City of Bellevue

MEMORANDUM

DATE: July 11, 2024

TO: Environmental Services Commission

FROM: Eric LaFrance, Utilities Planning Manager
Astri Niederkorn, Utilities Planning Engineer

SUBJECT: Emergency Well Siting Study Update

ACTION REQUIRED

No action by the Commission is required at this time. This is an informational briefing.

BACKGROUND / ANALYSIS

The Emergency Water Supply Master Plan (EWSMP) was developed with review and input by the Environmental Services Commission and adopted by Council in 2023. The purpose of the EWSMP was to increase the resiliency of Bellevue's water system to provide water to our customers in the event of an earthquake. One recommendation of the EWSMP is to add independent emergency supply groundwater wells. The first step in implementing this plan was to conduct an Emergency Well Siting Study and this work is in progress. This memo provides a brief summary of the progress to date for the emergency well siting effort.

Rehabilitation of Existing Supply Wells

The Emergency Well Siting Study included an evaluation of the existing Crossroad Wells 5, 6, and 7, and Samena Well 3. The study concluded that the existing supply wells need to be redrilled due to their age and condition. In their current condition reconditioning the wells is not likely to be successful. There is sufficient available space on each of the existing well properties to redrill and construct replacement wells such that significant water rights adjustments and approvals would not be required.

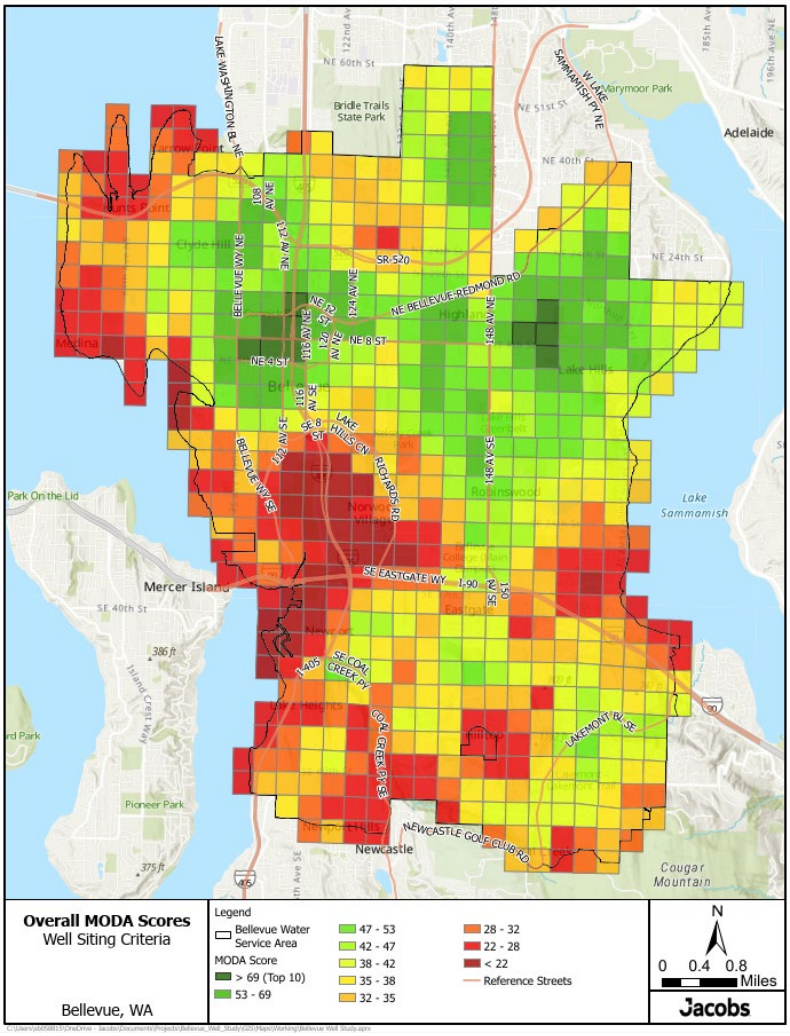
Analysis of Potential Additional Well Sites

This study also found that water supply capacities available from replacement Crossroads and Samena wells under existing water rights will only supply about one third of the future City emergency water supply needs. To improve emergency preparedness, the City needs to develop additional emergency water supply capacity by adding emergency groundwater wells in the future.

The study divided the City into Quarter-quarter (QQ) sections, (represented as squares in the figure below) and each QQ was examined as a potential site for a new emergency water supply well. Eleven criteria were weighted and used to assess each QQ in a multi-objective decision analysis (MODA). The following table details the criteria and weighting. The map that follows with color-coded squares denotes those areas of the city that are best for siting a new groundwater well (green) vs. the areas that are not as desirable (red):

Evaluation Criteria	Assessment Scale / Units	Weighting
1. Seismic Backbone Pipe Routes	Distance (mi) from QQ to nearest Backbone Pipe Route	12%
2. Water Pressure Zones	QQ Water Pressure Zone Proximity	8%
3. Critical Customers	Total Scaled Critical Customers Score within 0.25 miles of QQ	16%
4. Streets and Accessibility (Arterials)	Total Scaled Arterial Mileage Score within 0.1 miles of QQ	9%
5. Customer Density	Total Scaled Winter Water Demand Score within 0.25 miles of QQ	14%
6. Groundwater Contamination	Total Scaled Groundwater Contamination Score within 0.5 miles of QQ	9%
7. Surface Contamination	Total Scaled Surface Contamination Score within 0.5 miles of QQ	8%
8. Average Income (Equity)	Average QQ Household Income ($K)	4%
9. Car Ownership (Equity)	QQ Households Owning At Least One Car (%)	4%
10. Fire Department Drafting Sites	Distance (mi) from QQ to nearest Drafting Site	3%
11. Seismic Fault Zones	Distance (mi) from QQ to nearest Seattle Faultline	13%

The final weighted QQs are displayed in this heat map (green is best and shading to red is less desirable):



Based on the evaluation criteria rankings considered through the MODA process, optimal locations for emergency water supply well siting appear to center in and around downtown Bellevue, extend eastward south of the Bel-Red corridor, and focus in and around the Crossroads area extending to portions of the Lake Hills, Northeast Bellevue, and Bridle Trails neighborhoods.

Next Steps

The results of this study will be used to further implement the EWSMP. The existing wells at Crossroads and Samena will be improved as part of our future Capital Investment Plan (CIP) starting in 2025. The results of the emergency well siting study will be used to find specific parcels for future emergency supply wells. This more detailed study is already programmed as part of our future CIP.

POLICY ISSUES

Water rights will need to be established for any new emergency supply well. The study assumes that new wells will be permitted under the Washington State Department of Ecology Emergency Water Source Authorization (consistent with RCW Chapters 90.03, 90.44, and RCW 43.70.310 and 90.54.020(3)(a)).

FISCAL IMPACT

This study identifies preferred areas of the city for potential groundwater well project sites. Site identification, selection, and project development work is programmed into the proposed 2025-2034 CIP.

ATTACHMENTS & AVAILABLE DOCUMENTS

A. Emergency Well Siting Study Technical Memorandum