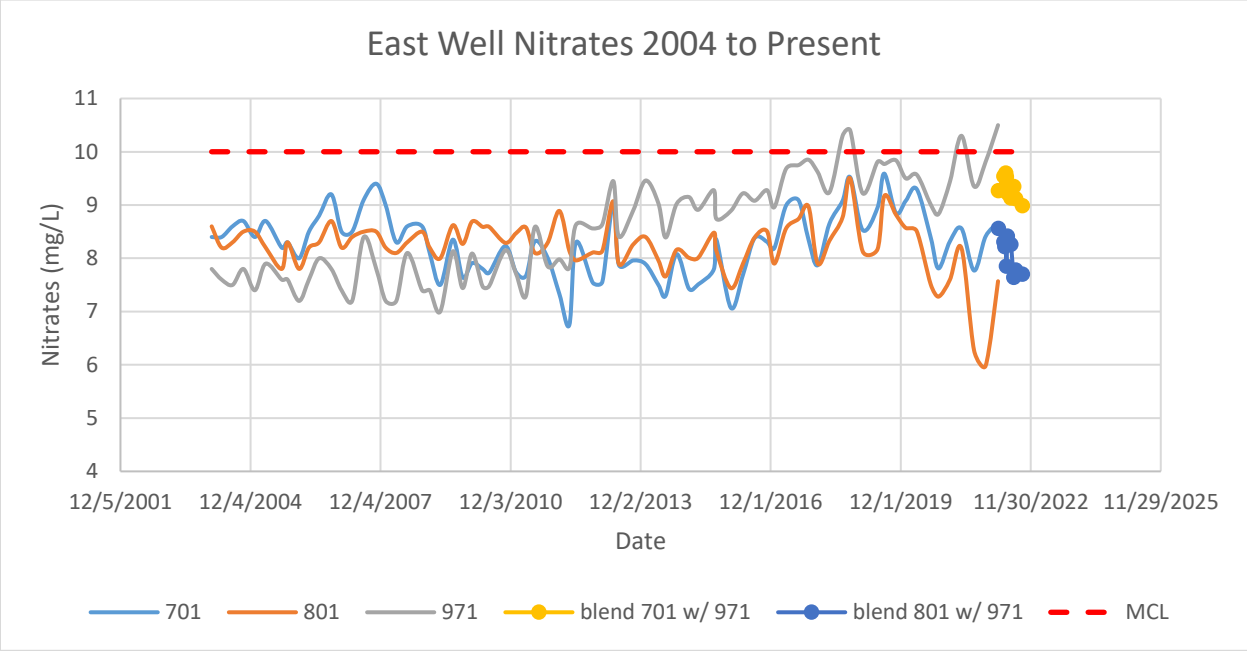
The LBPWP wellfield also addresses the 1974 Federal Safe Drinking Water Act (SDWA). Fairbury's source water supply, which is the LBPWP water source, was nearing the threshold for an Administrative Order (AO) from NDEE due to exceeding the MCL for nitrates. Only by blending can the east wellfield supply remain below the nitrate maximum contaminant level. Through this project, the LBNRD is applying their legal and fiduciary authority to provide safe drinking water for customers.

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;

- **Identify the property that the project is intended to reduce threats to.**
- **Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.**
- **Identify the potential value of cost savings resulting from completion of the project.**
- **Describe the benefits for public security, public health and safety.**

The entire project area would have reduced threats from nitrate contamination and supply deficits, as illustrated in Figure 20 – Fairbury East Wellfield Nitrate Trends. The critical infrastructure focus for this project is a public water system. There is currently a risk to the public water supply provided to LBPWP's nearly 1,500 customers – nitrate contamination, and at times, a lack of water. Nitrate contamination has been linked to a variety of health concerns, as recently documented by local news providers and the University of Nebraska – Lincoln. This project removes a physical threat to public health and ensures a long-term, safe, and sustainable water supply to the LBPWP.

**Figure 20 – Fairbury East Wellfield Nitrate Trends**




In 2017 a Preliminary Engineering Report was prepared for the City of Fairbury discussing water quantity and quality issues. Preliminary costs for treatment and water transmission improvements were outlined in this report. As part of the LBVWS, the treatment and improvement cost were updated on October 25, 2022, to make informed decisions on the development of a new source or the treatment of the existing Fairbury source. Based on the updated cost estimates by Olsson, the needed improvements would cost approximately $11.2M to $15.87M with annual operation and maintenance cost from $408,000 to $567,000. While some stakeholders lean towards nitrate treatment as an option, it would be cost prohibitive for all the public water suppliers with elevated nitrates to construct systems.

