



CITY OF LE SUEUR
REQUEST FOR COUNCIL ACTION

TO: Mayor and City Council
FROM: Richard Kucera, Public Services Director
SUBJECT: Water System Master Plan – Comprehensive Plan
DATE: For the City Council Meeting of Monday, July 8, 2019

PURPOSE

Consider approval of an agreement with Short Elliott Hendrickson, Inc. (SEH) to complete a Comprehensive Water Supply Plan and Water System Master Plan.

SUMMARY

The City of Le Sueur and staff have identified the need to update the Water System Master Plan for the City of Le Sueur. A comprehensive master plan will help guide the City and staff with water system needs. A plan of this nature will also assist the City and staff in financial planning of the water enterprise.

Staff solicited requests for proposals evaluated those proposals. Staff has reviewed the proposals and is recommending the proposal from SEH to complete the Comprehensive Water Supply Plan and Water System Master Plan for the City of Le Sueur.

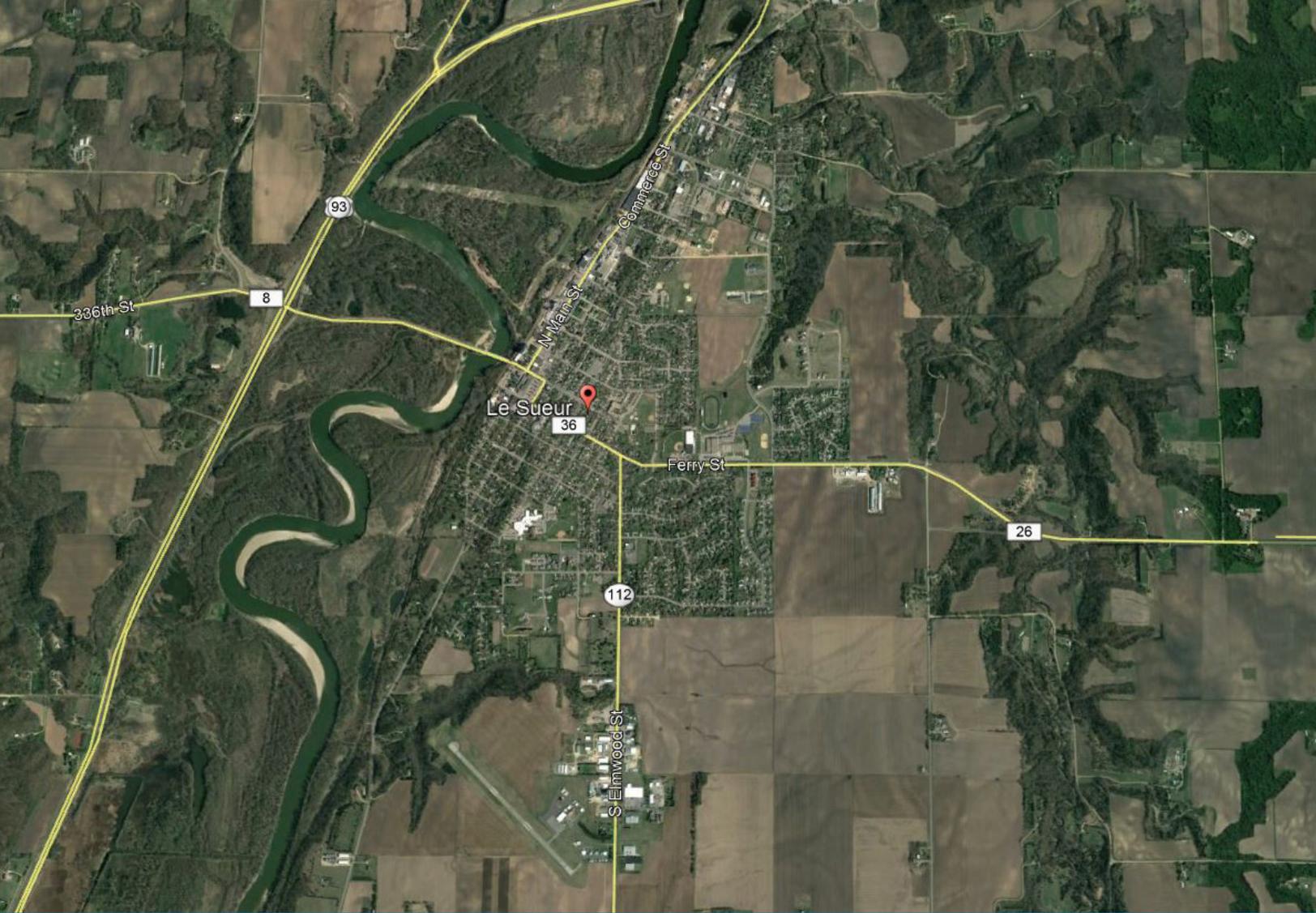
The proposal for the Comprehensive Water Supply Plan and Water System Master Plan from SEH has been attached; the process will involve four tasks.

