



September 28, 2015

Stefan Higgins
Assistant City Engineer
Engineering Department, City of Blaine
10801 Town Square Drive NE
Blaine, MN 55449

Sent via e-mail to shiggins@ci.blaine.mn.us

**Re: Proposal for planning and design of the northeast water supply and treatment system—
Blaine, Minnesota**

Dear Mr. Higgins:

Barr Engineering Co. (Barr) appreciates the opportunity to submit a proposal to provide engineering services for planning and design of the City of Blaine's (Blaine) future water supply and treatment system in the northeast part of the city. We have developed this proposal using information gathered during our meeting with you on August 10, 2015, as well as our relevant project experience.

Selecting Barr to assist Blaine with this work will provide several benefits, including:

- **Continuity.** Barr has been helping Blaine plan and design your water system for many years and it is safe to say your system is working well. Furthermore, our approach has garnered support from state regulators. We will keep the same core team members involved in your project to maintain consistency and quality.
- **Collaborative service.** Barr's water supply and water treatment group has a proven track record of working *with* our clients—not just for them—as a high-functioning team.
- **Experience with municipal water.** From well siting to permitting through design and operation of municipal water systems, Barr has worked on numerous municipal water supply and water treatment systems. Our experience enables efficient design and permitting of your project.

Project understanding

Background

Blaine's population is projected to continue to grow and in order to meet water supply needs new wells and treatment are needed. Blaine's potable water is currently supplied by wells drawing from the quaternary, Jordan, and Franconia-Ironton-Galesville aquifers. Water from these wells is treated to remove iron and manganese, provide disinfection, and prepare the water for distribution. Recently proposed

development in the northeast part of the city will require potable water system expansion in and around the water tower site in north east Blaine as has been planned for some time. Previous work by Barr has referred to this location as the "NE Well Field". The first part of this expansion was the construction of Well 18 which was recently drilled to test the availability of water in the quaternary aquifer in the NE Well Field. Test pumping and modeling of Well 18 revealed that there is a sustainable supply of water in the quaternary aquifer that can be appropriated without adverse impacts to surface water features of value.

The City would now like to continue to expanding at this location by preparing a Future Water System Infrastructure Plan for the NE Well Field, completing Well 18 and drilling Well 19. In general terms the Future Water System Infrastructure Plan will be a feasibility plan that describes the infrastructure needed to complete a 6,000 gpm well field and treatment plant for the NE Well Field. Completing Well 18 and drilling Well 19 will be accomplished via two sets of bidding documents. The first will be a set of plans and specs related to the drilling of Well 19. This document will include drilling Well 19 and installing the pitless adaptor and pump and motor for both Wells 18 and 19. The second set of bidding documents will include the infrastructure needed to connect Wells 18 and 19 to the existing distribution system according to the recommendations laid out in the Future Water System Infrastructure Plan. To do this temporary treatment is needed for the wells to bridge the time up to when a new treatment plant can be added at the water tower site. This set of bidding documents will also include an altitude valve to properly manage water levels in the water tower at the site. A more detailed description of the specific work is included below.

Objectives

Barr understands that the following objectives will guide our work:

- **Part 1 Future Water System Infrastructure Plan:** Recommend water system infrastructure needed to complete the NE Well Field
 - a. Determine specific sites for four future wells (wells 19-22)
 - b. Layout of temporary and permanent distribution system watermain for the water tower site and the remainder of the well field
 - c. Determine siting details for a future water treatment plant (WTP 4) so that temporary and future trunk watermain can be planned with the future water plant in mind
 - d. Determine a capital improvements plan (CIP) for the wells, piping, and treatment plant including the capital cost estimate and construction sequencing
- **Part 2 Well 19 and Completion of Well 18:** Complete bidding documents for the drilling of Well 19 and the completion of Well 18. The work will include installation of the pitless adaptors, pumps and motors for both wells.
- **Part 3 Wells 18 and 19 Connecting Piping and Temporary Treatment System:** Complete bidding documents for the portion of the NE Well Field site work related to connecting Wells 18 and 19 to the existing distribution system. This will include temporary and permanent watermains and temporary treatment systems needed to connect the wells to the system in the near term while preparing for the long term setting when the final water treatment plant is constructed at this site.

Proposed scope of work

Details of the scope of work we will perform to meet the objectives listed above are included below.

Part I: Future water system infrastructure plan

Task 1.1: Site wells

Barr will work with the city to help site the specific locations for the future Wells No. 19-22. Currently, the general area of the new wells is known, but not the specific location. Once the city has identified several potential sites, Barr will help the city to check the locations for potential interferences, well spacing, setbacks, and isolation distances for well code compliance. We will review up to six different well sites with the goal of settling in on four new sites. Well 19 is already preliminarily sited on the back of the lot that includes Well 18 and the water tower in the NE part of Blaine. Once the four sites have been identified we will layout the watermain needed to connect them to the planned future water treatment plant. Work will include plan layout only. Profile drawings will not be prepared in this work but interference checking will be performed to generally ensure that the watermain can be sited as planned without major problems with existing infrastructure.