As presented in Section 3B, the LBVWS was cost sharing improvements based on water used. The LBPWP uses approximately 28% of the water supply from Fairbury. Applying the 28%, the LBRND would be responsible for a potential cost of over $420,000 per year, whereas development of the new source (over $224,000 per year), equating to a benefit factor of 1.88.

9. Improves water quality;

- **Describe what quality issue(s) is/are to be improved.**
- **Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.**
- **Describe other possible solutions to remedy this issue.**
- **Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.**

Fairbury's drinking water quality, currently ranging from approximately 8 to 9 ppm in nitrate from the blended East Wellfield provides water to the LBNRD. This would be replaced with a new source, in a different groundwater aquifer, eight miles north and six miles west, that has been tested for nitrates. This source testing has indicated the water has concentrations of 1-3 ppm nitrates. The target or service area, previously shown in Figure 3, serves nearly 1,500 people, as presented in Table 17 – Connection Report Summary (2019). After completion of the project, the LBNRD anticipates the number of services connections to grow, as a backlog of requests has built up over the last ten years.

**Table 17 – Connection Report Summary (2019)**

| | North Water Project | | | | |
|---|---|---|---|---|---|
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 204 | 41 | 3 | 9 | **257** |
| **People Served** | 418 | 0 | 13 | 141 | **572** |
| | **South Water Project** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 109 | 26 | 7 | 1 | **143** |
| **People Served** | 233 | 0 | 346 | 300 | **879** |
| | **North/South Project** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 313 | 67 | 10 | 10 | **400** |
| **People Served** | 651 | 0 | 359 | 441 | **1,451** |

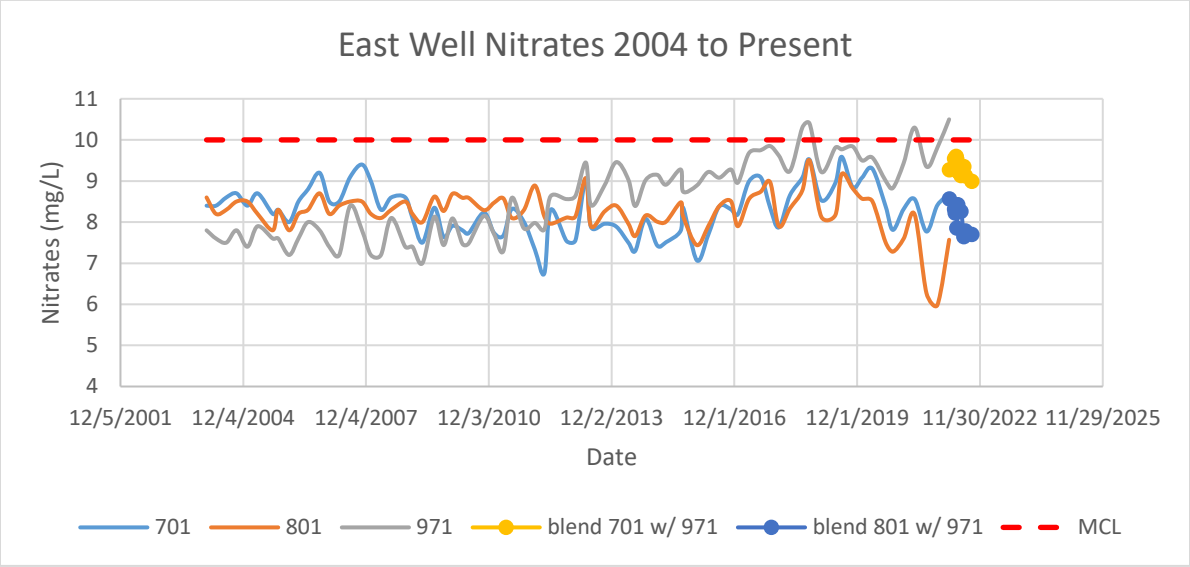
Other possible solutions attempted by the LBNRD include:

1) **2012 – 2022** – Numerous discussions with the City of Fairbury to increase the capacity to the LBPWS, negotiations on rates, and evaluation of new wells south of the City. The proposed south wellfield did not yield water.
2) **June 2019** – LBNRD created a draft Cooperative Agreement with the Village of Alexandria to provide water. No action was taken.
3) **August 2019** – LBNRD staff talked with Village of Jansen to discuss a joint project. No action was taken.