1. DNR Water Supply Plan
2. Water Demand Analysis and Planning
3. Water Distribution System Modeling & System Evaluation
4. Water Master Plan Summary Report

If approved, the process is expected to take around 6 months with a proposed cost of \$35,800.

ACTION REQUESTED

Staff is recommending City Council approve the attached agreement with WSB Engineering with a to not exceed the amount of \$35,800 to complete a Comprehensive Water Supply Plan and Water System Master Plan for the City of Le Sueur. The 2019 City of Le Sueur Capital Improvement Plan identifies \$100,000 for 'Water System Master Plan'; this line would be the funding mechanism for this plan.



Proposal for

Comprehensive Water Supply Plan and Water System Master Plan

City of Le Sueur, Minnesota | April 8, 2019



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April 8, 2019

Mr. Richard Kucera
Public Services Direction
City of Le Sueur
203 South Second Street
Le Sueur, MN 56058

RE: Comprehensive Water Supply Plan and
Water System Master Plan
City of Le Sueur, Minnesota
SEH No. P-LESUM 150410

Dear Mr. Kucera:

The City of Le Sueur (City) is taking a very important step by developing a comprehensive water supply plan and water system master plan for current and long-term water needs of the City. This important step will help to assure that water system will be ready to serve future generations with a high quality drinking water system.

A comprehensive master water plan paired with a water system model are vital components that will help the City prepare, plan and program for the communities future health, growth and prosperity. Short Elliott Hendrickson Inc. (SEH®) is best positioned to help the City focus on the technical details, identify feasible solutions to meet the needs of your community and develop a clear plan for future water system projects. Water system infrastructure requires substantial investment, and careful planning can help prioritize capital improvements and allow focused allocation of resources where they are most needed.

A national firm with a local feel. SEH is a full-service professional services firm comprised of more than 800 engineers, architects, planners and scientists located in offices across the nation. We've stood the test of time; having been in business for 90 years. The services we provide go beyond engineering, planning and architecture to include helping to identify funding resources for our clients and helping to move projects from ideas to completion. We bring the depth and magnitude of a national firm with the personal touch of a small local office.

Extensive project experience. SEH brings extensive in-house experience in comprehensive water planning, analysis and modeling for similarly-sized communities facing similar challenges. Over the past 10 years, SEH water modeling and water distribution specialists proposed for this project have worked on more than 30 comprehensive water master plans and more than 70 water models for communities throughout the Upper Midwest. Our dedicated drinking water team has 24 in-house staff that work hand in hand with our local office representatives to combine regional expertise with hometown service. We look forward helping you develop a plan to provide safe and reliable drinking water to your community for generations to come. A brief summary of similar projects and proposed project team staff is included as an attachment to this proposal.

We look forward helping you develop a plan to provide safe and reliable drinking water to your community for generations to come. Should you have any questions or need additional information, please do not hesitate to contact me at 218.855.1720 or ckatzenberger@sehinc.com. We appreciate the opportunity to work with the City, and look forward to putting our experience to work for you.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Chad Katzenberger".

Chad Katzenberger, PE
Project Manager

Table of Contents

Transmittal Letter	
Project Background.....	1
Work Plan	1
Fee and Project Schedule.....	5
Qualifications and Experience	6
References.....	11

The specific licenses and credentials of the team members are described in the personnel and/or resume section of this document.

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The information contained in this Proposal was prepared specifically for you and contains proprietary information. We would appreciate your discretion in its reproduction and distribution. This information has been tailored to your specific project based on our understanding of your needs. Its aim is to demonstrate our ideas and approach to your project compared to our competition. We respectfully request that distribution be limited to individuals involved in your selection process.

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SEH of Michigan, LLC

Project Background

The City of Le Sueur is required by the Minnesota Department of Natural Resources (DNR) to update the City's water supply plan, which was due in 2016. The City would like assistance in completing and gaining approval of the water supply plan. In addition to the Water Supply Plan, the City would like to develop a new comprehensive water system master plan. The development of this plan will allow the City to prioritize, plan, fund and compliment various water system improvements so that future growth of residential, commercial and industrial water users can be accommodated.

