



**BUILD A BETTER
GRINNELL**

Priority Need Report

Water Quality

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Executive Summary

- *Improve water quality* was ranked as the #2 priority in the needs prioritization survey. High concern for the issue cuts across all demographic groups living in the city.
- Parts of the city's drinking water infrastructure are in poor condition and outdated. In the spring of 2022, the city's water softener was taken off-line.
- The city plans to replace the water treatment facility with nanofiltration membrane technology, dig a new well, build a new water tower, and replace 11,500 feet of water main. The project is anticipated to be completed in 2026.
- Despite being hard, Grinnell's water has regularly passed EPA contaminant testing.
- Research participants expressed concern with the impacts of hard water in their homes, and many choose not to drink tap water directly due to concerns with taste and uncertainty about its potability. There was also concern that these issues are more impactful on low-income households and that they negatively impact the community as a whole.
- Many would like to see more communication or accessible information on the state of water. Many more demonstrated communication gaps through various misunderstandings
- The planned water infrastructure improvements will address water hardness, influence the taste, and provide one of the most reliable systems available for maintaining water safety standards.
- Public education and making information easily accessible would likely help to alleviate much of the anxiety, frustration, and misunderstanding that currently exists.
- Many would like more information on what they can do (and who can help) to mitigate impacts of hard water while the new system is being put in place.

Background, Purpose & Scope

Build a Better Grinnell 2030 Project

This Prioritized Issue Report represents one product of the non-partisan Build a Better Grinnell 2030 Community Visioning project (or BABG 2030). The broader project has involved an assessment of Grinnell's strengths, needs and visions for people who live and work in the community, or rely on resources within Grinnell, through a collaborative approach focusing on community input and engagement. The project's ultimate goals include:

- Building community pride and facilitating positive branding by identifying community strengths
- Enhancing organizational connections and community cohesion and building a commitment to action around a set of priorities through a collaborative and broadly participatory process
- Facilitating community growth and development for the next decade by identifying and illuminating the local context of a prioritized set of needs, together with community assets and policy options that are actionable, impactful, and easy to understand.

BABG 2030 is funded by the U.S. Department of Agriculture Rural Placemaking Innovation Challenge program. Co-funding is provided by the City of Grinnell, Grinnell Mutual, Grinnell College, and the Claude & Dolly Ahrens Foundation. The project is guided by a 20+ person steering committee representing a broad range of local constituents and community members.

The BABG research has taken place in three main phases, all involving significant community input: 1) an identification of the range of assets, strengths, and needs in the community; 2) selection of seven priority needs; and 3) a deeper assessment of each of the prioritized needs. The methodology is discussed in greater detail under the methodology section. The main products of this research will include:

- A broad-based assessment of Grinnell. This document will cover a broad range of themes and community services (e.g., healthcare, childcare, aging, food, housing, recreation, education, etc.), providing an overview of community strengths, assets, and needs.
- A community-based identification and prioritization of needs.
- Detailed assessments of each of seven top prioritized issues.

The Prioritized Issue Reports

The seven needs prioritized by the community were, in order:

1. More variety of restaurants.
2. Improve quality of drinking water.
3. Improve k-12 buildings and infrastructure.
4. Improve or expand mental health care services.
5. Improve roads & road maintenance.
6. Less racism.
7. Higher wages or lower prices.

This document represents the detailed assessment for *Improve quality of drinking water*.

What this Report Is, and What it Is Not

Our primary goal with this report is to provide the community with information to help stakeholders make informed choices and address the prioritized need. At its core, this is a participatory community-based needs assessment. It is an effort to bring in diverse voices of persons who live, work, or rely on Grinnell for resources, together with input from individuals who have worked in the community to service the needs in question or otherwise might be considered experts. Our goal in seeking community-wide input is both to empower community members to participate in community development, as well as to better understand the experiences surrounding each identified need, how the need affects members of the community, what underlying causes people see leading to the issue, the obstacles they personally face and that the broader community may face in resolving the issue or ameliorating its impacts, ideas they have for what can and should be done, and what they see as strengths and assets in the community that may contribute to solutions.

The goal of this report is not to answer each of these questions definitively. In some ways the core of this report reflects the results of a community-wide brainstorming session (e.g., where everyone in a room shares ideas on Post-it notes that all go on a board and are then organized by themes). The review of problems, impacts, causes, and solutions are provided from the perspective of members of the community, not the research team nor the project steering community. We have sought to gather input broadly from the community, particularly from those who may not frequently have a voice in decision making, and to share that input here. We believe that listening to and giving voice to such community members is valuable in itself and can be a means to solve problems. To highlight this value, we share the following vignette. At the end of one focus group hosted by a low-income community member in her home, she used our provided script to ask if there was anything else the participants wanted to add. One responded, “I’m just grateful to be able to, to be allowed to participate, that maybe my opinion matters.”

As is good practice in brainstorming sessions, we have not attempted to edit or filter input, nor are we trying to be arbiters of whose ideas are correct or not. Rather we have gathered lots of ideas and sorted them into themes. We do attempt to make note when there are contradictory views, or when there are clear factual inaccuracies. However, we believe it is valuable to represent all the voices who shared their ideas with us. Experiences differ, perspectives differ, even experts can disagree on underlying causes, and there are usually multiple possible solutions to any problem. Additionally, people make decisions on how they understand a situation, so even if all experts agree that some perspective represents a misunderstanding, knowing what the misunderstandings are and how common they are can be valuable to decision makers. Also, we expect that those who take on these issues will have expertise at the table.

While the experiences and ideas shared by members of the community is the core of the report, we also share additional information to help decision makers reach their own conclusions about what part of the problem might be addressed and how. This includes an overview of the current Grinnell context related to the prioritized issue in terms of relevant infrastructure and resources, key measures, historical information, key inflection points, and ongoing efforts, as well as comparisons to a selected group of peer communities. In most cases we have also sought to provide our own input (making it clear when this is the case) to the community asset list when we have identified relevant organizations or other assets that did not come up in interviews, surveys, or community sessions. Finally, we provide some information on policy options pursued in other communities, and assets available outside of the community (e.g., funding resources or resource hubs), though these are not intended as endorsements.

Who is this Report for?

Each issue report is intended for those organizations and individuals interested in addressing some aspect of the issue or well positioned to do so. The Build a Better Grinnell Steering Committee plans to help as necessary to bring such persons together to discuss the findings and consider next steps, though any group is welcome and encouraged to make use of the findings of this report.


In most cases, multiple action priorities can be identified with a diverse range of possible solutions for each issue. It is possible that a single well-positioned group or organization will elect to take on all priorities related to a single issue. It is also possible that different groups will tackle different action priorities and possible solutions. It is possible that only one or a limited number of action priorities will be taken on. It is possible that new coalitions or interest groups will form to take on issues with no other “home,” or alternatively with many possible homes. In the spirit of community-based development, we hope that members of the community most impacted by these issues will continue to be included in decision making in ways that positively inform the details of action plans. While we provide a review of community input below, we mostly review the challenges or concerns that exist under current systems, not potential ones. Users of the services in question can provide valuable insight.

How to Use the Data


The experiences on the nature of the problem and its impacts or consequences should help to understand where some of the key areas of concern are within each of the broader issues. Those sections of the report address who is affected and how. Causes or obstacles that people have identified can be looked at as possible intervention points suggesting areas for solutions. These, together with community members’ specific suggestions for solutions as well as policy options tried elsewhere, provide a range of ideas.

One might start by considering which of the impacts or problem areas should be prioritized, and what causes or solutions relate most closely to those. A policy analysis approach is to start with a specific problem or part of the problem, identify a number of possible solutions (evidence-based or community generated), and then compare the options in terms of key criteria such as cost, feasibility (could this approach be used in Grinnell given things like available infrastructure and the political or cultural climate), and efficacy (if the solution could be implemented, how much of the problem is it likely to solve). This weighing of options can benefit from considering the resources and strengths available in the community or those that could be brought to the community that might support different solutions. Those making use of the document should also apply their own understanding and experience of the community. Another strategy is to apply force-field analysis, which considers what the forces are both in favor and against a particular solution, and considering how forces in favor might be strengthened and forces against diminished to enable action.

In each section where we report on community input, we provide data on the number of community sessions, interviews, and surveys in which an idea was identified. Such counts can be useful for getting a sense of where there is consensus on who is affected and how and may indicate good areas for intervention. Relatively high counts may also indicate areas where there is consensus on obstacles and possible solutions.



We suggest thoughtful caution on how much weight is given to the “counts.” Much of the detail in this report is gained from the listening sessions and focus groups. These are very useful for gaining a sense of the diversity of concerns, experiences, and ideas. They are also useful in getting people to talk to one another. They do not serve, however, as a random or representative survey. Not everyone participates equally, and just because an issue isn’t raised in a session doesn’t mean that no one agrees with it or is thinking about it. The potential of bias decreases some the more sessions that are held. Still, something raised in 10 sessions is not necessarily more common or important than something raised in 8. Additionally, just because something was raised in many sessions doesn’t mean that it was more impactful than something raised only by a few persons. Also, minority opinions are not necessarily less valuable in considering solutions. Innovation often reflects a change from the consensus view on how to do something. This is not to suggest that the counts are not useful, just that they should not be used to apply too much nuance and should be considered with other factors in mind. It is up to those who organize to take action to review the data provided and decide what solutions seem most important and probable given the totality of evidence.