4) **August 2019 – July 2021 -** An evaluation of potential new water sources, consolidation with other communities and six waterline routes was completed by Miller & Associates and presented to the LBNRD.
5) **July 2021** – A proposed wellfield north of Fairbury was selected, east of the current site, two miles southeast of Daykin and located partially within the Lower Big Blue NRD (LBBNRD). During a public landowner and informational meeting, the LBBNRD stated water could not be transferred across NRD boundaries.
6) **January 2022** - Formation of the Little Blue Valley Water System (LBVWS), a new public entity of Fairbury and LBNRD to manage a combined water system with a new wellfield, at the proposed location.
7) **February 2022 -** Test hole drilling, test pumping, state approvals and water quality testing was completed by Miller on the wellfield site.
8) **November 2022** – The Fairbury Council voted not to proceed with the new water source as part of the LBVWS.
9) **November 2022** – LBNRD terminated the LBVWS agreement with Fairbury.
10) **December 2022** – LBNRD proposed the Jefferson Thayer Counites Water System (JTCWS) a new public entity with the Village of Alexandria.
11) **February 2023** – The Village of Alexandria did not proceed with the JTCWS, prompting the LBNRD to terminate negations.

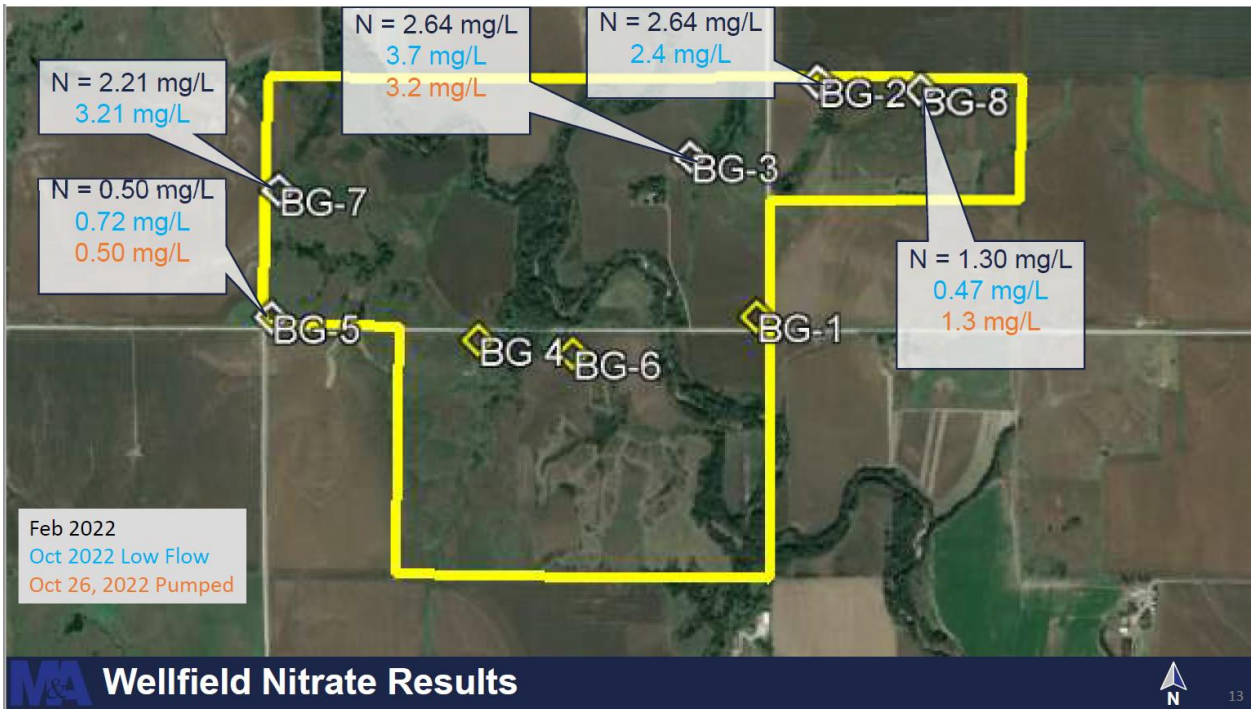
Elevated nitrates in the current water supply have been a concern for the last 20+ years. In 2022 the biofilm that has built upon Fairbury's Crystal Spring biological filters, only adding to the concern, now with two water quality issues facing the current water supply. The trend of nitrates in Fairbury's current water supply, the East Wellfield, is shown in Figure 20 – Fairbury East Wellfield Nitrate Trends.