For this Water System Master Plan we will divide the project into four (4) phases which will deliver the water supply plan master plan within the requested schedule. The following provides a description of the tasks we will perform in completing each of the phases. Accompanying the Work Plan discussion is a detailed breakdown of project tasks, project staff, task hours, billing rates and total cost which will inform the proposal process.

Work Plan

Task 1 – DNR Water Supply Plan

SEH will work closely with the City to complete the Water Supply Plan (Plan) and secure approval of the Plan from the DNR. The level of effort to complete the Plan is broken down into sub-tasks, as summarized below. Each subtask identifies the work to be done and data to be provided by the City and incorporated into the Water Supply Plan by SEH.

If this proposal is selected, we would proceed by forwarding a request for information to the City outlining specific data needed from the City for the Plan. The data will then be compiled and used to complete the tables in the report with the information provided for the first draft of the Plan. Additional information required to provide clarity, questions regarding the Plan, or items of concern will be identified while completing the first draft Water Supply Plan. These items along with the draft will be forwarded to the City for review. After City staff has had a chance to review the draft, we will have a kick-off meeting to review Plan together. Meeting minutes will be provided and will include action items and identify any additional information required based upon review of the draft Plan and comments or modifications to be incorporated into the Plan.

The Plan will be updated based on the City's comments from the meeting and additional data received. Once updated, the Water Supply Plan will be submitted to the City for a final review. A second meeting will be held to review the final Plan and make final modifications. Upon completion and City approval, the Plan will be submitted to the DNR for review and approval. SEH will respond to any questions the DNR may have regarding the Plan as required to secure plan approval. The proposed schedule is detailed below.

Tasks to be completed:

- Project Kickoff Meeting
- SEH provides list of requested data for completion of the Water Supply Plan
- City sends requested information to SEH
- SEH complete draft of Water Supply Plan for review and sends list of questions to City
- Meeting – review draft of Plan and questions
- Meeting minutes sent to City (includes request for additional information as needed).
- City sends additional information as needed
- Meeting - Water Supply Plan to 90-95% complete - review recommendations with City
- Incorporate comments, send Plan to City for final review
- Incorporate final comments and submit final Water Supply Plan to DNR for approval
- Response to DNR comments (as required) for final approval

Task 2 – Water Demand Analysis and Planning

Concurrent to the DNR water supply plan work, we will initiate the water master planning process. As part of the water system evaluation, historical water system demands will be analyzed to determine average per capita water use averages and analyze peak water system demands. Historical water use will then be paired with future land use and population projections to make an estimate of future water system demands through 2040. These future demands will then later be compared with existing water

system supply, distribution and storage capacities. This task will also help complete the DNR water supply plan demand analysis and water use projection requirements.

Individual tasks include:

- Water Needs Analysis:
 - Review current and future service area population forecasts and update water demand projections over the planning period.
 - Collect available current demographic data and planning forecasts for the identified service area based on the City’s Comprehensive Plan.
 - Collect and review water demand data information including billing (AMI), SCADA pumping records, DNR annual reports, other historical data sources, and other available planning and engineering reports.
- Demand Analysis: Develop unit demands (gallons/day/unit) to be used for projecting future water requirements.
- Forecast future average day demand in 5-year increments starting with year 2020 and going through year 2040.
- Develop peaking factors for maximum day (MD), maximum hour (MH), average day (AD), average summer day (ASD), and average winter day (AWD).
- Develop 10 max day (MD10) use patterns for modeling purposes.

Task 3 – Water Distribution System Modeling & System Evaluation

The first step in the water system evaluation process will be to the construction of a water system model. The model will be utilized as a tool to evaluate deficiencies in the existing water system and evaluate improvement alternatives related to water supply (well capacity), system pressures, pipe flow and transmission capacities, and system reliability and resiliency.

Seamless data import and export allow for a computer model to be easily constructed with available GIS data and then calibrated to industry standards. Once constructed and calibrated, the water system model becomes a valuable tool for developing an understanding of existing water system operations, evaluation of deficiencies and analysis of potential improvements. A summary of the tasks needed to complete the proposed model are listed below:

Model Development: A new computer model of the water distribution system will be developed using Bentley WaterGEMS (WaterCAD v8i.) SEH maintains software licensing for all industry leading water system modeling software (InfoWater, WaterCAD, WaterGEMS) and we are able to transition between software platforms if needed. For this project we propose using the WaterGEMS software due to the power processing capabilities in developing system analysis. SEH will work with existing City mapping data to import water infrastructure information into the proposed water system model. The current water distribution piping, elevated storage tanks, well pump curves and operational data will be incorporated into the model. Historical usage data (from billing records) will be analyzed and incorporated into the model to closely represent current water system conditions. Additionally, field testing will be completed to collect real water system pressure and flow data to calibrate the model to assure realistic results are being calculated.