Methods

Research was conducted through three primary phases, though some of the data collection (particularly gathering archival materials and key stakeholder interviews) has continued over the entire research period.

Phase I: The Community Visioning Survey

A community-wide visioning survey ran from December '22 through March '23 and asked individuals who live or work in Grinnell, or rely on Grinnell for key resources, twelve open-ended questions concerning what they felt were the strengths and needs in the community. In total, 603 surveys were completed, and 120 additional individuals provided a response to a single question posed on Facebook or in person. Since many surveys were taken by groups (as large as 15-20 people), it is impossible to know precisely how many participated in total, but the research team feels confident that it was over 10% of the Grinnell population.

To process the data from the open-ended surveys, the research teams sorted responses into general categories (e.g., healthcare, or things to do) and then identified and organized data into sub-categories (e.g., more mental healthcare services, more community events). There were many cases in which the same distinct response was only provided by a few people. Rather than creating hundreds of sub-categories, we looked for ways to group many of these responses together under a shared theme. For example, individuals asking for Indian, Thai, Vegetarian, or a wide range of restaurants were all grouped together under "greater variety of restaurants."

Subcategories that reflected more than 1% of all responses or had a high number of very specific responses (e.g., events for teens or teen hangout spaces) were selected to move forward to a prioritization phase. Forty-six issues were identified in the open-ended survey. The data from phase one is available at www.buildabettergrinnell.org.

Phase II: Prioritization Phase

Our next step was to determine which of the forty-six issues were most important for those who live, work, or rely on Grinnell for resources. The follow-up *Needs Prioritization Survey* asked individuals to select and rank up to seven issues. The survey also asked for demographic data so we could better determine who was most affected by the range of issues, and we invited individuals to provide their contact information if they were willing to participate in follow-up focus group on the prioritized issues. It was launched on May 9, 2023, and closed on July 16. We distributed the survey widely, promoted it frequently over ten weeks, and received 1270 complete surveys from individuals.

We identified the top choices for a range of demographic groupings using a rank-order voting method. This data, as well as additional details on the methodology is available on www.buildabettergrinnell.org. The top five issues to follow through to phase three were determined by taking the top two issues identified by lower-income respondents and the next three issues from all respondents.¹ The method and the selection process were determined and publicized prior to distributing the survey. Our definition of lower-income corresponded roughly to Iowa's definition for use with Medicaid eligibility (varying by household size).

¹ Grinnell College student responses were multiplied by .3 to weight their responses relative to their population as a proportion of Poweshiek County.

The top five issues identified through the prioritization survey are:

1. Improve Quality of Drinking Water
2. More Variety of Restaurants
3. Improve K-12 Buildings and Infrastructure
4. Improve or Expand Mental Health Care Services
5. Improve Roads and Road Maintenance

The steering committee selected the final two issues to move to the next stages from among those highly ranked needs that did not make the top five through the prioritization survey. The committee took into consideration issues of equity and the overall welfare of the community, as well as what other initiatives are already underway in the community. The two issues selected were:

6. Less Racism
7. Higher Wages or Lower Prices

There were other issues that steering committee members discussed as important concerns for the community, particularly those affecting lower-income families, such as affordable housing and childcare. *Higher wages or lower prices* was seen by many as a good final pick both because it was ranked third by lower-income individuals and seventh by all respondents. It was also seen as a potentially good way to hear more from those members of the community with financial challenges about what issues were most important.

Phase III: Community Sessions (Listening Sessions, Focus Groups, and Community Hosted Discussions)

The final research phase focused on gaining more detailed information from the community to better understand the prioritized issue. This was done primarily through community listening sessions, focus groups, and community hosted discussions.

We scheduled one listening session and three focus groups each month between late September and mid-December 2023, for twelve sessions total. We frequently advertised these throughout the community, and specifically reached out to individuals who provided contact information and indicated an interest in participating in this stage in the prioritization survey. Listening sessions were all held in public spaces in the Grinnell's Drake Community Library and open to the public on a walk-in basis. Focus groups were also primarily scheduled for the library,² were limited to 6 participants, and required signing up. Attendees at these were paid. We also hired six individuals from lower-income households to conduct up to seven focus groups each (one on each issue) with their friends and family. We provided funding for a meal for the group and left it up to them how many and which issues they elected to address.

For *Improve Quality of Drinking Water*, we had 10 Sessions in total, including 6 focus groups, 3 listening sessions, and 1 session that was hosted by a low-income community member in their home. We were not able to generate a group for three planned focus groups. On average the sessions had 3-5 attendees each.

At all sessions, participants were asked to share their experiences and identify what they saw as the nature of the problem, its impacts on their lives, their thoughts on why it exists, what obstacles are faced in addressing it (for them and the community more broadly), their ideas for possible solutions, and strengths and resources in the community that might be helpful. A full list of questions used to guide these is provided in Appendix 4.

² Some other arrangements were made when in the interest of scheduled participants for some issues.

In listening sessions, all participants were given an opportunity to respond to each question. The goal was to give everyone a chance to contribute what they would like, but it is not required that they respond at all. Focus groups are generally intended to be more dynamic. A list of questions served as a guide, but participants were also encouraged to have a conversation, and the sessions were given more flexibility to explore directions that might not have been foreseen by the facilitator. Because attendance was typically not too large at the listening sessions (under a dozen for each), these often had more of a character of a focus group with discussion amongst members.

Focus groups have weaknesses and strengths as a research tool. They are not intended to get every participant to respond in detail to every question. They cannot be used in the same way as a detailed questionnaire where we can generate a random sample and have statistically valid conclusions about a population. They are very useful for fleshing out a range of experiences and ideas on a topic, somewhat like a brainstorming session, particularly taken in their totality (i.e., across a handful of sessions, lots of ideas get raised). Thus, after a set of focus groups, a researcher usually will have a good sense of the right questions to ask for a questionnaire and the range of possible responses, but they would not necessarily be accurate in determining whether there might be a statistically significant difference in how a population responds to the questions. Focus groups can help to understand when there is a broader cultural understanding of an issue (e.g., shared ideas about it), and what the cultural norms or shared ideas are. This is in part because they are useful in getting people to talk to one another about an issue, creating a context for group analysis where an idea can be more fully explored and where new ideas or understandings may be generated.

Sessions were recorded, transcribed, and then individually coded using the overarching questions to sort responses and identify recurring themes and unique perspectives.

Interviews with Local Experts and Key Stakeholders

Early in the research process, before identifying the prioritized issues, we held over seventy interviews with individuals involved in a range of community services and community development. The goal was to gain input from a broad mix of community leaders and experts from a range of content areas (e.g., arts and entertainment, business, health, education, etc.). Each interview primarily focused on understanding the community needs, ongoing efforts, and assets related to that area. These were largely intended to inform the project's broader, but less detailed, community assessment. During each interview, individuals were also asked more generally to comment on what they saw as key needs in the community and recent successful or promising community development efforts. Detailed notes or transcriptions were generated from every interview.

After identifying the community priorities, the interviews were reviewed for any mention concerning each prioritized issue by using a range of search terms (including word bases) associated with the issue (e.g., water, treatment, waste). All relevant information was extracted and coded into themes similarly to the community session data. Because very few of the interviews addressed water, we also held two additional interviews, one with the city manager and director of the city water department, and one with a member of Grinnell College with expertise in water quality. The list of all organizations interviewed is provided below. Those that that focused specifically or mostly on water are bolded.

- Bayer Crop Science
- Capstone Behavioral Health (multiple)
- Central Iowa Community Services (CICS) Grinnell Iowa
- **City of Grinnell (Multiple)**
- Claude W. and Dolly Ahrens Foundation (multiple)
- Community Support for Immigrants (CoSi)
- Davis Elementary
- Door of Hope
- Drake Community Library
- First Presbyterian Church
- Greater Poweshiek Community Foundation (multiple)
- Grinnell Area Arts Council
- Grinnell Area Chamber of Commerce
- Grinnell Area Mental Health Consortium- JPK Fund
- Grinnell City Council
- Grinnell Community Early Learning Center
- Grinnell Counseling
- **Grinnell College (multiple, one focused on water)**
- Grinnell Christian Church
- Grinnell Fire Department
- Grinnell Mutual Reinsurance
- Grinnell-Newburg School District (multiple)
- Grinnell Parks and Recreation
- Grinnell Police Department
- Grinnell School of Music/Studio E
- Grinnell State Bank
- Healthy Homes Family Services, Int. Mental Health Counseling
- Hey Grinnell Did You Know (Facebook)
- Imagine Grinnell
- KGRN Radio
- Iowa Kitchen
- Link Grinnell
- Mayflower Community
- Mid Iowa Community Action (MICA)
- Poweshiek County Emergency Management
- Prairie Lakes Church
- Region 6/People Rides
- Rotary Club
- SeaJae Properties
- Total Choice Shipping and Printing
- United Way Grinnell College
- UnityPoint Health
- Welcoming Communities

Review of Archives (Web and Paper)

Throughout the research process, we gathered and reviewed all nature of documents we could find associated with community development and assessments in general and a range of content areas common to comprehensive community assessments, and specifically related to the prioritized issues (once identified), through literature searches and requests to key stakeholders in the community. These materials were primarily used to produce the *Grinnell's Drinking Water* section below. They were also reviewed for mentions of concerns and needs, as well as assets.