**Figure 20 – Fairbury East Wellfield Nitrate Trends**



The nitrate concentrations were monitored by LBNRD at the time the five test wells were constructed in 2022 as seen in Figure 21 – Glenn Wellfield Nitrate Results 2022.

**Figure 21 – Glenn Wellfield Nitrate Results 2022**




10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- **Identify the local jurisdiction that supports the project.**
- **List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.**
- **List other funding sources for the project.**

The users of the LBPWPs will be responsible for the local share of the construction cost. Property tax income, which is obtained by LBNRD under state law, will not be used to pay for the project. The LBPWP will provide a cash match to build the source water project through grants and loans from the USDA-RD. Documentation of the financial commitment of the LBNRD and LBPWP is provided in Appendix A.

There is sufficient annual revenue within the LBPWP's annual budget, specifically user fee revenues obtained by the district allowable through state law (Appendix D). The user income fee for the North system is $180,000 with a total budget of $364,332, which included possible income of $193,364 from grants/loans. The south user income is projected at $160,000 with a total budget of $343,980 including possible income of $193,364 from grants/loans. For both projects, $42,750 is budgeted for salaries for two part-time employees.

While property tax is not actually utilized to repay the cost, LBNRD is the local jurisdiction leading the project and is responsible for the administration of the LBPWPs through its Board of Directors. The LBNRD has the adequate professional, technical, and financial support to manage the project. The LBPWP covers the cost for LBNRD staff to manage the LBPWPs.

The USDA-RD is the other funding source and is providing an initial grant of $1,008,000 from the original budget and borrowing the local share to the LBNRD, starting with an initial loan in the amount of $2,844,000. The LBNRD will continue working with USDA-RD to obtain the remaining funding from the USDA-RD. The USDA-RD was not able to commit the subsequent loan and grant figures at this time until a direction was selected, and the land was secured. As documented in this application, the LBRND has committed to a cost-effective solution and USDA is willing to provide additional funding with this commitment. A summary of cost by funding source is shown below in Table 18 – Cost Summary by Funding Source.

**Table 18 – Cost Summary by Funding Source**

| **Project Cost** | **$10,055,000** | ***% of Total*** |
|---|---|---|
| USDA Grant Anticipated Total | $2,216,000 | *22.0%* |
| Remainder | $7,839,000 | *78.0%* |
| | | |
| Local (50%) | $3,919,500 | *39.0%* |
| WSF (50%) | $3,919,500 | *39.0%* |

11. Has a local jurisdiction with plans in place that support sustainable water use;

- **List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.**
- **Provide the history of work completed to achieve the goals of these plans.**
- **List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.**
- **Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.**
- **List all stakeholders involved in project.**
- **Identify who benefits from this project.**

The LBNRD's primary planning document used to identify a safe supply of water for the LBPWP is the September 2020 'New Source Investigation' prepared by Miller & Associates. Referred to as the Preliminary Engineering Report (PER), it can be found in Appendix B. The project will have a direct benefit to nearly 1,500 people which includes the communities of Gilead and Gladstone as shown in Table 19 – Connection Report Summary (2019).

## Table 19 – Connection Report Summary (2019)

| | North Water Project | | | | |
|---|---|---|---|---|---|
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 204 | 41 | 3 | 9 | **257** |
| **People Served** | 418 | 0 | 13 | 141 | **572** |
| | **South Water Project** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 109 | 26 | 7 | 1 | **143** |
| **People Served** | 233 | 0 | 346 | 300 | **879** |
| | **North/South Project** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 313 | 67 | 10 | 10 | **400** |
| **People Served** | 651 | 0 | 359 | 441 | **1,451** |

The LBNRD has four plans in place that support sustainable water use. Highlights from each of the plans, and the specific goals and objectives that relate to this project, are shown below.

