

Silver Hawk Development Co

MEMORANDUM

To: Silver Hawk Residents

From: Allyssa J. Hale and Michael Manke

Date: August 23, 2019

Subject: Status of Water System Investigation and Treatment

On 8.19.19 we met with Steve Hatton, a principal engineer at Hatton Godat Pantier, Kevin Odegard, Operations Manager at NW Water Systems, and Mike Krautkramer and Mike Piechowski, hydrogeological engineers at Robinson Noble. At this meeting we discussed the results from the speciation (see prior memo from J&M) and our next steps for treatment at Silver Hawk.

While bacteria levels are greater than when the well was originally installed, the professionals at the meeting noted that the well is not impaired by any apparent blockage from colonization. Blockage occurs when bacteria colonies grow at the rapid rate which results in a loss of well production. This is common in systems that have issues with secondary bacteria. In our case, the well production is similar to when we installed the water system. The professionals were also perplexed because there is a strange variability of water quality considering many residents have never experienced issues with their water quality. It may be that there is an issue in distribution, which could explain the variability. To that end, we are planning a round of field testing with a machine called a Horiba. The Horiba is a water quality instrument that takes multiple readings at a single location and analyses the data. We will target areas and homes that have complained of poor water quality. We have red flagged all of these homes. Additionally, we will have neutral test sites to compare to the red flagged homes.

Depending on the results of the field testing, we will likely embark on a well-redevelopment. The redevelopment will consist of pulling out the two pumps, performing a video inspection of the well, brushing the casing, and sterilizing the riser and the screen. If things look good at this point, we will install the pumps, pump the waste and perform bac-t testing. This process will take approximately a week. We have contacted the drilling company who dug the well and installed the pumps to get on their schedule. For the redevelopment period we will have to tie-in to the city of Lacey's water system. Accordingly, we are currently seeking a permit for an emergency inter-tie.

Mike Piechowski specializes in treatment of bacteria in water and specifically in wells. He does not think there is any chemical treatment system that will work here. However, he found a machine called a Harsonic which has quite promising technology. The Harsonic employs

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ultrasound technology to emit frequencies and destroy bacteria colonies. In short, bacteria hide inside polysaccharides and use the polysaccharides to expand their colonies. If the polysaccharides are destroyed, the bacteria have no place to colonize. After the well redevelopment, we will likely install this technology to prevent future bacteria growth.

We understand that this process has taken longer than expected. The engineers thought a couple more shock chlorination treatments would fix this issue. However, the chlorination treatment provided inconsistent results. After reviewing the surveys, we reconvened and came up with a new plan. It took over a month to obtain the speciation results and met within a week of the engineers' evaluation of the results. As stated above, we are now moving forward with additional field testing and well redevelopment. These steps take time, but there is no other way to determine the root of the problem as they are not readily apparent. That said, we will continue to work with the engineers until we resolve this issue. In the meantime, we will keep the community posted of the well redevelopment schedule and the results from the field testing.

Silver Hawk Water System

September 22, 2019

To: Silver Hawk Water System Members

Re: Water Quality Survey

Dear Silver Hawk Water System Member:

As you already know, the Silver Hawk Water System has been doing extensive research to find the best solution for the water quality. After the chlorination treatment that was recommended by the engineers back in March, we received several complaints of discoloration, odor and now visible sediments in the water. We are furthering our research and need your participation, please complete the following survey and return in the enclosed envelope along with your utility payment.

Circle either yes or no on the following questions:

Are you experiencing odor YES or NO

Is your water discolored Yes or NO

Is there visible sediment in the water YES or NO
Can look like sand or dirt like substance

If you answered yes to the previous question:

Is the sediment floating? YES or NO

Is the sediment sinking? YES or NO

Any other comments and/or observations you would like to contribute:

This survey was completed by:

First & Last Name: _____

Service Address: _____

Phone Number (not required): _____

We thank you for your patience during this time and appreciate your feedback.

Silver Hawk Water System

Silver Hawk Water System

Dear Residents,

Thank you for your continued patience during our water system testing and investigation. So far, we have performed the following: (1) two attempts at shock chlorination in combination with flushing the lines (this had mixed results); (2) a speciation, the results of which were not remarkable; (3) field testing, which also showed pretty consistent results and did not show the levels of turbidity complained of by some residents; and (4) source testing of the water, the results of which we are waiting for. We received our annual water permit last week and remain in good standing with the Department of Health (“DOH”). I know this does not provide solace to those who are experiencing problems, but please understand your water does still meet the health standards set forth by our state. All that said, we have learned the following

1. The water has low iron (Fe) and low to medium levels of manganese (Mn).
2. Our water is in a highly reduced environment. This means that the Fe/Mn is mostly staying in solution in the water mains.
3. The Fe/Mn is coming out of solution when it is exposed to heat (hot water tanks) or air (backs of toilets, sink aerators) in people's homes.
4. The problem is worse/better from house to house. This could be because of differences in hot water heaters (tank vs tankless and set temperature), people's water use patterns, and the type of fixtures they have.
5. Fe, and especially Mn will build up some sediment, or a film, and then occasionally break loose, causing issues with water for a while that will then get better. This is especially true with high flow fixtures like a bathtub that uses a lot of water all at once which increases the velocity in the pipes.