To the extent possible, we also gathered data from four peer communities selected by the steering community (Decorah, Fairfield, Pella, and Waverly) to better understand Grinnell's relative strengths and weaknesses as well as to look at how those communities may have addressed similar issues (Decorah, Fairfield, Pella, and Waverly). Once gaining a clearer sense of the nature of the issue from focus groups, we also looked for ideas for possible solutions from communities around the country, focusing on ones like Grinnell, as well as other non-local potential assets and resources (e.g., organizations and funding).



Review of the Visioning Survey and Prioritization Survey

Once the prioritized issues were identified, we returned to both earlier surveys. The open-ended visioning survey was reviewed to extract any data relating to the prioritized issue. For example, in the case of water, we went back to look in detail at every mention (using a handful of key words) to identify what, beyond “better water” was said. All responses were extracted and coded similarly to community session data. Finally, we pulled information from the prioritization survey to show how different demographic groups ranked the issue.



Grinnell's Drinking Water System³

Source of Water

Grinnell draws its water from the Jordan Aquifer - also known as the Cambrian-Ordovician aquifer using five wells - three currently active - of between 2,220 and 2,378 ft deep. The Jordan aquifer is the “most productive and extensive bedrock aquifer in Iowa.”³ It is at low risk for contamination since the water extracted from it is between 300,000-500,000 years old.⁴ Given the age of the aquifer water as well as physical features of the aquifer itself, the water is considered very ‘hard’, meaning it is high in dissolved solids, specifically calcium, iron, and magnesium ions.⁵

Among Grinnell's peers, only Fairfield and Pella have the same source. Wavery draws its water from the Silurian-Devonian aquifer, which is susceptible to ground water contamination. Decorah draws its water from the Upper Iowa River Alluvial-Ordovician aquifer, which also has high susceptibility to contamination. Pella has only recently (2017) switched to the Jordan Aquifer, previously drawing the majority of its water from the Des Moines River, which is also highly susceptible to contamination.

Water Processing & Distribution, and the State of Infrastructure

Water is processed at the treatment facility, which has a pumping capacity of 2.67 million gallons per day⁶ to meet Grinnell's average daily water consumption of 1.2 million gallons. The plant dates to the 1940s, with the most recent updates in the 1990s. Up until 2022, water underwent forced draft aeration, pre-chlorination, sedimentation, Zeolite softening and chemical treatment.

Eighty years of treating the hard water with salts eventually corroded the steel tanks used in softening and the pipe gallery beyond repair, and the water softener was taken offline in the spring of 2022. The city began planning for a new water plant (discussed below), and for multiple reasons officials decided not to try to replace it or soften water temporarily. Replacement would cost millions. Zeolite salt softening of hard water has been getting phased out nationally because of the high amount of chloride pollutants it adds to wastewater and streams/water bodies. The quarter million dollars that annually goes to salt could be used for other system improvements.⁷ While the softener was taken offline, the facility continues to treat water to adjust its pH, reduce its corrosiveness, and ensure its potability.

In 2023, the city also put in place an emergency solution in case the pipe gallery (the connection from water treatment to distribution) failed, which would have taken water offline for multiple weeks.⁸

Water is piped to the 300,000 gallon-capacity Grinnell water tower, which creates the pressure to distribute the water throughout the city via water mains and into households and businesses via service lines.⁹ There

³ “Iowa Water Use Program Update for Jordan Aquifer Stakeholders,” Iowa Department of Natural Resources, 2019

⁴ Donnelle Eller, “Growing Water use threatens to strain Jordan aquifer,” Des Moines Register, Nov 15, 2014, <https://www.desmoinesregister.com/story/money/agriculture/2014/11/15/water-use-jordan-aquifer-restrictions/19040407/>.

⁵ “Iowa Water Use Program Update...”

⁶ “Water,” City of Grinnell, Accessed April 2, 2024, <https://www.grinnelliowa.gov/186/Water>.

⁷ “Grinnell Water Treatment Plant Update,” Grinnell Chamber of Commerce, Get Into Grinnell Blog, Feb. 13, 2023, https://www.grinnellchamber.org/index.cfm/84817/19415/grinnell_water_treatment_plant_update#:~:text=The%20City%20of%20Grinnell%20is,plant%20on%20line%20in%202026.

⁸ “Grinnell Water Treatment Plant Update.”

⁹ “Water,” City of Grinnell.

are approximately 65 miles of water main lines, with around 3,300 home/business service lines, approximately one-quarter of which were built before 1930.⁴

Water Testing and Quality

The Iowa DNR regulates water testing and drinking water safety. The Grinnell water department tests the incoming and outgoing water at the treatment facility daily. Ten samples per month are tested for bacteria from schools, nursing homes, restaurants, and the hospital. Prior to 2022, a full sample analysis for everything covered by Grinnell's permit was done each year from 20 sources and published as the Consumer Confidence Report, available on the city website.¹⁰ Contaminants tested include lead, copper, TTHM (a byproduct of chlorination), fluoride, radium, barium, radioactivity (gross alpha), sodium and nitrates. With the recent adjustments at the treatment facility and a major project under planning, the city has increased the testing of lead and copper, as per DNR guidelines.

Testing of tap water has consistently found no measured contaminants that exceed EPA threshold limits. Radium levels have varied from well to well over time. Recently, testing at Well 9 identified that radium exceeded the contaminant level (MCL) of 5pCi/L requiring notification of the public and reduction & mitigation strategies. Total dissolved solids (TDS) - particularly Iron - have also exceeded safety standards for MCL (250 mg/L) in two wells (No. 6 & 7). Dissolved solids levels of sulfate were very high and are thought to contribute to the unpleasant taste and smell.¹¹

Anyone interested in additional information about Grinnell's drinking water quality can contact the Iowa Department of Natural Resources Region Five Field Office at (515) 725-0268.

Plans for New Water Infrastructure

According to the city manager, the planning for a new plant began before 2010, however a lawsuit by the EPA required the city to change gears and prioritize replacing the wastewater treatment plant. Grinnell did not have sufficient staffing to oversee two major water projects, and the funding on the other project has only recently been wrapped up.

As of 2024, efforts to replace significant parts of Grinnell's water infrastructure were under way. In 2022, the city hired McClure Engineering Company to study the water treatment plant and propose a plan for upgrades. The city also convened a Citizen Water Taskforce made up of 15+ citizens and stakeholders to consult and advise on water treatment facility plans. The city engaged the Chamber of Commerce to provide communication to the public, as well as using the radio and newspaper. The citizen taskforce meets regularly and serves as another way to connect with the community and share out information.

Plans include a new nanofiltration water treatment facility, new water tower, and new well. There will also be upgrades to transmission lines from wells, and upgrades to water mains, and service lines.

¹⁰ "Water Quality Reports," City of Grinnell, Accessed April 2, 2024, <https://www.grinnelliowa.gov/Archive.aspx?AMID=53>.

¹¹ "Water System Preliminary Engineering Report," McClure Engineering Company, 2022.

The nanofiltration system will work similarly to reverse osmosis technology, essentially forcing water through a semi-porous membrane containing microscopic holes through which water, but no contaminants, can pass.¹² This removes nearly all possible contaminants. Water will then be mixed with chemically treated and mineralized water to address taste and ensure potability, as well as with an additive to reduce possible leaching from pipes.¹³ This process is among the most effective for addressing potential health contaminants and will also significantly reduce hardness without the need to add salts.

Construction of the treatment plant is anticipated to last from 2024-2026. It will be located directly east of the current facility (likely at 703 Broad Street). The old treatment plant will be demolished, and wells 5 & 6 will be taken offline since they are older than the recommended 60-year useful lifespan.¹⁴ The new well and transmission lines from all wells to the treatment facility are estimated to be completed in 2024. Construction of the new 1-million-gallon water tower will likely be completed in 2026. The project also includes replacing 2.17 miles of water mains.¹⁵

Iowa DNR is responsible for oversight of water quality during changes to water systems. Between April and September of 2023, the city conducted a DNR-required pilot study of the proposed nanofiltration technology.

In total, the water system project budget is \$35 million. To cover costs, the city will borrow from Iowa's state revolving fund (SRF) at a rate of 2.8% and is pursuing city revenue bonds. The city has also been awarded a \$3 million federal grant.¹⁶ The city continues to seek other grants and explore additional funding options. Other options under consideration are tax increment financing, local option sales tax, and grant funding, though grants for water systems are very rare. Water rates will increase, but the amount will depend on the nature of funding secured.