The **2017 LBNRD Groundwater Management Plan** (GWMP) acknowledges that "nitrates are the most common groundwater contaminant which pose public health concerns for residents of the LBNRD". This project meets the goal of the GWMP to protect public health by assisting public water suppliers in locating safe and reliable water sources. The GWMP also acknowledges the action taken to construct and maintain the LBPWP to mitigate poor quantity and quality in the region. The following is taken from the 2017 GWMP, Section 3.7:

*"Additional evidence of the value of water can be attested to in the southeast part of the LBNRD where the Little Blue Public Water Systems were constructed as early as 1975, 1978 and 1998 to mitigate a poor quantity and quality water in that region of the District. Because rural water became available to areas with limited supply, it provided opportunity for modern rural farmsteads, better livestock production and even business growth and expansion. All these factors demonstrate the tremendous value that groundwater provides in a thriving local economy. As competing water interests continue to grow, the proper management and development of our water resources is critical to supply water uses and meet the various groundwater demands."*

The **2019 LBNRD Master Plan** states the following goal, which is achieved through the LBPWP wellfield project.

## GOAL 1: MAINTAIN AND PROTECT GROUNDWATER RESOURCES AND PUBLIC WATER SUPPLIES FOR BENEFICIAL USES

Objectives

- Ongoing development and implementation of a comprehensive water management plan.
- *Operate and maintain existing rural water supply projects*
- *Develop a systematic process for evaluating the feasibility of potential water supply projects*
- *Assist communities with wellhead protection*
- *Identify potential sites for new developments*
- Maintain integrity and functionality of existing structures
- Strive toward Compact compliance concerning the Blue River Compact

Activities

- *Groundwater level monitoring and data collection*
- *Initiate comprehensive hydrogeologic investigations to fill data gaps*
- Develop a dedicated monitoring network
- *Conduct groundwater quality monitoring and track trends*
- *Promote new water resources technologies and tools*
- Offer education and technical assistance
- Assist with proper decommissioning of water wells
- Enforce irrigation runoff rules and regulations
- Investigate opportunities for enhancing groundwater recharge
- *Management staff will oversee rural water systems*
- *Develop and implement standard operating procedures*
- Complete GPS locations of all facilities
- Develop GIS databases for all facilities linked to GPS locations
- Change out 10% of existing meters per year on old system

The **LBNRD Integrated Management Plan** (IMP), dated **August 2019**, states the following goal, “Goal 2: Scientifically sound, locally based management actions to protect interconnected groundwater and surface water”, Objective 2.2, “Manage expansion of water uses”, Action Item 2.2.3 “Investigate and development water storage, groundwater recharge, and augmentation projects in areas where long-term groundwater level declines exist.

The LBNRD achieved this goal through its thoughtful and detailed scientific evaluation of the new water supply source. A numerical flow model (MODFLOW) was established to ensure the new wellfield was in an area known to have a plentiful water supply and would not further contribute to declines seen in other areas of the district.

The **LBNRD Little Blue River Basin Water Management Plan (WMP)**, completed in 2015, addressed water quality and quantity issues district wide. The

WMP was driven by a diverse group of stakeholders who identified 'nitrate contamination of groundwater' as the second highest priority. The WMP outlines actions to provide resources to public water systems that would reduce the threat from nitrates. At that time, Fairbury was listed as a 'high' priority level for wellhead protection area concerns due to having nitrate concentrations over 7 ppm.

Project stakeholders include the users of the LBPWPs including the Villages of Gladstone and Gilead, LBNRD, and the USDA-RD. The citizens obtaining drinking water and/or water for livestock operations will benefit from the project.

Also benefiting are the rural economies of south central Nebraska. Dozens of potential property owners seeking new homes, businesses, and industries have put plans on hold for over a decade when they were told by the LBNRD that they could not increase the supply to the LBPWP due to capacity issues with Fairbury's water supply. With the addition of Glenn Wellfield, the LBPWP will discontinue to purchase water from Fairbury and be able to say 'yes' to these requests. The agricultural economy will benefit.

