



WATER REIMAGINED

DATE:

Wednesday, March 6, 2024

TO:

Mr. Chris Kostik
City of Credit River
18985 Meadow View Boulevard
Prior Lake, MN 55372

RE:

2023 Year-End Report of Wastewater Treatment System
Stonebridge Estates
City of Credit River, Minnesota

Dear Honorable Mr. Mayor Kostik,

Natural Systems Utilities (herein NSU) is providing wastewater operation and maintenance services for the Stonebridge Estates wastewater treatment facility. Attached is a summary of system performance, flow monitoring, interpretation of analytical results, and groundwater mounding analysis.

Description of System

The Stonebridge WWTF is designed to treat wastewater from 32 homes in the Stonebridge Estates development. All homes have individual septic tanks and a septic tank effluent pumping (STEP) system that pumps wastewater effluent into a pressurized force-main and delivers it to the treatment facility. The wastewater pumps into a 2,000 gallon stilling tank that is followed by two 5,000 gallon recirculation tanks. The effluent is pumped from the final recirculation tank to one of three AdvanTex® AX100 pods. Textile blankets in the AdvanTex® pods provide surface area for microbes to colonize and grow, and the wastewater is then treated by the microbes as it percolates through the pods. The wastewater cycles through the pods at a 2.5:1 recirculation ratio to maximize the removal of organic matter and nutrients. Following recirculation the water enters a 3,500 gallon denitrification MBBR with MicroC carbon addition that was added to the system in 2018. Following denitrification, wastewater enters a 3,000 gallon dosing tank for disposal to a drain-field. The disposal system consists of three zones of six mounds each, with each mound designed to infiltrate 800 gallons per day.



Repairs and Service Calls:

There were alarms at the Stonebridge wastewater treatment facility that required service calls in 2023. Below is a breakdown of the alarms by two categories, STEP home system alarms and treatment site alarms, as well as details on repairs and maintenance completed at the facility.

STEP Home System Repair & Alarm Breakdown:

- In January NSU troubleshoot a panel at 21792 Dundee Dr.
- On 3/3 NSU replaced a float at 9020 Canter Lane
- In August NSU completed STEP inspections at houses in the Stonebridge neighborhood.
- On 11/17 NSU troubleshoot and cleared ants from a panel at 8850 Callender Circle.

Treatment Site Repair & Alarm Breakdown:

- In March, June and November NSU had more Micro-C chemical delivered to the control building.
- In May NSU found the UPS battery backup off and reset the battery.
- On 5/24 and 5/25 NSU oversaw and assisted in the drilling and installation of two new groundwater monitoring wells. On the 24th the drilling rig got stuck in a rut near the southwest area of the facility and needed a tow truck to haul it out. The monitoring wells have now been installed and paperwork was updated.
- On 6/27 NSU met with surveyor onsite to ensure all groundwater monitoring wells were accessible.
- On 8/22 NSU found media had infiltrated the denitrification pump and caused it to fail, NSU replaced the pump.
- On 11/17 NSU was advised of a lid issue at 21960 Carrbridge Ct, NSU troubleshoot and replaced a damaged air release valve lid at the end of Carrbridge Ct.
- On 11/22 NSU responded to a treatment site alarm and found denitrification tank high level due to a clogged outlet. NSU cleared the outlet screen, readjusted the denitrification pump, and turned off the chemical feed to reduce bacteria accumulation.
- In November NSU replaced a recirculation pump. Due to no underground conduit being installed NSU had to run wire aboveground into the panel.
- In December NSU rebuilt discharge pipe connections to allow quicker access and maintenance
- On 12/21 NSU replaced failed float in the dose tank.