Replacing lead water mains and service lines is also a priority, and the city has applied to the Iowa State Revolving Fund for forgivable funding to address the south side of Grinnell (south of 6th Avenue). Service lines are generally the responsibility of the homeowner, not the city. Given their age, the city estimates that 30-40% of these may be lead. A city ordinance requires that homeowners that need to repair access pipes must replace all lead piping. This can be expensive ranging from \$5,000-\$8,000.¹⁷ Recently, the City sponsored the insurance company HomeServe to help citizens cover replacement costs associated with service line failure, with a monthly cost of \$9, covering up to \$7K in replacement costs. The city anticipates that some of the State funding may be available to support low-income families to replace such lines. There may also be additional funding available from the city.

¹² "Ultrafiltration, Nanofiltration, and Reverse Osmosis," Safe Drinking Water Foundation, Accessed May 9, 2024, <https://www.safewater.org/fact-sheets-1/2017/1/23/ultrafiltrationnanoandro>.

¹³ "Water System Preliminary Engineering Report."

¹⁴ "Water System Preliminary Engineering Report."

¹⁵ "City awarded \$3M federal grant to help fund water upgrades," The Grinnell Herald-Register, April 11, 2024.

¹⁶ The Grinnell Herald-Register "City awarded \$3M federal grant to help fund water upgrades." April 11, 2024

¹⁷ Elizabeth Hansen, "City of Grinnell, Iowa 2022 Leadership - Goal Setting - Strategic Planning Work Session Executive Summary," City of Grinnell, Accessed May 9, 2024, <https://www.grinnelliowa.gov/DocumentCenter/View/1499>.

Homeowners who are concerned about the possibility of lead can conduct tests to measure their tap water. The city also recommends that “when your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking.”¹⁸

Table 1 summarizes the changes expected with the new water infrastructure project.

Table 1: Key Differences between Past, Current, and Anticipated Water Treatment in Grinnell

	Pre-2022 Water	2022 - 2026	2026 Onwards
Difference from Water Sources	Hardness reduced & contaminants treated. Aesthetic qualities improved. Quality significantly improved.	Bacterial disinfection treatment. Quality not significantly different from source.	Completely filtered of contaminants, and then blended with other water for desired quality. Significantly different (improved) quality from source.
Removal of iron oxidation and sediment	Yes, storage tank	Yes, storage tank	Direct Membrane Nanofiltration Treatment
Hardness (magnesium and calcium) treatment	Zeolite	None	Direct Membrane Nanofiltration Treatment
Radium treatment	Zeolite	None	Direct Membrane Nanofiltration Treatment
Disinfectant (bacterial) treatment	Sodium Hypochlorite	Breakpoint chlorination, Sodium Hypochlorite	Direct Membrane Nanofiltration Treatment, Sodium Hypochlorite
Corrosion Prevention	Polyphosphate	Polyphosphate	Yes, TBD?
Fluoride	Not added, naturally occurring	Not added, naturally occurring	Naturally occurring partially removed by membrane, not added
IDNR Storage Requirement met	No	No	Yes

¹⁸ “Water Quality Reports.”

	Pre-2022 Water	2022 - 2026	2026 Onwards
Storage Method	Existing water tower (0.3 MG). 98 years old.	Existing water tower (0.3 MG). 98 years old.	Treatment facility storage tanks (0.3MG), previous water tower (0.3MG) (101 years old), new water tower (1MG)
Total Treated Storage Capacity	0.3 million G	0.3 million G	1.3 million G
Treated water detention tanks	None	None	0.3 million G on site tanks.
Raw Water detention tanks	1 million G (x2 .5M G concrete tanks)	1 million G (x2 .5M G concrete tanks)	None
Water loss rate	42-45%	42-45%	Predicted 15-30% (after water main improvements)

Community Input: Perspectives on Water Quality

This section of the report details the input collected from members of the community through community sessions (listening sessions, focus groups, community hosted discussions), the open-ended visioning survey, the prioritization survey, and interviews. The information shared here does not represent the views of the researchers or the Build a Better Grinnell Project steering committee. Nor are we trying to be arbiters of what belongs or doesn't or what is true or not. We are presenting experiences and views held by participants in this study.

The core of this section comes from the community sessions, where we specifically asked participants to talk in detail about their concerns with water, how they are impacted by their concerns, who they feel is most affected, why they think these problems exist, the obstacles they anticipate in addressing them, their ideas for addressing the situation, who should be involved, and what they see as the community's strengths and assets. We also include all relevant information from the initial visioning survey, but that data is mostly limited to the nature of the problem and is often vague (e.g., better water quality), so it does not consistently appear throughout sections below. Input available from interviews is also included.

The Concern for Water

In the BABG open-ended survey, there were 89 mentions across 53 surveys (approx. 9% of all surveys) of drinking water or the water system in Grinnell as a need or frustration. This made "water quality" one of 46 issues to move forward to the community prioritization process. In the prioritization survey, *Improve Water Quality* was ranked as the second priority for the community. In our interviews with key community stakeholders and experts across a range of services, water was only raised by the city manager in reference to key infrastructure needs. Compared to other issues, our ability to generate focus groups and attendance at community sessions was average.

What is the Nature of the Issue?

In our Visions of Grinnell survey and interviews, we used several questions to help identify what things people would like to see changed in Grinnell (e.g., what things have frustrated you, and what changes would you like to see). Twenty-five responses referred vaguely to water quality (e.g., better drinking water, better water quality). Responses that provided more specificity are included below. In community sessions, we asked participants to discuss what they see as the nature of the problem (e.g., why do you feel that water quality should be a priority issue, and what are your specific concerns). Below are the general areas of concern that were shared.

1) Hard water.

Hard water was discussed as a main concern (10/10 sessions, 9 surveys). Most of this focused on the impacts, which are discussed below.

2) Taste and smell.

The second core issue specifically concerning water quality related to the taste and smell of the water (9/10 sessions, 5 surveys).

- a) Most could not specify the nature of the taste/smell, only that they did not like it.
- b) A few suggested that it tasted like minerals or metal, and one thought that it smelled like chemicals, suggesting it might be chlorine.
- c) Many of those commenting on the taste reported moving to Grinnell and noticing the difference. Most of those who did not feel this was an issue were native Grinnellians.

- d) All three experts interviewed noted that taste is highly subjective and not formally a “quality” issue when it comes to water.

3) Potability Concerns.

Some were concerned that Grinnell’s water is not safe to drink (6/10 sessions, 1 survey).

- a) A small number feel strongly that the water is not potable. They noted things that had been reported in city water tests (discussed above), felt that EPA standards are too lax, or had concerns for possible dangerous chemicals or contaminants that are not being measured.
- b) Most were simply unsure and hesitant to drink it, particularly given the smell, taste, sediment, and sometimes the color.
- c) Some noted that despite the smell, taste, and being hard, they understand that it is safe to drink.
- d) In a couple sessions individuals noted a concern for lead from pipes.
- e) A couple sessions also noted a concern for pesticides from farm run-off in the water (something that does not affect Grinnell water because of the depth and age of the aquifer).
- f) A water quality expert from Grinnell College questioned what people mean by “quality,” and noted that neither the taste nor the hardness of Grinnell’s water makes it unsafe, but that people often conflate not liking water with safety.

4) Color.

Participants in 6 sessions raised concerns that their water is sometimes brown, yellow, or off-color. Most of these referred either to using a faucet after a long period of inactivity, the impact of the city flushing hydrants, or water left sitting for a period of time.¹⁹

5) Lack of understanding and communication.

Many participants across 6 sessions explicitly raised concern for a general lack of understanding of what is going on with water quality and the treatment plant and insufficient access to information. Many more demonstrated communication gaps through various misunderstandings.

- a) Most of these are either unsure or desire to be informed about what is going on, the safety of the water, the state of the plant and timeline for replacement, and how the new plant might change water taste and hardness.
- b) Many, including those who understand the current situation, are unsure what they should or could be doing to mitigate the impacts they are experiencing.
- c) There is also a high degree of uncertainty on how to find information. Some who had specifically looked for information could not find updates or answers to their questions on the city website. The Herald Register is not online and searchable.
- d) Many are also misinformed. For example, across four sessions, persons believed that a reason for perceived poor water in Grinnell (or Iowa more generally) is farm runoff. (In one session, a participant pointed out that the Jordan Aquifer is very deep and does get such runoff.)
- e) In two sessions, individuals commented positively on information provided through the Grinnell Herald Register or the Chamber website.

¹⁹ Water left sitting that is high in iron or manganese, which is the case with Grinnell’s source water, can become yellow in hue.

6) Infrastructure.

Water system infrastructure was addressed at most sessions, though primarily in regard to the cause of water quality concerns. Many mentioned the water plant problems and the softener going offline, as well as old infrastructure in town including pipes. In the Visions of Grinnell survey, 24 surveys identified concerns with water infrastructure or the water system, 16 specifically identified the treatment plant as either a frustration or a need, and 4 identified water lines or mains as a concern (e.g., breaks, aging).