12. Addresses a statewide problem or issue;

- **List the issues or problems addressed by the project and why they should be considered statewide.**
- **Describe how the project will address each issue and/or problem.**
- **Describe the total number of people and/or total number of acres that would receive benefits.**
- **Identify the benefit, to the state, this project would provide.**

Nitrate contamination is among the state's top issues. The NDEE, NRDs, University of Nebraska Medical Center, agricultural producers, and many other related groups have been communicating regularly throughout 2022 and into 2023 after news articles raised attention to the potential connection of nitrate contamination in drinking water and various forms of cancer. Given that nitrate is a non-point source of pollution, it is a statewide issue as recently brought to light by the series of articles by the Flatwater Free Press.

This project will switch the water supply for the LBPWPs from a source documented to have rising nitrate levels, approaching the federal listed 10 ppm MCL, to a source recently tested to have levels between 1-3 ppm. The project has been designed so the public water supply wells will pump deep, and slow. The wells will be constructed to reduce the ability of the water near the top of the aquifer, which could be higher in nitrates, will not be pulled deeper into the aquifer during pumping.

The total number of beneficiaries is shown in Table 20 – Connection Report Summary (2019).

### Table 20 – Connection Report Summary (2019)

| | North Water Project | | | | |
|---|---|---|---|---|---|
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 204 | 41 | 3 | 9 | **257** |
| **People Served** | 418 | 0 | 13 | 141 | **572** |
| | **South Water Project** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 109 | 26 | 7 | 1 | **143** |
| **People Served** | 233 | 0 | 346 | 300 | **879** |
| | **North/South Project** | | | | |
| | **Residential** | **Livestock** | **Commercial** | **Transient** | **Totals** |
| **Connections** | 313 | 67 | 10 | 10 | **400** |
| **People Served** | 651 | 0 | 359 | 441 | **1,451** |

13. Contributes to the state's ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- **List other funding sources or other partners, and the amount each will contribute, in a funding matrix.**
- **Describe how each source of funding is made available if the project is funded.**
- **Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.**
- **Describe how you will proceed if other funding sources do not come through.**

The WSF contribution will provide financial relief to the LBNRD and reduce the substantial water rate increases they are facing. The WSF will be leveraged with federal funding provided by the USDA-RD in two forms, including a grant and a low-interest loan provided to the LBNRD to pay their local share. The USDA-RD and LBNRD have provided a letter of conditions provided in Appendix A. The cost breakdown is shown in Table 21 – Cost Summary by Funding Source.

### Table 21 – Cost Summary by Funding Source

| **Project Cost** | **$10,055,000** | ***% of Total*** |
|---|---|---|
| USDA Grant Anticipated Total | $2,216,000 | *22.0%* |
| Remainder | $7,839,000 | *78.0%* |
| | | |
| Local (50%) | $3,919,500 | *39.0%* |
| WSF (50%) | $3,919,500 | *39.0%* |

State and local funds are further leveraged by a donation from the Glenn family, owning the property where the wellfield will be located. The property owners offered the LBNRD a no-cost easement to their land as a good-will offering to the

citizens of the LBNRD for access roads, the wellfield, and utilities. A letter of intent from the Glenn Family is included in Appendix A.

If WSF is not approved, the LBNRD may need to delay the project by at least one year to locate alternative funding sources and/or would consider reapplying to WSF in 2024. The LBNRD will remain in communication with USDA-RD for final confirmation of tentatively obligated funding.