Task 1.1 meetings

- None, we have met enough on this topic that we believe this can be accomplished through email and GIS type figures. If meetings are needed they can be combined with those from Task 1.2.

Task 1.1 deliverables

- Email or memo on suitability of the proposed well locations including maps and comments related to code compliance

Task 1.2: Site future WTP 4 and raw watermain

To support the siting of the future WTP and the capital cost estimate for the CIP, Barr will review the current and projected future water quality from the new wells and conduct a review of options for the primary treatment processes that will likely be necessary. While we anticipate that the water quality from the new wells will likely be similar to the existing wells, we understand that the city would like to consider gravity filtration for the new plant, and this will be incorporated into the review of primary treatment options. Additionally, the review will consider the following:

- Footprint
- Operability and maintenance considerations (compared to existing plant equipment)
- Treated water quality and blending considerations
- Relative cost
- Expandability for future treatment or capacity needs

We understand that a general location has been identified for the future treatment plant, in the area of future Wells No. 18 and 19. Siting options for the future plant and its raw water main will focus on the plant footprint relative to other planned development and existing infrastructure maps. The siting of the plant will need to consider the sequencing of the raw water main, plant, and distribution system construction so as to minimize conflicts, ease tie-ins, and be cost efficient. Site grading, access, and utility needs will also be considered in the siting evaluation. As part of the work, geographic information system

(GIS) maps showing the existing system, the proposed WTP, raw water main routing, and distribution system connections and sequencing options will be developed.

Task 1.2 meetings

- Meeting to review and discuss process options
- Meeting to review plant layout and siting options

Task 1.2 deliverables

- Water treatment process options review memorandum (draft and final)
- Water treatment plant planning-level design basis and treatment plant layout memorandum (draft and final)
- Raw water main and treatment plant siting options memorandum (draft and final)

Task 1.3: Capital improvement plan

Based on our understanding of the future infrastructure, we will develop a CIP to outline future infrastructure needs, construction timelines, and capital improvement costs. The CIP will be in the form of a memo, with a table outlining tasks, costs, and implementation date.

Task 1.3 meetings

- One meeting to present the findings to the City either in a workshop or council setting.

Task 1.3 deliverables

- Draft CIP memo for city review
- Final CIP

Part 2: Plans and Specs for Well 19 and Completion of Well 18

This task will consist of preparing plans and specifications to construct Well 19 including the pitless adaptor, pump motor and associated site work immediately around the well. This task will also include bidding documents to complete Well 18. Well No. 18 (unique no. 809699) was constructed at 12260 Lexington Avenue north of the water tower and was completed in May 2015. The site consists of the completed and capped well, which still needs a pitless unit, and pump assembly. The work included in this set of plans and specifications will include:

- Installation of casing and screen for Well 19, the well will be completed in the quaternary aquifer similar to Well 18
- A pitless adapter unit with protective enclosure for both Wells 18 and 19
- A sample tap located on the pitless adapter
- Ports for permanent and manual water level measurement in each well
- A water level indicator in a 1-inch diameter pvc tube with 4 to 20 mA output

- A submersible pump (1,400 to 2,000 gpm) and motor for Wells 18 and 19 it is assumed that the motors will be sized to pump directly to the distribution system with additional head as needed to account for future losses through the water treatment plant
- 10-inch diameter drop pipe with down hole check valve for both wells

It is assumed that the wells will be designed to pump to the water distribution system and that the same well assemblies will pump to the future WTP 4 once it is online.

Task 2.1: Design and permitting of Well 19 and Completion of Well 18

Barr will perform all design and engineering services needed to prepare bidding documents for the construction of Well 19 and completion of Well 18. We plan to bid construction of all items specific to the wells that require a licensed driller as a single project. The documents will consist of specifications and drawings necessary to depict the well equipment and site work outlined above to prospective bidders. As in past well projects, Barr will assist the city with bidding services and meet with city staff as needed to obtain input for the design process.

This task is based on the assumption that the city will provide the following data and/or work to assist in the design and preparation of bidding documents with the following tasks:

- Front-end plans and specifications
- Submission of Minnesota Department of Health (MDH) applications and fees
- Administration of the bidding process, ad for bid, online bidding submittals, bid opening, etc.

The Barr work tasks are as follows:

- Design drawings and specifications for the construction of Well 19 and completion of Well 18
- MDH applications for submittal by the city
- Preliminary wellhead protection plan for Well No. 19
- Review of the bids

Task 2.1 meetings

- Meeting to review and discuss equipment preferences

Task 2.1 deliverables

- MDH permit applications for submittal by the city
- Plans and specifications for bid (draft and final)
- Bid award recommendation letter

Task 2.2: Construction Services

As in past projects, Barr will perform construction services for construction of Well 19 and completion of Well 18, such as partial and final pay estimates, change orders, shop drawing review, on-site construction observation at key junctures of equipment installation, and equipment start-up.