7) Other issues raised.

- a) Poor access to water was raised by students on Grinnell College campus (e.g., not enough fountains, or non-functioning fountains) (1 session, 3 surveys).
- b) Concerns or questions about sustainability of the aquifer were raised in 2 sessions. Discussing such concerns, one of the experts interviewed noted that the Jordan Aquifer is the most reliable source of drinking water available, that there are no short or mid-term concerns about its sustainability, that Grinnell does not have other viable options, and the state of Iowa regulates use of the Aquifer for sustainability.

What are the Impacts or Consequences?

Participants in community sessions were asked how they were impacted by the issues they were identifying as concerns and what they saw as the impacts on the broader community. Some responses to surveys and interviews also provided related input. The following responses were provided.

1) Destruction of property.

Participants lamented the impact of Grinnell's hard water on their property (10/10 sessions, 4 surveys). Specific impacts noted include the following.

- a) Most noted that it left a residue on dishes, sinks, bottles, bathtubs, showers, faucets, icemakers, filters, and more.
- b) Many are also concerned about the water ruining faucets, clothing, and major appliances such as washing machines, dishwashers, and water heaters.
- c) Some are concerned about the impact on household plants (e.g., residue in soils) and gardens.
- d) Some worry it will destroy their pipes (often they were unsure, and just want to know).

2) The cost to adjust.

Many discussed costs associated with adjusting to water concerns (9/10 sessions).

- a) Most commonly, participants discussed buying bottled water, water filters, water softeners, or reverse osmosis systems in response to poor tasting water and concerns that it might not be safe to drink. Many participants stated they simply would not drink tap water any longer.
- b) Participants also specifically discussed the costs of adapting to hard water to protect clothes, appliances, pipes, counters, and faucets (e.g., buying a water softener system or lime-away).

3) Bathing and skin problems.

Participants noted problems caused by bathing or showering, including skin discomfort or hives (particularly for those with sensitive skin or skin conditions), bad hair, residue in hair, and change in hair color (7/10 sessions).

4) The added burden and frustration of adapting.

Participants discussed the increased difficulty of cleaning hard water residue, of having to go out of way for water, taking extra steps to be sure water is safe, having to change filters, etc. (6/10 sessions).

5) Frustration and trust issues.

Multiple participants indicated frustration with the situation and either directed this at the city or had questions they would like answered by the city (6/10 sessions).

- a) Most raised questions about how the water system got to this point, why things weren't done sooner, or why it is taking so long for anything to be done. (Most of these connected these frustrations to a concern with lack of communication noted above.)
- b) A few indicated that the situation had negatively impacted their trust in the city.
- c) A few indicated feeling frustrated at paying water bills on top of added expenses.
- d) Some questioned whether they were getting accurate information, and how they could reconcile their experiences (e.g., poor taste, skin problems) with experts telling them it is safe (particularly given events around the country that show mistrust over water can be warranted).
- e) Some noted that, while they understand the situation and difficulty involved, they are still frustrated by it.

6) Broader Impacts on Community.

Participants expressed concern for impacts on the community as a whole (6/10 sessions).

- a) Most of these were concerned with the cumulative economic impact on families, community, and businesses of hard water.
- b) Many of those uncertain of the potability of water are concerned for public health impacts.
- c) Concerns were also raised about what impression Grinnell's water makes on those visiting the community, and how it might affect Grinnell's ability to recruit top talent and get people to live in the city (those expressing this concern included an individual whose job involves recruitment).

7) Environmental Impacts.

Participants raised concerns for the environment (6/10 sessions).

- a) Mostly these included the environmental impacts created from increased use of water bottles (common) and discarded destroyed property.
- b) Some were concerned about the impact of using so much salt in lots of household softeners and the use of chemicals like lime-away.

Who is Most Affected?

Participants expressed concern that the impacts are not borne equally throughout the town (8/10 sessions). Mostly, they expressed concerns about those who can't afford to adapt, such as through buying filters or bottled water. Some few also feel that water tastes worse and water mains break more in some parts of town. Those with sensitive skin or hair were also identified as experiencing more direct impacts from bathing. Concerns with taste were more common with those who had moved to town

Table 2 shows the ranking of *improve water quality* by a range of demographic groups from the prioritization survey. The issue was ranked in the top three by every demographic group living in city, with five of demographic groups ranking it as the top issue. This includes lower-income respondents and racial and ethnic minorities. Even those who do not live in the city, but commute and work in Grinnell, ranked it relatively high (9th).

Table 2: Ranking of *Improve Water Quality* by Demographic Group

Priority Ranking	Demographic Group
#1	Lower-income, ²⁰ excluding GC students (N=102)
#1	Aged 26-45 (N=301)
#1	Under age 25, excluding GC students (N=76)
#1	Racial & ethnic minorities, ²¹ excluding GC students (N=61)
#1	Women aged 19-45, excluding GC students (N=222)
#2	Men aged 19-55, excluding GC Students (N=156)
#2	All respondents, excluding GC Students (N=882)
#3	Aged 66 and over (N=153)
#3	Grinnell College students (N=388) ²²
#9	Commuters, excluding those living in Grinnell's rural outskirts (N=72)
#14	Identifying as rural (N=121)

Is the Problem Getting Better or Worse?

Most participants identified hard water and its impacts as getting worse recently, many (though not all) recognizing the loss of the city softener as a contributing factor. Most of those who had concerns for the taste/smell felt that this predates the loss of the city's water softener.

Causes: Why Do these Problems Exist? What Obstacles do You See to Addressing Them?

In every community session we asked questions to get at perceptions of underlying causes. These included asking why the issue exists for the community, why it has not been resolved, what difficulties individuals have in resolving the issue or alleviating its impacts for themselves or their family, and what they view as the likely obstacles in addressing the concerns. Focusing on underlying causes can be one strategy to resolve a problem.

Participants are experts in their own experiences and likely have a good understanding of the obstacles that exist for them personally to alleviating or resolving a problem. Most are not necessarily experts on the issue as a whole and may not be aware of broader underlying causes. As a result, many participants may be speculating on broader causes. At the same time, non-experts may have valuable insights on the obstacles that exist to addressing a problem in the community, and there is often a "wisdom of the crowd" or shared cultural knowledge on how things work. Even when causes and obstacles perceived by community members reflect misunderstandings or misinformation, these can be valuable for decision makers as they may reflect opportunities for education. Those misunderstandings may also present obstacles themselves to the feasibility of various options. For example, if community members don't think that solutions are getting at the right problem or causes, they may be less likely to be supportive and the solution may be less likely to succeed or be perceived as successful.

²⁰ Household income under \$25,000, or \$25,000-\$50,000 in households of 2+, or \$50,000-\$75,000 in households of 6+.

²¹ Identifying with one or more race/ethnic categories other than White, as well as those identifying as being of Spanish, Hispanic, or Latino origin

²² While 388 Grinnell college students participated in the prioritization survey, each vote counted as one-third of a vote (explained in methods) in determining the ranking by all respondents including the college students.

The following perceptions on causes were shared.

1) Explaining taste/smell (and related potability concerns).

There was no consensus on why water may taste or smell different from what participants for whom it was an issue would like. The range of ideas included the following.

- a) Some recognize that Grinnell's source of water has a high mineral content, which they believe contributes to the taste.
- b) Some thought that the treatment process itself may add chemicals like chlorine or salt that affect the taste.
- c) In four sessions, participants believed that farm runoff was likely to blame. In one session, and both interviews with experts, farm runoff was discarded as an issue for the city's water because of the age and depth of the Jordan aquifer.
- d) In a few sessions, participants speculated that old pipes and/or the old water tower might contribute to water taste and smell.

2) Explaining hard water.

- a) Some recognized the ultimate source of water hardness as mineral content in the water and the source of the aquifer, though there was also a fair amount of speculation here by participants with ideas ranging across the spectrum of those provided for taste and smell.
- b) Most addressed the question of causes by focusing on why city's water system is not making the water better, pointing to problems with the water infrastructure (7/10 sessions). Most of these recognized that the softener had been taken offline.

3) Explaining infrastructure degradation and failures.

- a) The majority of those who pointed to infrastructure problems being related to taste, smell, or hardness of the water believe that the age of the infrastructure was a key factor.
- b) Participants in 5 sessions questioned whether there may have been a lack of planning or foresight to allow things to get to where they are (e.g., perhaps someone dropped the ball, perhaps there have been other priorities, failure to make timely investments in aging infrastructure is nationwide issue).
- c) In 2 sessions, individuals speculated that the delay in repairing infrastructure was due to a lack of funds available.
- d) In 1 session, it was speculated that that Covid and disruptions in supply chains caused delays in availability of parts.

4) Costs to household adaptation.

As noted above, one of the main impacts identified by participants has been the costs of adapting to hard water and perceived quality concerns. Many participants raised concerns that this may create an obstacle for lower-income households, and several participants noted that they had considered household under sink filters or water softeners but could not afford it.