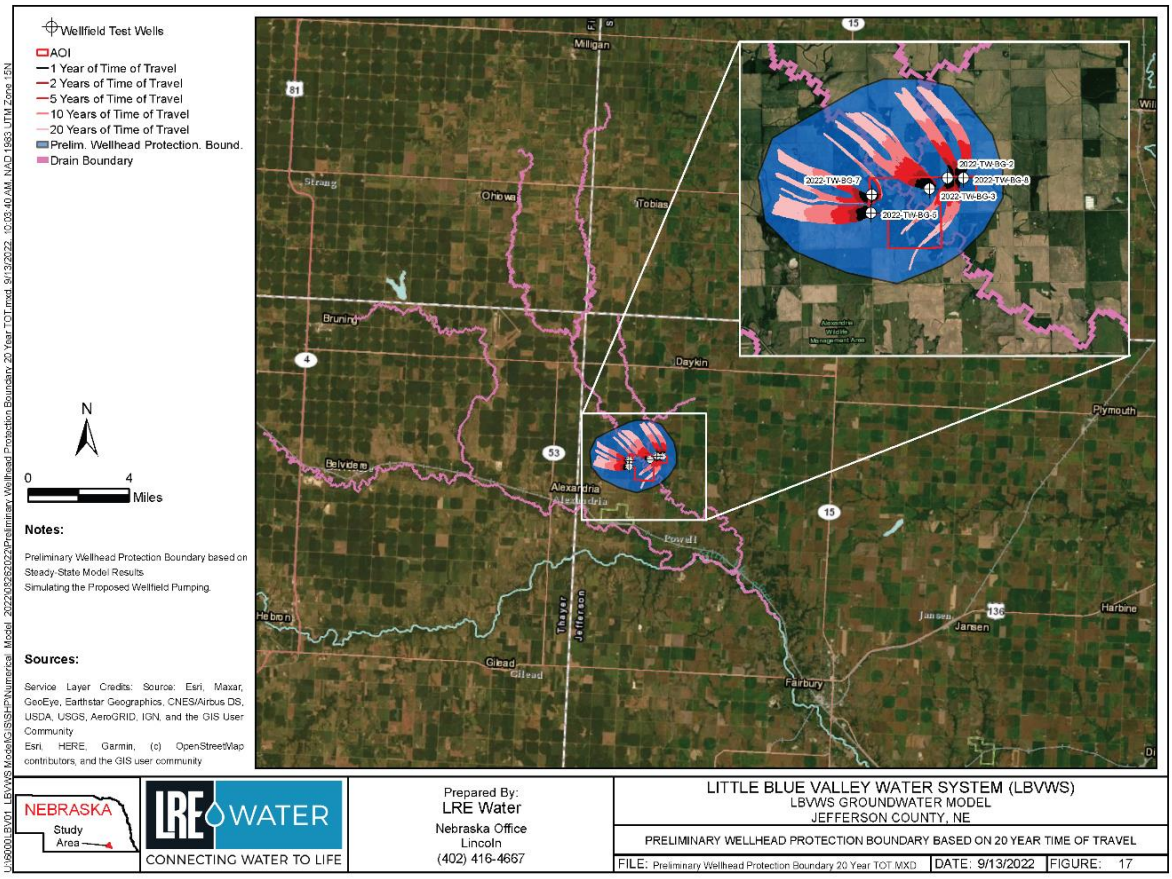
The water purchase agreement, renewed on January 1, 2023 for 25-years with Fairbury, has been extended to January 1, 2048. After this time, it is expected the water rates will be increased again, and an additional financial burden will be placed on the users of the rural water district.

14. Contributes to watershed health and function;

- **Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.**

The new Glenn wellfield is adjacent to the Little Sandy Creek, part of the Lower Little Blue watershed (HUC 10270207). The LBNRD will work with NDEE's Wellhead Protection (WHP) Program to establish a WHP area, using the existing 3D numerical flow model (MODFLOW). The WHP area will delineate the surface area above the source water aquifer and will be the basis for a WHP Plan for the LBPWP public water supply. The numerical flow model was run in 2022 to identify the capture zone, which is the basis for a future official WHP Area, shown in Figure 22 – 20-Year Capture Zone Time-of-Travel. It is important to note the capture zone representative includes five wells at withdrawal for both Fairbury and LBRND and would be recreated for the two wells selected for the Glenn wellfield for the LBRND only.

## Figure 22 – 20-Year Capture Zone Time-of-Travel




The LBNRD has an interest in establishing a wellhead protection program once the wells are operating. This program will work with agricultural producers to reduce the infiltration of nitrates past the root zone and to the aquifer. The goal of the program will be to ensure crops are fully utilizing any fertilizer that is applied, to maximize the yield of the crop, while protecting the groundwater simultaneously. Potential conservation practices could include crop-to-grass conversion, increasing residue and organic matter, cover crops, grass buffers, and similar types. These practices will also reduce nutrients and sediments that would otherwise flow to Little Sandy Creek, passing near the Glenn wellfield, and downstream to the Little Blue River.

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- *Identify the date of the Annual Report utilized.*
- *List any and all objectives of the Annual Report intended to be met by the project*
- *Explain how the project meets each objective.*

The six goals described below were taken from the Annual Report to the Legislature and Plan of Work 2021-2022.

**Goal #1** – "Establish strong state leadership, involvement, and support for science-based decision-making that is necessary to sustain state and local water management outcomes".