To address this, we are going to treat the water using polyphosphates. With this process, the DOH requires us to chlorinate. We will add chlorine at the lowest possible level. Polyphosphates chelate (hug) the Fe and Mn and prevent them from turning into a solid. We will implement this upon receiving DOH approval. We expect this will take two to three weeks. In the meantime, we will flush the lines next week to prevent the Fe and Mn from building a sediment layer in the pipes. After the flushing has been completed, the signs will be taken down in the neighborhood and it is important to flush the lines in your home using both hot and cold water. This means that you would turn on every faucet for a minimum of 5 minutes or until the water is clear. Once you have flushed the lines it's also important to flush your hot water tank per manufacturer instructions.

After the polyphosphate treatment is operating, we will send surveys to the residents to ensure the treatment is effective.

Respectively,

Silver Hawk Water System

Silver Hawk Development Co

MEMORANDUM

To: Silver Hawk Residents

From: Allyssa J. Hale and Michael Manke

Date: February 25, 2020

Subject: Status of Water System Treatment

The engineering project for treatment has been approved by Department of Health. All the parts and materials have been ordered and are expected to be delivered in the middle of March. The treatment will be installed shortly after all the materials arrive and is estimated to take 2 days to install. Once the treatment has been installed periodic field testing will be done to ensure optimal performance. We anticipate a 2 week minimum to make adjustments. You will be informed when installation of treatment has been installed and working.



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March 26, 2019

To: Silver Hawk Water System Members

From: *Operations Department*
NORTHWEST WATER SYSTEMS, INC.

Re: Temporary Chlorination Treatment

Dear Silver Hawk Water System Member:

The Silver Hawk Water System will begin low level chlorination beginning on Friday, March 29th and will maintain for approximately 15 days. This is being done as part of a maintenance program to address taste and odor concerns that have been reported in the distribution system. Following the chlorination, a thorough flushing on the distribution system will be done to clear any mineral sediment that may be present in the lines. You may notice smell of chlorination and/or taste however, the water is considered usable and safe. The level of chlorination will not exceed the level set by the WA State Department of Health as an acceptable level for human consumption. If you have animals within the home (aquariums, birds, dogs, etc.) we recommend that the water is not consumed and/or used during this duration of time, unless dechlorinated, until the flushing is complete, and the sign has been removed from entrance of the community. During the chlorination process, it is possible to experience discoloration in the water. This is due to naturally occurring iron in the source water which is not considered a health risk, though may be aesthetically unpleasing. Please ensure during the chlorination period that water is used throughout the home, including fixtures that may not be commonly or routinely operated. To be the most effective, a high level of turnover throughout the home plumbing system is advised. This should include both cold and hot water.

After the 15 days of treatment the entire system will be flushed. Once the distribution flushing has been completed, please flush your home plumbing to clear out any potential discoloration or odor from the lines. A sign will be posted at the entrance to the community keeping users apprised of the current status of this project. Once the sign is removed, the system shall be considered in normal routine operation. In addition to flushing the household plumbing, flushing the hot water heater/boiler, per your manufacture instructions may also show improvements with discoloration.

We would like to get your feedback after the treatment & flushing has been completed. A survey will be enclosed with your next utility billing statement that will be mailed at the end of April.

Sincerely,

Kevin Odegard
Operations Department
NORTHWEST WATER SYSTEMS, INC.

MEMORANDUM

To: Silver Hawk Residents

From: Allyssa J. Hale, Michael Manke and Northwest Water Systems, Inc.

Date: April 24, 2020

Subject: Water System Treatment & Backflow Assembly Testing

Water System Treatment

The treatment system has been installed. There has been a delay in the electrical control component installation, though we hope to have this completed very soon. We appreciate the patience and communication we have received regarding this project.

Annual Backflow Assembly Testing

As part of the Cross-connection Control Program (Chapter 246-292 WAC) all backflow prevention assemblies are required to be tested on an annual basis to ensure they are in proper working condition. The Silver Hawk Water System is conducting a group testing program to ensure the costs are as low as possible. The group testing will take place in the month of June and you do not have to be present during this test as the assemblies are located next to the water meters. Each test will be \$45 and this cost with a copy of the testing report will be included with the July or August billing statement. As stated above, we are trying to keep the cost of this annual test as low as possible but this doesn't mean you can't schedule and have the test performed yourself. If you decide to 'opt out' of the group testing, please contact a certified backflow assembly tester and provide a passing test result to Northwest Water Systems, at PO Box 123, Port Orchard, WA 98366, or info@nwwatersystems.com by **May 31, 2020**.