5) Grinnell College fountain taste and failures.

In 2 sessions several students at Grinnell College believe that poor tasting fountain water and non-functioning fountains is due to lack maintenance, including cleaning or replacement of filters.

Solutions: What Could be Done to Resolve the Problem or Alleviate Their Impacts?

The following are suggestions that were provided in community sessions or the first visioning survey. Discussion of solutions in the interviews are primarily reflected by the city plans outlined in the *Grinnell's Drinking Water System* section above. We also include an appendix with a range of home solutions and mitigation strategies for dealing with hard water identified through on-line searches. The solutions presented in this document do not reflect the views of the research team or the Build a Better Grinnell steering committee.

As we addressed in the background and scope section, we caution those reviewing the document not to assume that the most suggested solutions are necessarily the “best” or most likely to succeed. This is not intended as a comprehensive list. These are the range of ideas that came up in our community-wide “brainstorming sessions.” Those making use of this document may have additional ideas to address causes or alleviate impacts.

1) Home solutions.

Most session participants have made some manner of adjustment to the quality of water. The level and nature of such adjustment depends largely on their level of concern or impact, as well as their level of understanding of the issues and their financial situation.

- a) Many participants noted that they filter water either using a pitcher, a bottle, under sink, or a fridge filter system (8/10 sessions). Some have purchased or thought about getting an under-sink filter system but found that the cost is quite high.
- b) Some participants stated that they will only drink bottled water (5/10 sessions), and a few stated that they used bottled water for “everything” (e.g., including plants and pets). Some are boiling water, and some avoid drinking water, or at least plain water, altogether.
- c) Some participants noted that they have installed or considered installing water softeners (5/10 sessions). One noted that while they had considered it, they decided against it given that it will be unnecessary once the new city treatment plant is in place by 2026. In our interview with city representatives, they also discourage home softener installations, noting that it is questionable whether the increased damage from harder water over two years is worth the expense of installing such a system. Importantly, these systems would all need to be removed once the new plant is active or they would simply be adding salts to the wastewater with no added benefit but significant cost on wastewater treatment and the environment.
- d) Additional home solutions (mentioned in 2-3 sessions each) have involved more cleaning, avoiding the water, and installing shower filters.
- e) Some discussed purchasing or considering the line insurance made available by the city.

2) Economic Support.

In addition to the solutions used or suggested above, some participants wanted to know if there could be support, particularly for low-income, to help mitigate impacts of the current water situation.

3) Suggestions for the city relating to water quality and infrastructure.

Participants also had suggestions for what the city could do to address the issue (8/10 sessions).

- a) Many are looking forward to the new plant, though most also lack clarity of what it will “fix” or not.
- b) In 3 sessions, participants discussed the growing needs of the city and wondered whether the new infrastructure (tanks, water treatment) would be sufficient.

- c) Beyond this, there were not many suggestions provided in more than a couple of sessions each or by a few people. Mostly, individuals just had questions.
 - i) Some want to be sure that the taste will be addressed.
 - ii) Some would like the city to help to identify possible home solutions while the new plant is being built.
 - iii) Some suggest the city could assist in identifying bulk solutions (e.g., home installed softeners) at a discount as it seems to have done with the line insurance.
 - iv) Some do not want to wait for softer water and would like to see a city-wide temporary new softener. For reasons addressed above (cost and impact on the environment), the city is not going to continue to add salt to the water.
 - v) Some would like to see a neutral third-party assessment of the water quality and the plans for a new facility. (Note: such assessments exist.)
 - vi) There is also concern for pipes and mains around town. How will these be affected by the new system? Will these also be replaced? If not, will they affect Grinnell's water quality?

4) Communication.

In community sessions, there was a lot of discussion about lack of knowledge and communication as a key concern, and even more identified it as an important part of the solution (7/10 sessions).

- a) Many of those who believe that the new plant will solve the main problems would like more updates and details on the timeline and what will be resolved and what won't.
- b) Many would like help identifying possible home solutions while the new city system is under construction.
- c) There is a desire for information to be widely available, easy to find, easy to understand (e.g., technical jargon is translated to meaningful messages), and address concerns and questions that exist.
- d) Some suggestions specifically included:
 - i) Making things more easily available on the city website.
 - ii) Sending a regular newsletter to everyone's mailboxes.
 - iii) Including information along with the water bill.
 - iv) Making information available where low income can find it (e.g., MICA, Local Foods Connection).

Who should be involved?

In every session, we asked participants who should be involved in addressing the issue. There were not a lot of suggestions apart from the city. Those few suggested included:

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Third party experts to review the system and water quality. | issues in their homes. |
| 2) Water health experts. | 8) The college. |
| 3) Homeowner representatives. | 9) Farmers (this was in relation to the perceived impact of farm-runoff, which is not an issue for Grinnell's water supply). |
| 4) Renters. | 10) Organizations to help raise awareness and distribute information (local foods connection and MICA were specifically suggested to get to the low-income community). |
| 5) Businesses, who are likely impacted but also may be able to contribute by stocking resources needed for mitigation (e.g., filters, cleaning products, etc.). | 11) ISU extension to help with how to adapt |
| 6) Long-term care facilities. | |
| 7) Those with economic barriers to resolve | |

What are Grinnell's Strengths Concerning Water

In community sessions and interviews focused on the topic, we asked participants what they believe are the strengths or assets related to the issue. In the initial visioning survey and in community interviews we also asked community members more generally what they feel are strengths and things that improve their quality of life in the community.

1) Grinnell's water service and infrastructure plans.

Two surveys identified Grinnell's water service as a strength for the community. Participants in many sessions noted that they are looking forward to the new plant, and some specifically saw the city's efforts as a strength. As one participant noted, *many towns in Iowa are faced with aging water infrastructure. At least we are doing something about it* (sic). In 2 sessions, individuals commented positively on the city's sharing of information about the condition of the water system and plans. In 2 sessions, individuals who were aware of the new technologies noted that it would be a significant upgrade. One particularly appreciated that it would have much less salt. Interviews with city representatives confirmed this view, noting that plans will be completed by 2026 and involve replacing the current system with nanofiltration, which will treat water without adding salts, allowing greater protection of Grinnell's wastewater system and the environment.

2) Potable Water.

In two surveys and three sessions, participants identified the fact that Grinnell's water is clean or potable as a strength. One participant noted that events in other parts of the country highlight how a community can sometimes take this for granted.

3) The Jordan Aquifer as a water source.

Participants in 3 sessions noted that they were thankful for Grinnell's source of water as being relatively clean. One pointed out how much more cleaning needs to be done to pull water from the Racoon or Des Moines rivers. Experts interviewed also highlighted the relative lack of concerns for contamination and the reliability of the aquifer (no short or mid-term sustainability concerns).

Summary & Discussion

Parts of the city's drinking water infrastructure are in poor condition and outdated and, in the spring of 2022, the city's water softener was taken off-line. The city plans to replace the water treatment facility with nanofiltration membrane technology, dig a new well, build a new water tower, and replace 11,500 feet of water main, all of which is anticipated to be completed by 2026. Despite being hard, Grinnell's water has regularly passed all EPA contaminant testing.

In the BABG open-ended survey, there were 89 mentions across 53 surveys of drinking water or the water system in Grinnell as a need or frustration. This made "water quality" one of 46 issues to move forward to the community prioritization process, where it was voted as the second priority for the community. Ten community sessions were held to build on input provided in the initial survey and gain a greater understanding of the community's concerns.

Participants key concerns and questions related to the water's hardness, taste & smell, potability, and occasional color. Other core concerns were for the state of the water system's infrastructure, and for information and communication relating to city water.


The top impacts that participants were concerned with included the destruction of property as well as skin and hair problems caused by hard water, the financial costs to adjust to the water concerns for families and households, the burden and annoyance that the individuals face to adapt, general frustration and questioning of the city's handling of the situation, and environmental impacts. Participants were also concerned that these issues are particularly difficult for those with a lower income, and that the cumulative impacts on the community could be significant.

There was not a high degree of consensus or confidence among participants on the causes of the perceived problems with the water itself. Most believed that it was related to the source of water (though only some were aware of what this was), the treatment process, or the aging infrastructure. Most did recognize that the city had taken the softening plant offline and that this had led to greater water hardness. Problems with the infrastructure were seen largely to relate to its age, though many questioned why the issue is only being addressed now, and why there were not more proactive efforts.

Despite the range of questions and concerns, most participants are looking forward to the water infrastructure improvements planned by the city and some feel that the city has done a good job sharing information with the community and moving the project forward. Grinnell's water source and the safety of the water were also identified by some as strengths.


The city's planned water infrastructure improvements are likely to address many of the concerns with water quality, such safety and hardness. Nanofiltration will also affect the smell and taste, for example by reducing excess sulfur and dissolved solids that are often associated with smell and taste. While taste will change, it is impossible to be certain how people will judge the new water as taste is largely subjective. Yet, many are not aware of the broad plans, and even among those who are, many are unclear on which of their concerns will be addressed and which will not.