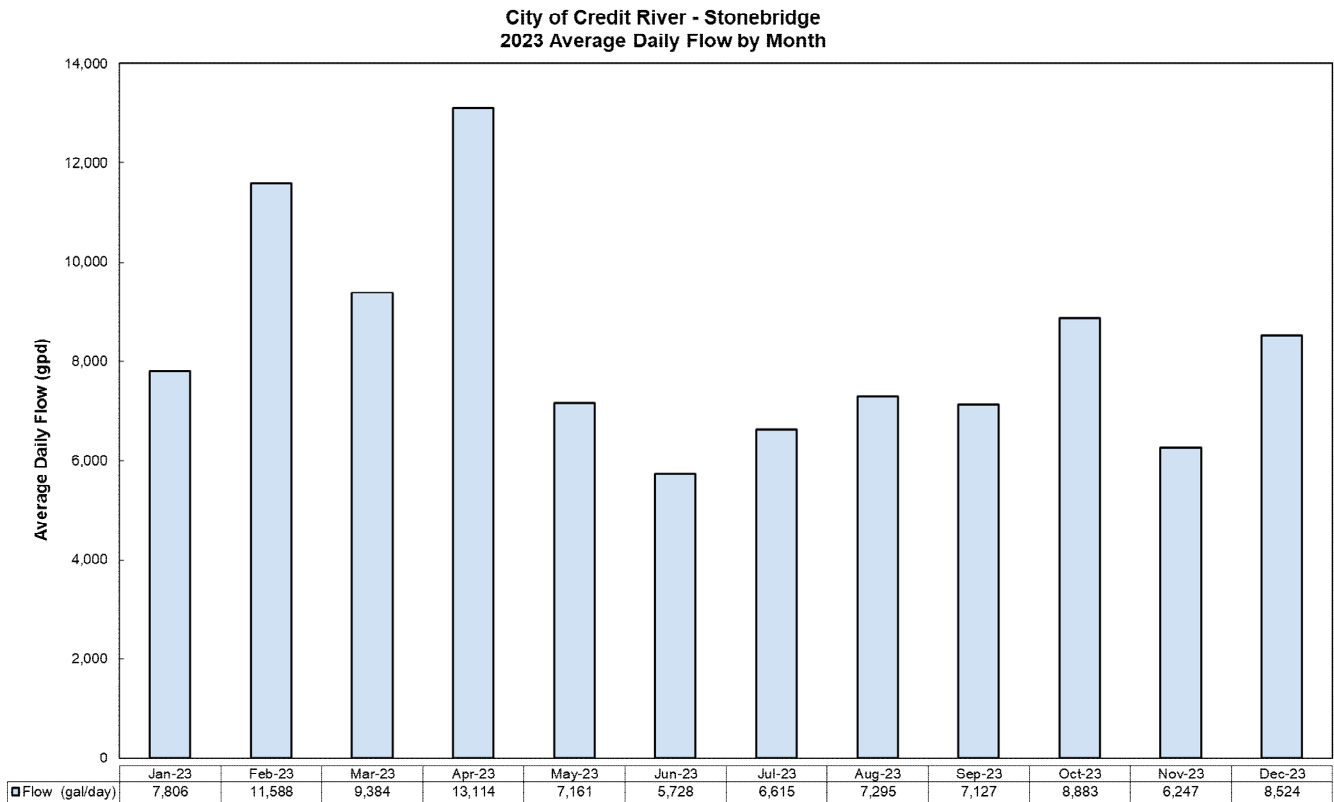
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Septic Tank Pumping/Maintenance:

In 2023 10 homes had their septic tanks pumped due to solids accumulations. *Mikes Septic* completed the pumping for these STEP systems.

Flow Monitoring:

The system has a design flow of 14,400 gallons per day (gpd). The average flows for the system are within the design flow but trended higher in flow per home in February and April. This may be due to iron filter settings, individual water fixture units installed, having a higher population per home on average, an unidentified source of inflow and infiltration, or another unidentified factor. Below is a chart of the average daily flow by month for 2023:

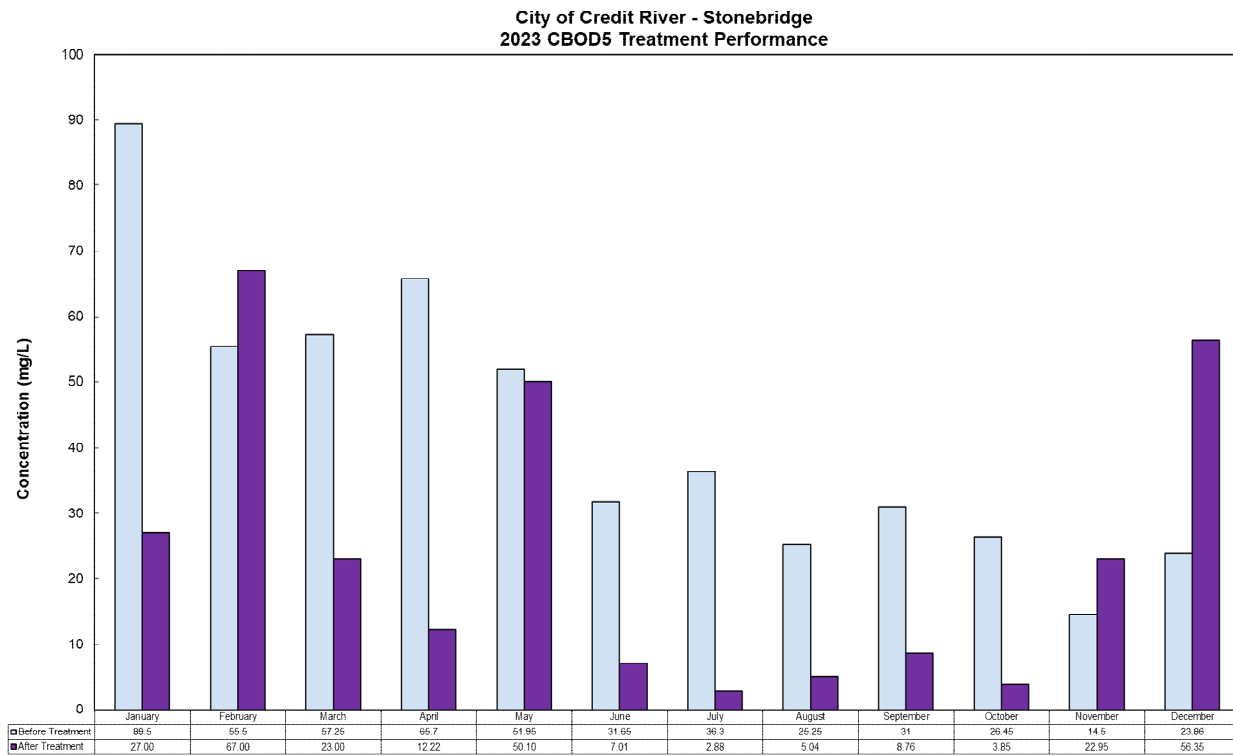




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Wastewater Treatment Analytical Results:

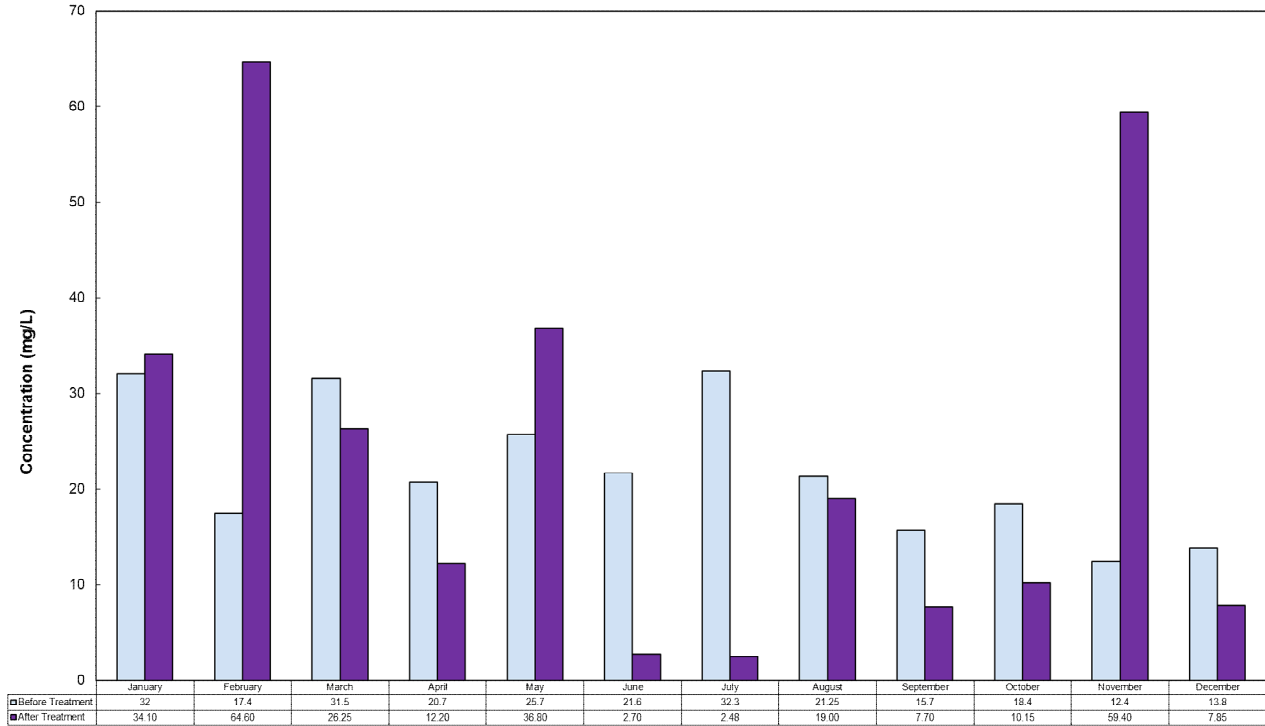
NSU samples the wastewater system twice per month to satisfy MPCA permit requirements. NSU uses these sample results to assess the performance of the facility. Overall, the treatment in 2023 of CBOD₅ and TSS worked well when additional chemical was not fed, but worked poorly with the additional of chemical (Micro-C). This happens when the additional chemical carries over into the dosing tank, causing increased nutrients in the dosing effluent which show up in sample results. This chemical was fed during the year to help with nitrogen reduction, which has underperformed in years past, especially during colder temperatures. The AdvanTex[®] pod recirculation ratio, and chemical feed rates to the MBBR were modified throughout the year to improve nitrogen treatment. Weekly field testing for nitrates and dissolved oxygen were used to make chemical feed adjustments and track denitrification MBBR performance as well. Charts with analytical results are included below:



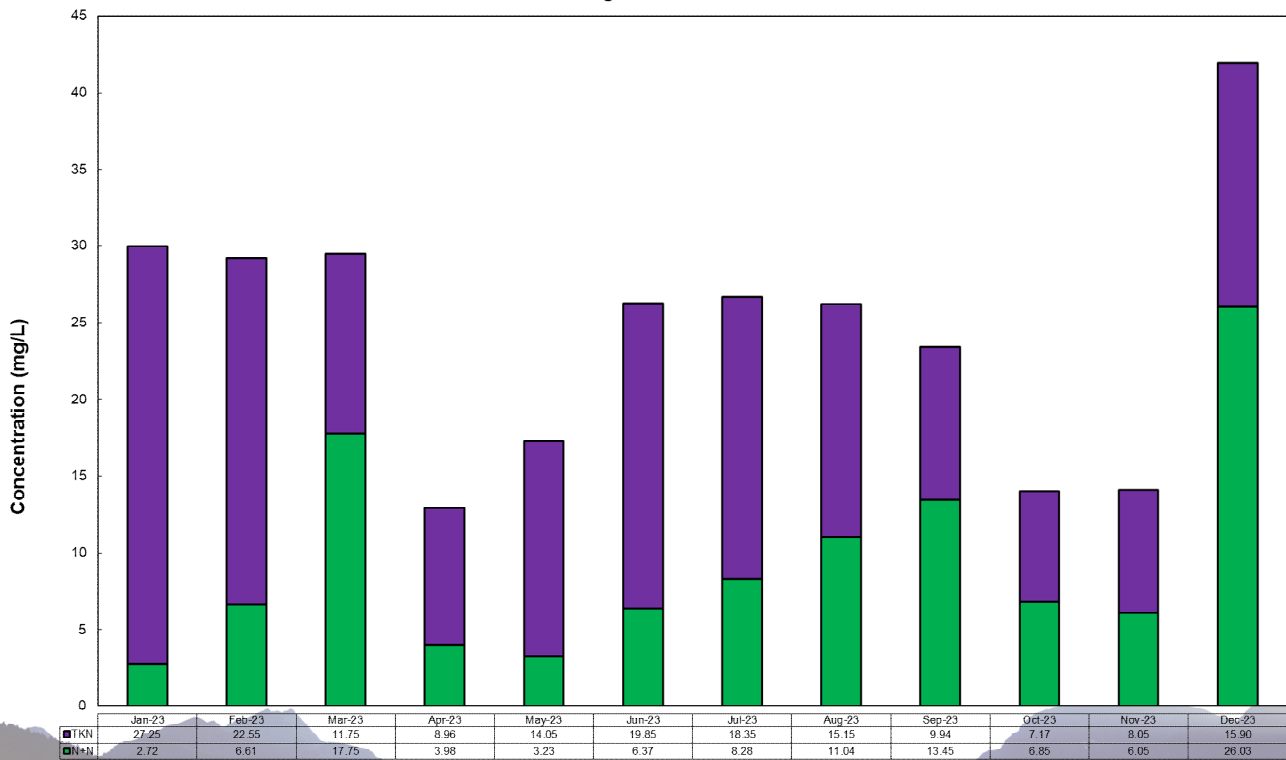


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City of Credit River - Stonebridge
2023 TSS Treatment Performance