Model Evaluation: The updated, calibrated model will be utilized to model the adequacy of the distribution system and to recommend improvements. The model will simulate the operation of the Le Sueur water system during average day, maximum day and fire flow events. Water system operational flow capacities and system pressures will be examined to assure that the water system is capable of delivering an effective level of service. The resiliency of the water system will also be tested to determine if redundant water lines are needed to serve the water system adequately in the future.

Water System Facility Review: As part of the water model development process, it will be important for our project team to familiarize ourselves with your unique water system. Upon initiation of the model construction, we will plan a water facility Site visit where our project team can tour and become familiar with your entire water system including wells, treatment distribution and storage. This will help to assure that your system is accurately represented in both the water model and overall water system evaluation. Unique nuances of water system, in addition to operator experiences are important elements to be accounted for when evaluating the overall water system.

Overall Water System Evaluation: As part of the water system evaluation, historical water system demands will be analyzed to determine average per capita water use averages and analyze peak water system demands. Historical water use will then be paired with future land use and population projections to make an estimate of future water system demands through 2040. These future demands will then be compared with existing water system supply, distribution and storage capacities. Potential water

system deficiencies related to projected water system demands will be identified in addition to deficiencies identified in relation to water system modeling (model evaluation). These deficiencies will then be addressed by potential water system improvement alternatives.

Individual tasks in this effort include:

- Construct new water system model using GIS sources related to water system infrastructure.
- Using GIS-based mapping, SEH will associate demands to junction nodes spatially throughout the water system, assigning each demand to the correct demand location. GIS geocoding can be used to locate meters based on address. A demand allocator tool will automatically assign demands based on the GIS fields.
- Using a combination of SCADA data, meter billing data, land use considerations, and field calibration measurements, SEH will produce diurnal demand curves for estimating peaking factors.
- Using the same information as above, the diurnal and seasonal demand curve will be generated for the water system model.
- Allocate Updated Water Demands throughout entire water system.
- Develop diurnal curves for the full system, representing maximum day conditions
- Create the full system Distribution System Hydraulic Model.
- Create full water system hydraulic profile drawings.
- Calibration and Testing of the Hydraulic Model.
 - Develop a distribution system hydraulic model calibration and testing plan with steps, processes, and schedule for review by the City.
- Flow Testing: SEH will assist in completing one full day of hydrant flow testing. Data collected from this testing will help to verify the friction values assumed in the model. Testing procedures will be done in accordance with AWWA M32 and with certified calibrated pressure gages accurate to 0.5 percent.
- Operation Data Review: SEH will request 1 historical maximum demand week of total system data including system demand, tank levels and influent flow rates in a minimum hourly basis. This data will then be used in the model to complete an extended period calibration of system facilities.
 - Following review and agreement on the model calibration and testing plan, calibrate hydraulic model to meet project objectives and standards.
- Using the updated and calibrated hydraulic model, perform an evaluation of the full distribution system.
 - Ten day extended period simulations will be used for scenario evaluations. Time periods to be considered will include current system (2019), 5-year (2020), and 20-year (2040).
- Develop a hydraulic analysis plan. Plan will include the following:
 - System configuration and pressure management
 - Water supply capacity analysis.
 - Storage volume capacity analysis.
 - Pumping capacity analysis.
 - Fire flow capacity analysis
 - Emergency operations analysis.
 - Scenarios needed to analyze system, identify deficiencies and needed improvements.
 - Analysis evaluation criteria and methodology.
 - Draft plan provided to Project team for review and comment.
 - Following approval of plan, perform hydraulic analysis of water system.
- Perform a deficiency analysis.
- Hydraulic Analysis Report:
 - Prepare Hydraulic Analysis Report.
 - Provide draft report to Project team for review and comment.
 - Incorporate project team comments and finalize report.
 - Incorporate Hydraulic Analysis Report as a chapter into Master Plan Update report

- Water Supply Well Aquifer Investigation
 - Investigate the potential for the availability of well water sources within the City as well as the surrounding area within a 1 mile radius of the existing water system
 - Conduct general desktop hydrogeological investigation of known wells constructed in the area,
 - Review the potential for additional water supply wells to be added to the Le Sueur water system
- Water Treatment Plant Evaluation
 - Conduct treatment plant review and tour
 - Review current treatment processes
 - Evaluate existing capacity
 - Inventory existing system deficiencies
 - Evaluate current production water quality.
 - Review potential regulatory impacts
 - Recommend future water treatment improvements

Task 4 – Water Master Plan Summary Report

The ultimate goal of the project is to develop a sustainable Comprehensive Water System Master Plan. The work done in this section will reach that goal by utilizing previous planning work through the development of recommended water system improvements.