Otherwise, the testing will be performed in the month of June. If you do not have a water fixture installed that is directly plumbed to your private plumbing system (i.e. irrigation system, hot tub, booster pump, etc.) then you most likely do not have a backflow assembly installed and this doesn't apply to you. If you have any questions please feel free to contact Northwest Water Systems to speak to the Cross-connection Control Specialist, Jen Trenary if you have any questions.

MEMORANDUM

To: Silver Hawk Residents

From: Allyssa J. Hale, Michael Manke and Northwest Water Systems, Inc.

Date: June 25, 2020

Subject: Water System Treatment Update

Water System Treatment

NW Water installed the water treatment system at the end of April. The installation occurred later than the anticipated January/February dates due to both DOH delays and because certain parts for the system were backordered. The system was further delayed because the electrical connection to the existing electric controls required the utilization of outside contractors. The COVID-19 pandemic slowed the latter process down. That said, the outside contractor said the treatment should be up and running no later than July 1st. Northwest Water System is performing a complete flush of the system on June 25th and will perform another flush after the system is running. We strongly recommend flushing the water lines at your property on Friday, June 26th or shortly thereafter.



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July 28, 2020

Silver Hawk Treatment Plan and Timeline

Current:

Waiting for polyphosphates to arrive to re-activate sequestration treatment. First Shipment is scheduled to arrive Saturday, August 1, 2020 or Monday, August 2, 2020. The polyphosphates and chlorination will be put on-line immediately.

A second polyphosphate blend from another manufacturer will arrive soon thereafter (no arrival date confirmed yet from vendor).

Post relevant reports and information regarding the Silver Hawk Water System on Northwest Water System's website (full disclosure). Some items have already been uploaded, other reports and information will take more time to gather, organize, and post. We have a goal to post all available information by August 1st.

August/September

Optimization of sequestration treatment process (adjusting amount of polyphosphate and chlorine added). The goal of optimization is to achieve the best water quality possible while injecting as little chlorine and polyphosphates into the water as possible. During optimization there will likely be periods when the chemicals are out of balance and water quality will temporarily be worse. We will notify the community when an adjustment is made, so the possibility that a change in water quality might be observed can be anticipated.

~2nd Week in August

Hold another zoom meeting open to the community with the following proposed agenda:

- Update on the optimization process
- Update on the investigation of obtaining City of Lacey water
- Feedback on observed water quality throughout the community
- Answer questions related to water tests and reports posted on NWS website
- Answer any other questions

Sometime in September (?)

Once the sequestration process has been optimized, perform a full and thorough flush of the distribution system. Provide instructions to homeowners on flushing private homes.

End of September

Evaluate sequestration effectiveness based on flushing results, community feed-back and direct observations. If water quality is acceptable, continue with sequestration. If water quality is not acceptable, begin design of oxidation-filtration system. As an aesthetic water quality problem, "acceptable" is a qualitative term. The current water quality is obviously not acceptable. At the same time, everyone has a different opinion of "ideal" water (some like very soft water, and

others like their water with a little hardness, for example). Community feedback will largely determine if the water is acceptable.

If sequestration is effective, then continued monitoring, occasional flushing, and other normal operations will resume into the foreseeable future.

If sequestration is not effective at all, it will be discontinued, very regular flushing will be scheduled, and oxidation-filtration treatment will be designed and expedited as much as possible.

If sequestration is partially, but not acceptably successful, it will be continued and oxidation-filtration treatment will be pursued. The process will be expedited according to the degree of effectiveness of the treatment process. The worse the water quality, the more the process will be expedited. Connection to City water will also be investigated concurrently; however, not enough is known at this time to provide a meaningful timeline for connection to the city, if connection is even an option.

If oxidation filtration treatment is necessary, the following timeline is anticipated:

Preliminary design and analysis of alternatives	mid to late October
Pilot design submittal to WSDOH	late November
WSDOH review of pilot	30-90 days
Respond to DOH comments	2 weeks -1 month
DOH review of comment response	3 weeks-2 months
Build pilot plant	1-4 weeks
Operate pilot plant	2-6 weeks
Submit pilot report to DOH and full-scale design	3-6 weeks
DOH Review	30-90 days
Respond to DOH comments	2-4 weeks
DOH Comment Review	3 weeks-2 months
Build Full-Scale plant	2-6 weeks
Treatment plant testing and commissioning	2-7 days
Treatment plant placed on-line	May 2021-May 2022