City of Credit River - Stonebridge
2023 Total Nitrogen Treatment Performance

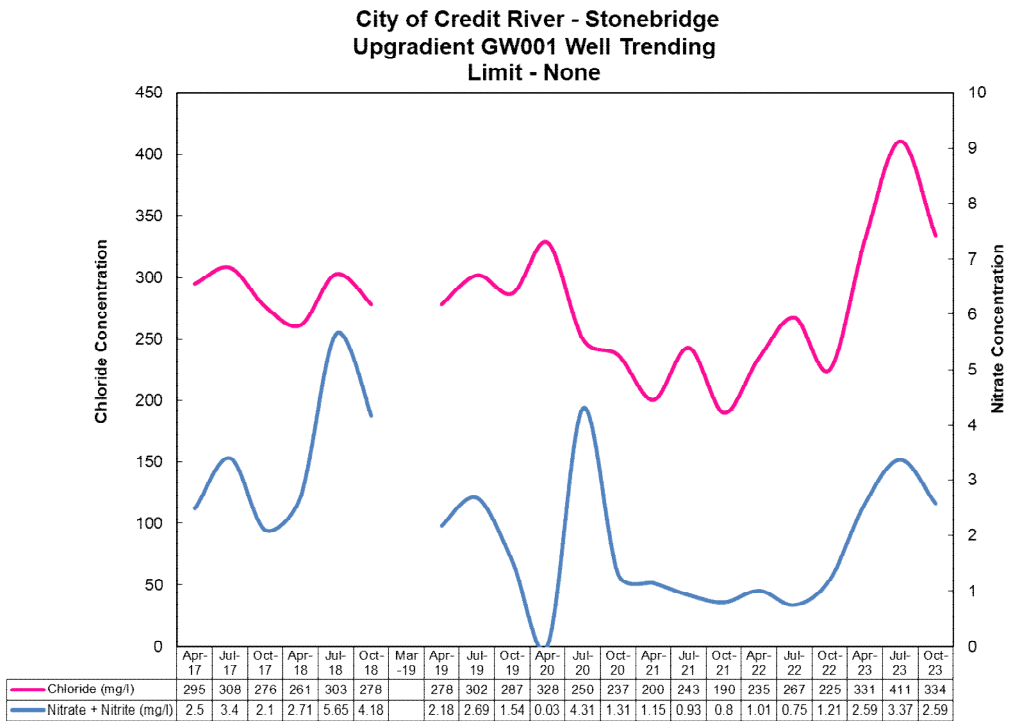




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Summary of Groundwater Analytical Results:

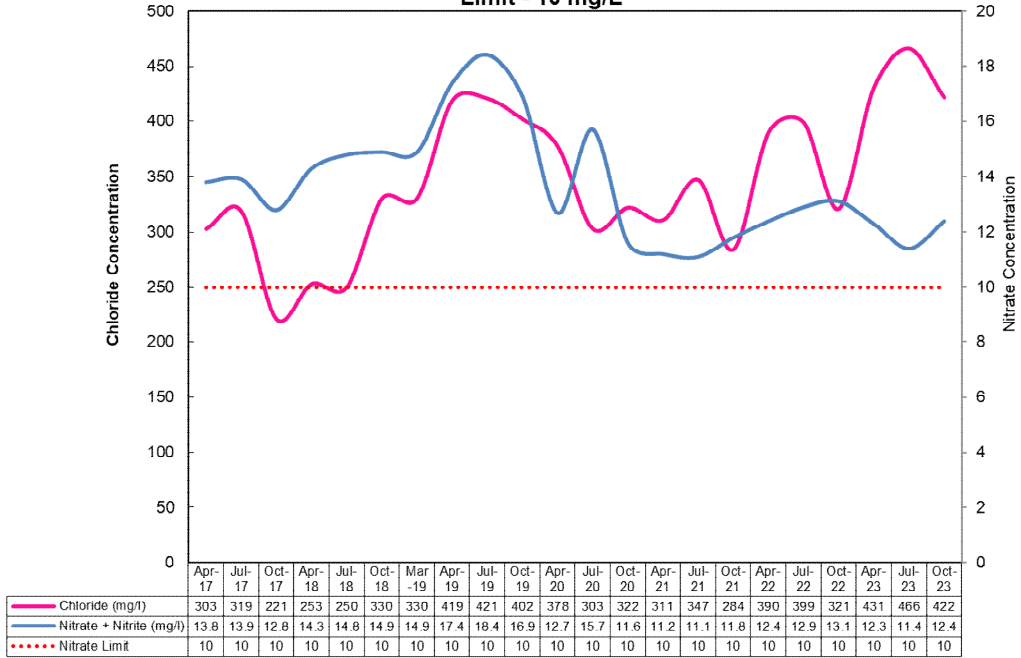
In May as part of the permit requirement two new groundwater monitoring wells were installed, bringing the total groundwater monitoring wells at the system to five. These wells monitor groundwater impacts at Stonebridge Estates. Chloride can be used as an indicator if nitrate levels are from wastewater or from some other source. Nitrate levels in GW002, GW003, and GW004 were all above 10-mg/L through 2023. The groundwater results are documented in the following charts:



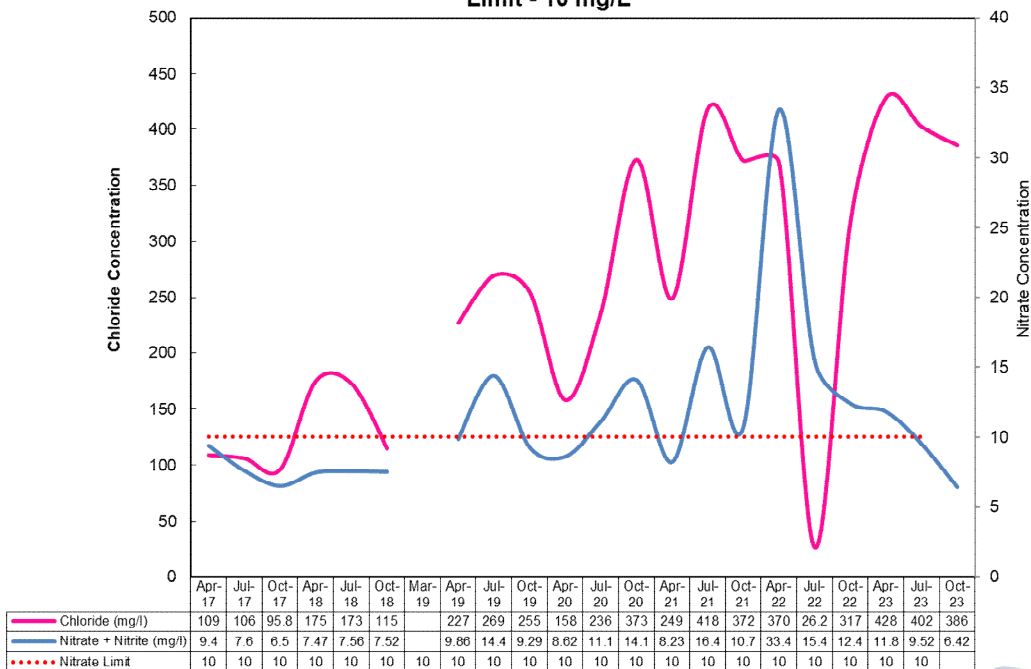


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**City of Credit River - Stonebridge
Upgradient GW002 Well Trending
Limit - 10 mg/L**