- For decades, the NeDNR has relied on various forms of groundwater modeling to lead scientifically based decision-making for water management across the State. The same can be said for the LBNRD, who worked with engineers and hydrogeologists to create two groundwater models to assess the new Glenn wellfield. First, the initial design utilized an analytical and particle tracking model to forecast drawdown and potential effects on neighboring wells. Then, after further questions were raised, a robust 3D groundwater flow model (MODFLOW) was created in 2022. This model agreed with the first, that impacts were minimal to adjacent wells at the increased pumping rate for the LBVWS joint project of five wells and helped graphically illustrate the effects of the wellfield during four meetings, each open to the public to gain feedback. Resources of the NeDNR were used to support the construction of the model. This impact would be less for the two proposed well for the LBNRD wellfield.

**Goal #2** – "Provide high-quality products and services through the performance of our duties in the areas of floodplain management, flood mitigation planning, dam safety, and survey to promote the safety of all Nebraskans".

- The project is located out of a floodplain. NeDNR mapping resources will be used during design and construction to ensure that the project has no impact on the floodplain and that pump houses are located out of the floodplain.

**Goal #3** – "Develop and implement customized and decentralized water management plans established through collaboration with local Natural Resource Districts and stakeholders that provide for the long-term sustainability of the state's water resources".

- As previously described, the LBNRD is aware of the groundwater declines and is working to improve water sustainability in the district. The WSF has been used previously by LBNRD to locate and build five groundwater recharge projects. The existing management plans provided valuable information for the siting of the LBPWP wellfield helping to ensure the pumping will not negatively affect the aquifer.

**Goal #4** – "Encourage strong public engagement with multiple constituents and stakeholder groups in planning and implementation activities to ensure that local and state needs are addressed"

- The LBNRD staff exhausted tremendous resources during the planning of a new wellfield including numerous meetings with the Village of

Alexandria, the City of Fairbury, the City of Hebron, the Lower Big Blue NRD, the USDA-RD, and property owners. Two formal presentations were provided by consultants who built the groundwater flow model to answer questions from concerned property owners. Ultimately, the open communication and opportunities for public engagement led to the success of the project thus far.

**Goal #5** – "Protect existing water uses through collaborative investments in water resource projects, planning, administration and permitting of surface water rights, and the registration of groundwater wells".

- Correspondence occurred with NeDNR to file an intent to consider a wellfield in January 2023. The LBNRD made this move to help ensure other well developments would not encroach on the future setbacks of the two new public water supply wells.

**Goal #6** – "Provide agency-wide services and support in the areas of information technology and transparent data sharing, business process improvement, public information, and administration of state-aid funds in conjunction with the NRC".

- With the success of the new LBPWPs water supply, the LBNRD and NeDNR, in conjunction with the NRC, will meet Goal #6 completely.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- **Describe the federal mandate.**
- **Provide documentary evidence of the federal mandate.**
- **Describe how the project meets the requirements of the federal mandate.**
- **Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.**

The LBNRD has a responsibility to provide a long-term safe and reliable supply of domestic water to the users of the LBPWP under the Safe Drinking Water Act, a federal mandate passed by Congress in 1974.

Given that NRDs are tasked by the State of Nebraska to manage groundwater, nitrates are viewed as a federally mandated drinking water quality issue. As nitrates elevate, as previously described, the LBNRD is mandated by the federal government to act as a current partner with Fairbury, should they exceed the 10 ppm MCL.

The LBPWP is the action that will ensure the LBNRD meets this federal mandate. The LBNRD is acting proactively to ensure a local issue (nitrates) is managed by a local authority (NRD), rather than continuing down the same path and risking an Administrative Order for nitrate contamination for the existing water supply, thus involving the U.S. EPA and NDEE.

The health effects of nitrates in infants and elderly people have been well documented and recently discussed at length across the State of Nebraska. The MCL was established based on sound research. Without the LBPWP rural water system, not only would a majority of these residents not have any water, but if they could develop their own well, it could likely be elevated in nitrates and most private well owners rarely, if at all, sample their well water quality, thus potentially affecting their health.

This project has protected the rural water system by providing drinking water meeting the federal standards for over 40 years, and is seeking a lower nitrate source that will continue to provide drinking water meeting the federal standards for years to come.