Task 2.2 meetings

- Pre-construction meeting with the contractor and city
- Punch-list review meeting
- Final walk down and start-up meeting

Task 2.2 deliverables

- Weekly construction updates by email
- Reviewed shop drawings
- Reviewed pay applications

Part 3: Wells 18 and 19 Connecting Piping and Temporary Treatment System

This part of the project will consist of preparing plans and specifications for all of the items needed to connect completed Wells 18 and 19 to Blaine's existing distribution system. This will include watermain, temporary treatment systems to be housed in the base of the nearby water tower and an altitude valve for control of water levels in the water tower. The specific items included in this work are:

- Ductile iron pipe watermain to connect the two wells to the existing distribution system, with fittings as needed to connect the wells to the future water treatment plant. The piping will be set up to allow use of the wells up to the time when the water plant comes on line and then be used as by pass piping so that the wells can be used in an emergency in the future to pump directly to the system if the plant is off line for some reason.
- A check valve, deep well air release valve, and pressure gage located in a valve manhole or vault for each of the two wells
- A flow meter with dial readout and 4 to 20 mA output located in a meter manhole or vault for each well
- Sump pumps in each manhole or vault
- A well flushing hydrant for each well
- A flow control/well isolation valve for each well
- An altitude valve for the adjacent tower
- Temporary chlorine and fluoride feed in the water tower base, as needed
- A well control panel including radio communication with the city's SCADA system, digital displays of the flow meter and water level indicator output, and soft-start or variable-frequency drive (VFD) for the well motor; the control panel will be housed in the water tower base
- A site survey including a scan of the inside of the water tower if needed

- Site work including grading to meet well codes, concrete pads for the power transformer and control panel, an asphalt driveway for well access for future operation and maintenance, and seeding of all disturbed turf areas

Task 3.1: Design and permitting of connecting piping

Barr will prepare bidding documents to construct the connecting piping, temporary treatment system and altitude valve, and site grading along with the necessary MDH permits.

The Barr work tasks are as follows:

- Design drawings and specifications for the watermain, site work, electrical and controls systems to operate the pump, and chemical feed as needed.
- Design drawings depicting the length, size, and fittings of the water transmission main between the wells and distribution system, with a tee for a connection to the future water treatment plant
- MDH applications for submittal by the city
- Review of bids

Task 3.1 meetings

- Kickoff meeting, review of the site

Task 3.1 deliverables

- MDH permit applications for submittal by the city
- Plans and specifications for bid (draft and final)
- Bid award recommendation letter

Task 3.2: Construction Services

As in past projects, Barr will perform construction services for Wells 18 and 19 Connecting Piping and Temporary Treatment System, such as partial and final pay estimates, change orders, shop drawing review, on-site construction observation at key junctures of construction and project start up. We assume that the City will perform all on site observations related to buried watermain and related buried utilities.

Task 3.2 meetings

- Pre-construction meeting with the contractor and city
- Pumping-test coordination meeting

Task 3.2 deliverables

- Weekly construction updates by email
- Reviewed shop drawings
- Reviewed pay applications

Personnel availability

The team committed to this project consists of staff you are familiar with including:

- Brian LeMon Principal in charge, OA/QC
- Michelle Stockness Project manager
- Dan Nesler Senior process/civil engineer, well and site design
- Lisa Andrews Process engineer, preliminary WTP design
- Stuart Stephens Electrical engineer
- John Greer Geologist, well siting assistance

Project schedule

The proposed project schedule for the water system planning and design is as follows.

Work task	Deliverable date
Task 1: Future Water System Infrastructure Plan	December 2015
Task 2.2: Plans and Specifications for Well 19 and Completion of Well 18	January 2016
Task 2.2: Construction of wells completed	September 2016
Task 3.1: Plans and Specifications for Wells 18 & 19 Connecting Piping, Temporary Treatment System and Altitude Valve	April 2016
Task 3.2: Construction of Connecting Piping, Temporary Treatment System and Altitude Valve	November 2016

Fee estimate

Fee estimates for each work phase (described above) are provided in the table below. These fees are estimated as not-to-exceed costs on a lump-sum basis, with construction phases conducted on a time and materials fee. We have divided the fee estimate into several phases that will be billed as separate projects. The fee for each task can also be negotiated based on the final work scope.

Work task	Fee estimate
Part 1: Future Water System Infrastructure Plan	\$ 34,000
Part 2: Well 19 and Completion of Well 18	\$ 59,000
Part 3: Wells 18 & 19 Connecting Piping, Temporary Treatment System and Altitude Valve	\$ 86,000
Total	\$ 179,000

In conclusion

Thank you for the opportunity to propose on this project. If you have questions about our team's proposal scope or budget, feel free contact Michelle Stockness (952-832-2754, mstockness@barr.com) or Brian LeMon (952-832-2774, blemon@barr.com).

If the terms of this subagreement are acceptable to the City of Blaine, please date and sign in the space provided below. Keep one copy for your records and return the other to Barr Engineering Co.

Sincerely,



By: Brian LeMon, PE
Its: Vice President, Principal in Charge



Michelle Stockness, PE
Project Manager

Accepted this ___ day of _____, 2015

CITY OF BLAINE

By _____

Its _____