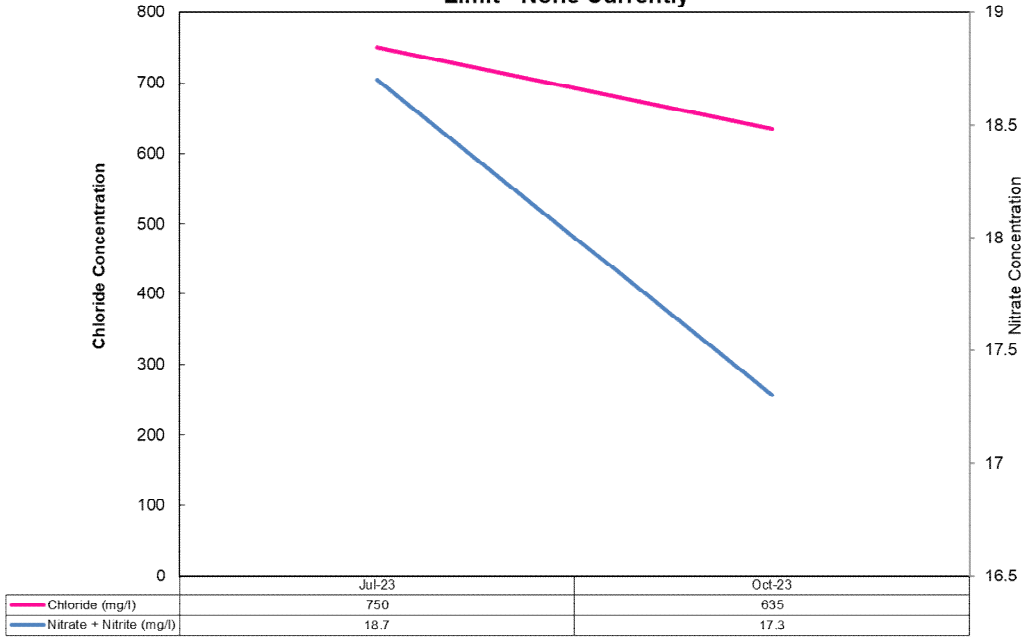
**City of Credit River - Stonebridge
Upgradient GW003 Well Trending
Limit - 10 mg/L**



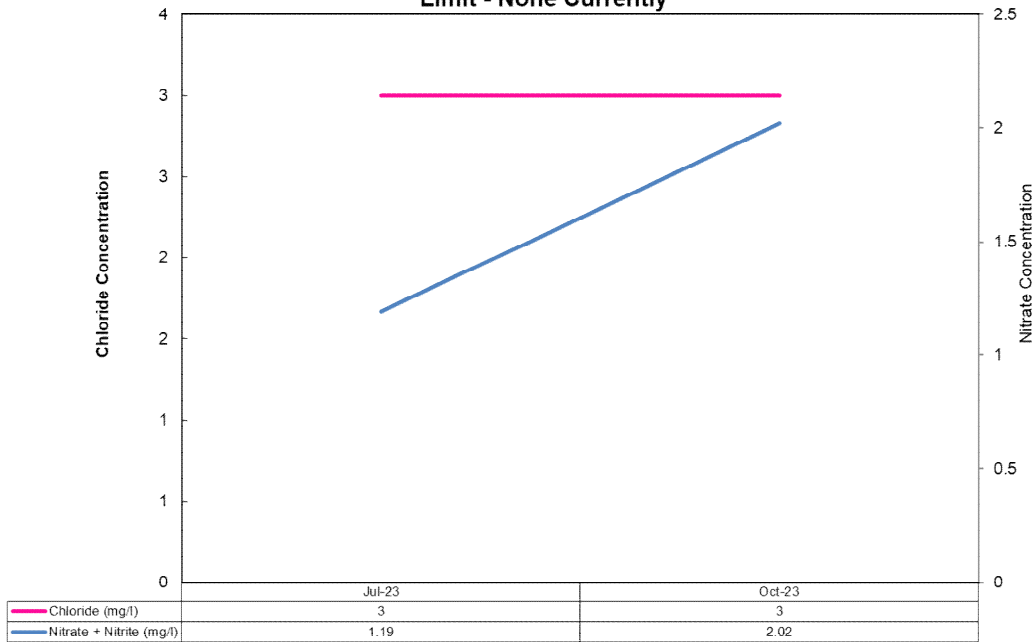


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**City of Credit River - Stonebridge
Upgradient GW004 Well Trending
Limit - None Currently**