While the new plant will significantly reduce the hardness of water, many would like to know how to mitigate the impacts in the meantime. Some would like help to identify possible home solutions. Some would like economic support for those in need. Some suggest that there could be assistance in identifying bulk solutions such as home installed softeners at a discount. Some do not want to wait for



softer water and would like to see a city-wide temporary new softener. Due to costs and environmental concerns, the city will not be softening the water while it installs the new system and discourages homeowners from doing so.

Most participants were interested in greater understanding and communication. Participants provided suggestion both on what should be communicated (e.g., updates and details on the timeline, what will be resolved and what won't with the new infrastructure, interim home solutions) and how (e.g., widely available, easy to find, easy to understand). Apart from the fact that many specifically asked for more information, it is clear from the sessions that there is a fair amount of uncertainty, frustration, and misunderstanding that could be addressed with communication and education.



Appendix 1: Strategies for Household Mitigation

General Strategies

Turning down the heat on your home water heater will reduce the effect and buildup of mineral deposits on appliances and fixtures.

Appliance Maintenance for common appliances such as washing machines, dish washers, ice makers, etc., such as weekly cleaning of limescale buildup, and professional maintenance every 6 months – year.

Increase Soap Use to maintain cleanliness. The chemistry of hard water impacts soap's ability to effectively clean. Use slightly more soap than you normally might.

Not recommended:

- **Do not boil tap water** for sanitation – unless in emergency. Boiling will increase the mineral deposits.
- **Not recommended: showerhead and faucet filters.** While they might marginally reduce some mineral concentrations, they will not significantly impact the hardness of the water. Depending on the type of filter, taste might be somewhat affected.

Protecting Appliances

1. **Regularly clean and maintain appliances.** Fixtures or removable parts can be soaked in vinegar for other descaling products to remove the buildup. (Note: descaling products are made of acids, which is what removes the limescale.)
2. **Under-sink water filters.** Instead of installing a whole home reverse osmosis system, smaller under-sink models are available (see “Water Filtration”)
3. **Remove residue** from fixtures, dishes, etc. Regularly removing the limescale residue can reduce the amount that builds up. Clean things with an acidic solution like vinegar, or descaling product.

Personal Hygiene

Strategies to reduce the effect of hard water on your hair & skin.

1. **Use gentle and/or extra moisturizing products.** They will help mitigate the increased drying effect of the hard water.
2. **Avoid products with sulfates.** They will increase the amount of mineral buildup on your hair and skin and may increase lingering odors due to the tap water's already high concentration of sulfur.
3. **Lower the temperature.** Avoid using really hot water in the shower/bath and when washing hands.

Clothes Washing

Strategies for doing laundry, to protect washing machines and clothing.

1. **Use more detergent.** Hard water decreases the effectiveness of soap.
2. **Add vinegar to washing cycles.** Vinegar will help reduce the effect of the mineral buildup.
3. **Avoid traditional clothing softening products.** Use borax or washing soda as a clothing softener because they will remove the calcium buildup.
4. **Regularly descale and clean your washing machine.** You can use specific descaling products, or vinegar and baking soda.
5. **Reduce the temperature of the wash.** Lime scale buildup is greater at higher temperatures. Lowering the wash temperature will reduce it.

If your clothes become stained in the wash *due to the water, and the load is still wet*, you may contact the city, and they have a stain remover you can use.

Protecting Plants & Pets

Potted plants will show mineral buildup deposits over time and some varieties are unable to filter out the minerals. Pets may be sensitive to overly hard water as well.

1. Use filtered or bottled water for watering your plants.
2. Clean deposits off of plant leaves and regularly change the potting soil.
3. Use filtered or bottled water for your pets.
4. If you regularly bathe your pet, their skin and coat may have mineral buildup. Refer to the Personal Hygiene section for solutions.

Bottled Water

Grinnell tap water is potable and safe to drink. It is chemically treated for bacteria and regularly tested. Taste and smell concerns may be due to excess sulfur and dissolved solids such as iron. If you are concerned about drinking the tap water, local retailers sell bottled water and 1- & 5-gallon jugs of filtered water.

In-Home Water Filtration

Home water filtration systems are a solution to dealing with hard water from the tap and can also affect the taste and smell. The most effective for hard water are Reverse Osmosis systems.

Home water softening systems, while effective for reducing hardness, are discouraged by the city as the additional salt adds stress to wastewater treatment and has negative impacts on the environment. After the construction of the new water treatment facility, in-home water treatment will no longer provide benefits and softeners should be removed.


Lead Service Pipes

Around 30-40% of all water service pipes in Grinnell are made of lead. Service pipes are underground and run from the middle of the street to your home or business. City water is regularly tested at taps for lead. Homeowners may also choose to do an at home water test. Service pipe failures are the responsibility of the property owner and replacing them usually costs around \$6,000+ and require replacing any existing lead pipes. Property owners may take out insurance on their water service lines through HomeServe Insurance for around \$9/month, with up to \$7,000 of coverage. (See their website for more information.)²³

The city also notes that “when your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking.”²⁴

²³ Homeserve.com, <https://www.homeserve.com/sc/shop>.

²⁴ “Water Quality Reports.”



Water tests are available through Keystone Labs in Newton. They cost \$25.

Email: info_keystone@microbac.com

Phone: 641-792-8451

Additional Information

Anyone interested in additional information can contact the Iowa Department of Natural Resources Region Five Field Office at (515) 725-0268 for more information about Grinnell's drinking water quality.



Appendix 2. Water System Funding Sources

The following funding sources support rural areas or small towns for water projects and lead line replacement. This does not mean that Grinnell is eligible. The specifics of eligibility would need to be further investigated by individuals with a better understanding of Grinnell's demographics, distinct needs, and currently options. Some funding sources require that those looking for funds have a conversation with the funding source to determine eligibility. Some of these may reflect different entry points to the same funding source.

Funding Options for Rural or Small City Water Projects

1. Iowa Drinking Water State Revolving Fund Loan Program (Iowa DWSRF)

This provides low-interest loans and financial assistance to public and private community water systems, non-transient noncommunity public water systems, and transient noncommunity systems if they are owned by government entities. Some eligible projects are installing or upgrading treatment facilities, rehabilitation of water pipes, rehabilitation of wells, storage of water tanks, consolidation of two or more water systems, and the creation of a new regional water system.

<https://www.iowasrf.com/drinking-water-loan-program/>. A full list of state revolving fund programs related to water can be found here: <https://www.iowafinance.com/water-quality-programs/>

2. Training and Technical Assistance for Small System Funding (EPA)

This EPA grant program supports small public water systems by helping their financial and managerial capacity to provide safe drinking water over the long term and improving water quality and promoting sustainable operations within small PWSs. <https://www.epa.gov/dwcapacity/training-and-technical-assistance-small-systems-funding>

3. Rural Water Loan Fund (RWLF)

This program is specifically designed to meet the unique needs of small water and wastewater utilities. The RWLF provides low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects. It was established through a grant from the USDA/RUS. Loan amounts may not exceed \$200,000 or 75% of the total project cost, whichever is less. Emergency loans are 90-day no interest, with immediate turn around on applications. There are reasonable, below market interest rate (currently 3%) and a maximum repayment period of 10 years.

<https://nrwa.org/members/products-services-portfolio/rural-water-loan-fund/>.

4. Community Development Block Grant (CDBG): Water/Sewer (Iowa Economic Development)

Approximately \$7 million in federal CDBG funds are available on an annual basis to cities and counties through the state of Iowa's Water/Sewer Fund. This competitive program offers grants to assist cities and counties with water and sewer infrastructure improvements including sanitary sewer system improvements, water system improvements, water and wastewater treatment facilities, storm sewer projects related to sanitary sewer system improvements and rural water connections. To be eligible for funding, at least 51% of project beneficiaries (residents served by the project) *must be low to moderate income* (here, it is defined as persons with incomes at or below 80% of the area median income as defined by the U.S. Department of Housing and Urban Development). Current income levels can be found on the IEDA website (<https://www.iowaeda.com/cdbg/management-guide/>).