Water System Improvement Alternatives Analysis:

As part of this task, we will utilize input from the project team to identify potential water system improvement alternatives that will best remedy the deficiencies identified in the previous section. The hydraulic model will be used to simulate potential solutions for the deficiencies discovered in Task 3, and to evaluate means to adequately serve proposed development areas. The analysis performed in this task will focus on the entire water system, but will also consider anticipated development areas based in feedback received from the City and long range planning information. As we work with project team to develop improvement alternatives, those that best mitigate identified deficiencies will help formulate the ultimate water system plan. We will also verify benefits of recommended improvement projects with the hydraulic model (as appropriate). Recommended improvement project alternatives will be illustrated and identified on Master Plan report figures and/or maps. Ultimately we will work with the project team to prioritize proposed projects based on criticality and category. For each selected project we will prepare a preliminary schedule for

projects taking into account financial, siting, permitting, and staffing capacity and goals. Ultimately the most effective projects will be recommended and scheduled to assure the water system will meet the demands of the City of Le Sueur.

Capital Improvement planning (CIP)

The work described in Task 4 will develop and identify the most cost effective solutions for improving and maintaining the existing water system. We will work with the project team to select the appropriate capital improvement projects and schedule the implementation according to projected water system need. The development of the CIP will provide the City with a water system planning roadmap through the 2040 design year and beyond. The final CIP will include phased benchmarks for implementation of each project, related budget and cost estimates as well as recommended funding plan for the plan activities.

Task included in this process will include:

- Conduct meeting with project team and City stakeholders to review system improvement recommendations and additional modeling results.
- Work with project team to develop improvement alternatives to mitigate identified deficiencies.
- Classify system projects as addressing one of the following primary improvement categories:
 - Water Supply
 - Water Treatment
 - Hydraulic capacity.
 - Fire flow.
 - Storage.
 - Growth.
 - Water Quality.
 - Energy conservation.
 - System optimization.
 - Pipeline repair, upgrade or replacement.
 - Administration and Support.
 - Other.
- Verify benefits of recommended improvement projects with newly developed hydraulic model (as appropriate).
- Projects shall be described and justified with reference to an identified deficiency and benefit to the City.
- Recommended improvement project alternatives will be illustrated and identified on Master Plan report figures and/or maps.

- Improvement Project Prioritization and Scheduling.
 - Work with City stakeholders and project team to prioritize proposed projects based on criticality and category.
 - Prepare a preliminary schedule for projects taking into account financial, siting, permitting, and staffing capacity and goals.
- Financial Analysis and Capacity.
 - Prepare an opinion of probable cost for each recommended improvement project.
 - Prepare a project cost/benefit analysis.
 - Include life cycle costs in project cost analysis.
 - Work with City financial staff for scheduling improvements taking into account water rate and annual funding capacity.
- Work closely with Project team to refine and finalize recommended improvement project list.
- Provide draft project list/map to Project team for review and comment.
- Incorporate Project team comments and finalize recommended project list and map.
- Incorporate Project team comments and finalize recommended project list and map.
- Provide assistance to City stakeholders for the development of a water system CIP
- Develop a potential capital improvement project lists using two major categories:
 - Facilities:
 - Supply
 - Pumping
 - Storage
 - Other
 - Pipelines:
 - Hydraulic capacity.
 - Replacement.
 - Rehabilitation.
- Deliver anticipated project needs to the City with budgetary cost estimates
- Refine project cost estimates for identified recommended projects after City selects preferred CIP alternatives
- Incorporate all findings and reports (as appropriate) into final master plan report.
- Prepare a master plan executive summary
- Provide report documentation as outlined in this scope

Fee and Project Schedule

Based on the scope of work requested and the information provided in our project approach, we have developed the following proposed costs:

Task	Fee	2019 Schedule					
		May	June	July	Aug.	Sept.	Oct.
Task 1 – Water Supply Plan	\$7,600						
Task 2 – Demand Analysis	\$3,600						
Task 3 – Water Distribution System Modeling & System Evaluation	\$15,500						
Task 4 – Water Master Plan Summary Report	\$9,100						
Total	\$35,800						

We are proposing to held the City complete the water supply plan submittal to the DNR within two months of initiation of the contract. The Master Plan is proposed to be completed by November 2, 2019.