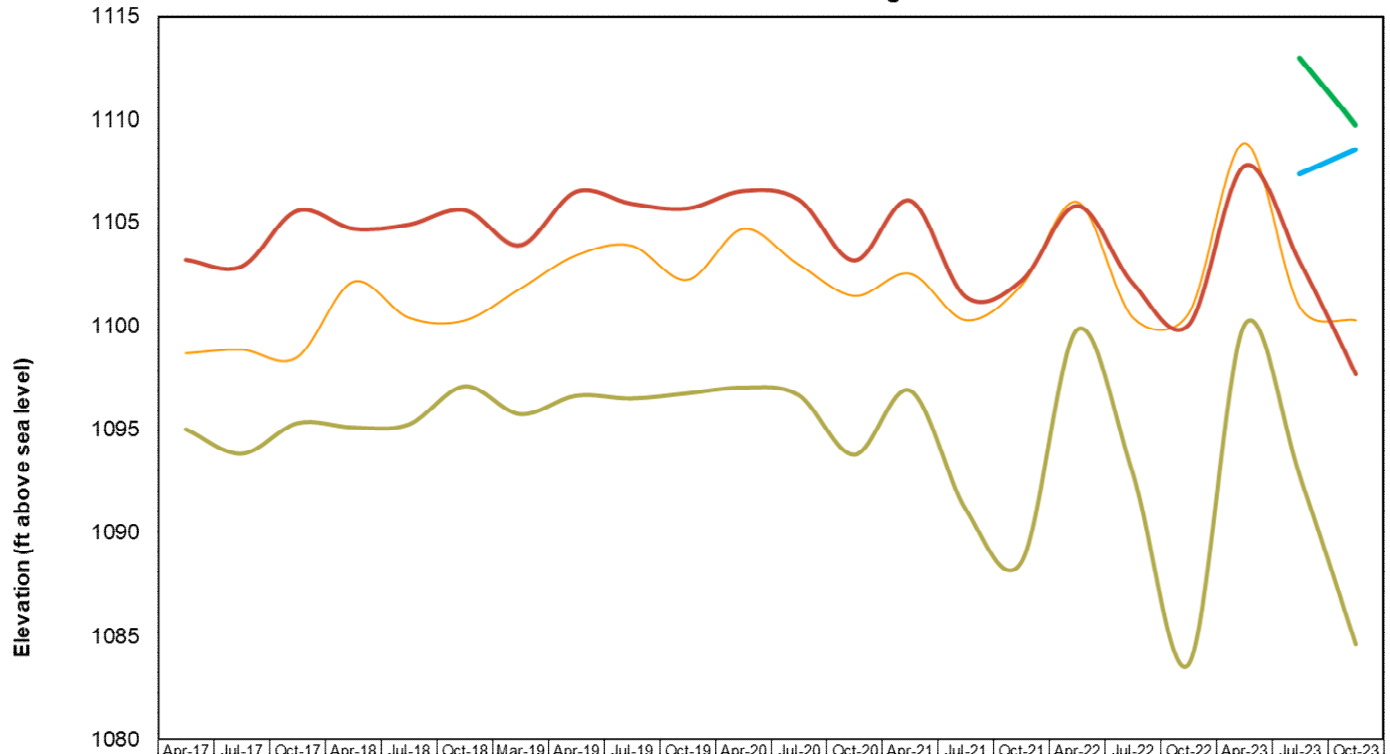
**City of Credit River - Stonebridge
Upgradient GW005 Well Trending
Limit - None Currently**





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City of Credit River - Stonebridge Groundwater Elevation Trending



	Apr-17	Jul-17	Oct-17	Apr-18	Jul-18	Oct-18	Mar-19	Apr-19	Jul-19	Oct-19	Apr-20	Jul-20	Oct-20	Apr-21	Jul-21	Oct-21	Apr-22	Jul-22	Oct-22	Apr-23	Jul-23	Oct-23
GW001 - Upgradient	1099	1099	1098	1102	1100	1100	1102	1103	1104	1102	1105	1103	1101	1103	1100	1102	1106	1100	1101	1109	1101	1100
GW002 - Downgradient	1103	1103	1106	1105	1105	1106	1104	1106	1106	1106	1107	1106	1103	1106	1101	1102	1106	1102	1100	1108	1103	1098
GW003 - Downgradient	1095	1094	1095	1095	1095	1097	1096	1097	1097	1097	1097	1097	1094	1097	1091	1089	1100	1093	1084	1100	1093	1085
GW004 - Downgradient																					1113	1110
GW005 - Downgradient																					1107	1109



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2024 Repair, Maintenance and Permit Considerations:

- **Facility Upgrade** - NSU recommends continuing to move forward with upgrades to the facility to limit the number of effluent violations and reduce effluent Total Nitrogen.
- **Wiring Replacement** - NSU recommends that direct bury electrical wires be replaced with electrical conduit where applicable.
- **Fencing Repair** – Parts of fencing around the treatment site are collapsing due to age. Fencing repairs will be needed in 2024.
- **Tree Removal** – Woody vegetation is encroaching on the edges of the drainfield, NSU recommends having brush removed and stumps treatment. NSU can provide a quote if desired.

If you have any questions regarding the annual report, please feel free to contact me at 612-283-1796.

Sincerely,

Robb Miller
Mobile Wastewater Operator