5. USDA Rural Development Loan and Grant Program (USDA)

Loans awarded to rural systems to serve communities of 10,000 people or less. Includes drinking water systems. <https://nrwa.org/usda-rural-development-loan-grant-program/>

6. WIIN Grant for Small, Underserved, and Disadvantaged Communities Grant Program (EPA)

A financial assistance program created to ensure access to safe drinking water, is considered a part of the DWSRF. Grinnell may or may not be eligible for this grant; it is determined via consultation with the designated Regional Agent. **Link:** <https://www.epa.gov/dwcapacity/wiin-grant-small-underserved-and-disadvantaged-communities-grant-program-contacts>

7. Water Infrastructure Finance and Innovation Act (WIFIA) (EPA)

A federal credit program administered by EPA that provides low-cost, flexible loans for water infrastructure projects across the country. **Link:** <https://www.epa.gov/wifia>

8. Water & Waste Disposal Loan & Grant Program in Iowa (USDA)

This program provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas. **Link:** <https://www.rd.usda.gov/programs-services/water-environmental-programs/water-waste-disposal-loan-grant-program/ia>

9. Water & Environmental Programs (WEP) (USDA Rural Development)

WEP is a federal program that funds water and waste infrastructure in rural communities with populations of 10,000 or less. It also provides funding for technical assistance and training. **Link:** <https://www.rd.usda.gov/programs-services/water-environmental-programs>

Funding Information Specifically Related to Lead Line Replacement

10. Support for lead service line replacement (EPA)

This EPA website focuses on helping to identify funding sources for lead service line replacement: <https://www.epa.gov/ground-water-and-drinking-water/identifying-funding-sources-lead-service-line-replacement#WIFIA>

11. WIIN Grant: Reducing Lead in Drinking Water (EPA)

This competitive program provides funding to disadvantaged communities (based on the affordability criteria established by each state under section 1452(d)(3) of the SDWA) to remove lead sources in drinking water. Eligible activities include infrastructure improvements, remediation in schools, and maintaining service line inventories to identify lead service lines. **Link:** <https://www.epa.gov/dwcapacity/wiin-grant-reducing-lead-drinking-water#funding1>

Appendix 3: Peer Community Comparisons with Notes on Recent Updates

Decorah²⁵

- Water quality meets all standards.²⁶
- Water source (Upper Iowa River Alluvial-Ordovician aquifer) has high susceptibility to contamination.²⁷
- 6 City wells (56-82 ft deep).
- Over 70 miles of water main.
- 5 storage reservoirs (total capacity of 1.5 million gallons).²⁸
- Average 1 million gallons a day pumped.

While Decorah has not replaced major water infrastructure in the last ten years, in 2023, they completed a Drinking Water Protection plan aimed to safeguard the city's water supply.²⁹

The City of Decorah recently received an Iowa Water Infrastructure Funding Grant of \$499,000 from Iowa Finance Authority in an application which also involved Winneshiek County Conservation, Iowa Water Quality Consulting, L.L.C., and Northeast Iowa RC&D. A portion of the grant is helping to pay for technical groundwater and surface water assessments to create a groundwater model that more accurately identifies Decorah's drinking water sources and to identify potential water quality risks.³⁰

Fairfield³¹

- Water quality meets all standards.
- The water source (Jordan Aquifer) has low susceptibility to contamination.
- 1 (of 2 drilled) well used.
- 2 water towers (capacity unknown).
- The water treatment plant has a capacity of 4 million gallons per day.
- Treatment: treatment and blending of lime softening and Electrodialysis Reversal (EDR) plant water, followed by the addition of chlorine to mix with the natural ammonia to create chloramines which that serve as the disinfectant.

²⁵ "Water Department," City of Decorah, Accessed March 1, 2024, <https://www.decorahia.org/departments/water-department>.

²⁶ "2022 Water Quality Report for Decorah Water Department," Decorah Water Department, April 6, 2022. <https://www.decorahia.org/wp-content/uploads/2022/04/2022-Decorah-Water-Quality-Report.pdf>.

²⁷ "Source Water in the Upper Iowa River Watershed," *Water Resiliency Plan*, UpperIowaRiver.org, 2019, <https://neiarcd.maps.arcgis.com/apps/MapJournal/index.html?appid=59ff48445f4f483d873ec7104daafa17>.

²⁸ "Water Department History," City of Decorah Water Department, Accessed July 27, 2024, <https://www.decorahia.org/departments/water-department/history#:~:text=The%20City%20Well%20Water%20has,storage%20tank%20on%20Locust%20Road>.

²⁹ Denise Lana, "For the Record: Discussing Decorah's Drinking Water Protection Plan," Decorah Leader, Aug. 16, 2023, <https://www.driftlessjournal.com/news/for-the-record-discussing-decorahs-drinking-water-protection-plan>.

³⁰ "Winneshiek County Development and Tourism Projects," County of Winneshiek Iowa, Posted April 11, 2022, <https://winneshiekiowa.gov/spotlight/2022/winneshiek-county-development-and-tourism-projects>; "During Source Water Protection Week, the City of Decorah is highlighting its efforts," Decorah News, Sep 25, 2022, <https://decorahnews.com/news/6170/during-source-water-protection-week-the-city-of-decorah-is-highlighting-its-efforts/>.

³¹ "Water Department," City of Fairfield, Accessed March 1, 2024, <https://cityoffairfieldiowa.com/202/Water-Department>.

Pella³²

- Water quality meets all standards.³³
- Water source (Jordan Aquifer) has a low susceptibility to contamination.
- Two wells to Jordan aquifer (2,205 and 2,190 ft). One Ranney Collector to groundwater supply in case of emergency.
- Two above-ground storage tanks, 81.98 miles of water lines, 608 hydrants, 1,899 valves.
- Total storage capacity of 5.75 million gallons.
- The water plant treats an average of 1.5 million gallons per day and provides water to approximately 3,925 residential, commercial, institutional, and industrial customers.
- Treatment : 3 reverse osmosis trains - each with a 1 Mil Gal/day capacity (online since 2017), operate in parallel with lime softening facility.³⁴

In 2017, Pella made large scale upgrades to ensure quality water for the next 20 years, which involved switching to a new reverse osmosis treatment system, which is meant to treat Jordan aquifer water for drinking. The city used to receive the majority of the water supply from the Des Moines River.³⁵ In 2021, Pella received Iowa State Revolving Funds.

Waverly³⁶

- Water quality meets all standards.³⁷
- Water source (Silurian-Devonian aquifer) has high susceptibility to contamination.
- 4 wells (150-220 ft),³⁸ 3 water towers (capacity unknown).
- 70+ miles of water main.
- Average of 928,416 G/day pumped.
- Treatment: Chlorine and Fluoride added.

In 2024 Waverly is rehabilitating the West Water Tower, involving cleaning, sandblasting, and painting all interior and exterior surfaces.³⁹ Another ongoing project is the Rolling Hills water main loop, which is a PVC water main construction.

³² "About Our Water," City of Pella, Accessed March 1, 2024, <https://www.cityofpella.com/141/About-Our-Water>.

³³ "City of Pella Water Quality Report," City of Pella, Accessed March 1, 2024, <https://www.cityofpella.com/waterqualityreport>.

³⁴ "Pella Reverse Osmosis Water Treatment Plant Well Design," HR Green Project Portfolio, Accessed July 27, 2024, <https://www.hrgreen.com/projects/reverse-osmosis-water-treatment-plant-well-design/#:~:text=Locations&Faced%20with%20increasing%20nitrates%20in,new%20reverse%20osmosis%20treatm ent%20facility>.

³⁵ "City of Pella Completes Water Treatment Project," KNIA-KRLS.com, Dec. 26, 2017, <https://www.kniakrls.com/2017/12/26/city-of-pella-completes-water-treatment-project/>.

³⁶ "Water," City of Waverly Public Works, Accessed March 3, 2024, <https://www.waverlyia.com/public-works/services/water/>.

³⁷ "2022 Drinking Water Quality Report For Waverly Water Department," The City of Waverly, Accessed Feb 27, 2024, <https://www.waverlyia.com/webres/File/public-works/Water/2022CCR.pdf>.

³⁸ "2019 Drinking Water Quality Report for Waverly Water Division," The City of Waverly, Accessed Feb 27, 2024, <https://www.waverlyia.com/webres/File/public-works/Water/2019%20CCR.pdf>.

³⁹ Robert Lynch, "Waverly City Council to hold hearing on West Water Tower Rehabilitation project," March 13, 2024, https://www.communitynewspapergroup.com/waverly_newspapers/waverly-city-council-to-hold-hearing-on-west-water-tower-rehabilitation-project/article_03fbcd2e-e0a2-11ee-a66a-c31f1ed94421.html.

Appendix 4: Questionnaire Guide for Community Discussion Hosts

Improve Quality of Drinking Water

Part 1: The nature of the problem

- What is the problem here? What's wrong with the drinking water?
- How bad is this problem?
- Is this always a problem, or are there particular times?
- How long has this been an issue? Is it getting better, worse?

Part 2: The Impacts or consequences

- How does the quality of drinking water affect you or your family?
- Can you give some specific examples of when and how you have been affected?
- Do you still use the tap water?
- What efforts have you made to adapt or solve this issue for yourself?
- What challenges do you and your family face in adapting to this problem and getting better quality water for yourselves?
- How does it affect the community as a whole?
- Are some people more affected than others?
- What happens if nothing is done?

Part 3: The Causes

- Why does this problem exist?
- Why haven't we been able to solve this issue as a community?
- What do you think the obstacles will be to getting this need met for the community?

Part 4: Solutions

- What ideas for solutions do you have for individuals, families, or the community as a whole?
- What efforts have been made to address this issue in the past? How did they go.
- Are you aware of current efforts to address this issue? Please share.
- What do you see as the community's strengths in regard to this issue? (What is working well? What might we build on?)
- Are there groups or individuals in the community that would be helpful or central in addressing this?
- Are there funding sources available to help address this?

Part 5: Other

- What else do you want us to know or be thinking about in relation to this issue?