HUDSON'S HOPE
PLAYGROUND OF THE PEACE

2025 Community Water System Annual Report

NORTHERN HEALTH OPERATING PERMIT NO. 2384

District of Hudson's Hope
5-4-2026

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1 Introduction

The 2025 Community Water System Annual Report was prepared in accordance with the British Columbia Drinking water Protection Regulation (DWPR) and the District of Hudson's Hope permit to operate as directed by Northern Health (NH).

The report provides an overview of the existing water treatment infrastructure at Hudson's Hope Water Treatment Plant (WTP), the water distribution system, completed and planned upgrades, a detailed analysis of the water quality provided to the community for the 2025 season in Hudson's Hope.

Supplementary details including drinking water quality guidance and alternative studies are organized at the end of this report in the Appendices and are hyperlinked throughout.

1.1 Operating Permit

The District of Hudson's Hope water supply network is permitted/required:

- Year-round operation (Jan - Dec)
- To maintain a minimum free chlorine level of 0.2mg/L throughout the system
- Bi-weekly bacteriological sampling
- Full chemical/physical water quality analysis submitted to NH annually
- Monthly turbidity values submitted to NH
- Water Operators to be certified by the Environmental Operators Certification Program (EOCP)
- An up-to-date Emergency Response and Contingency Plan
- Quarterly updates to NH on progress of water system construction
- An Annual Water System Report

The water system's issued permit can be seen in Figure 10: Permit to Operate

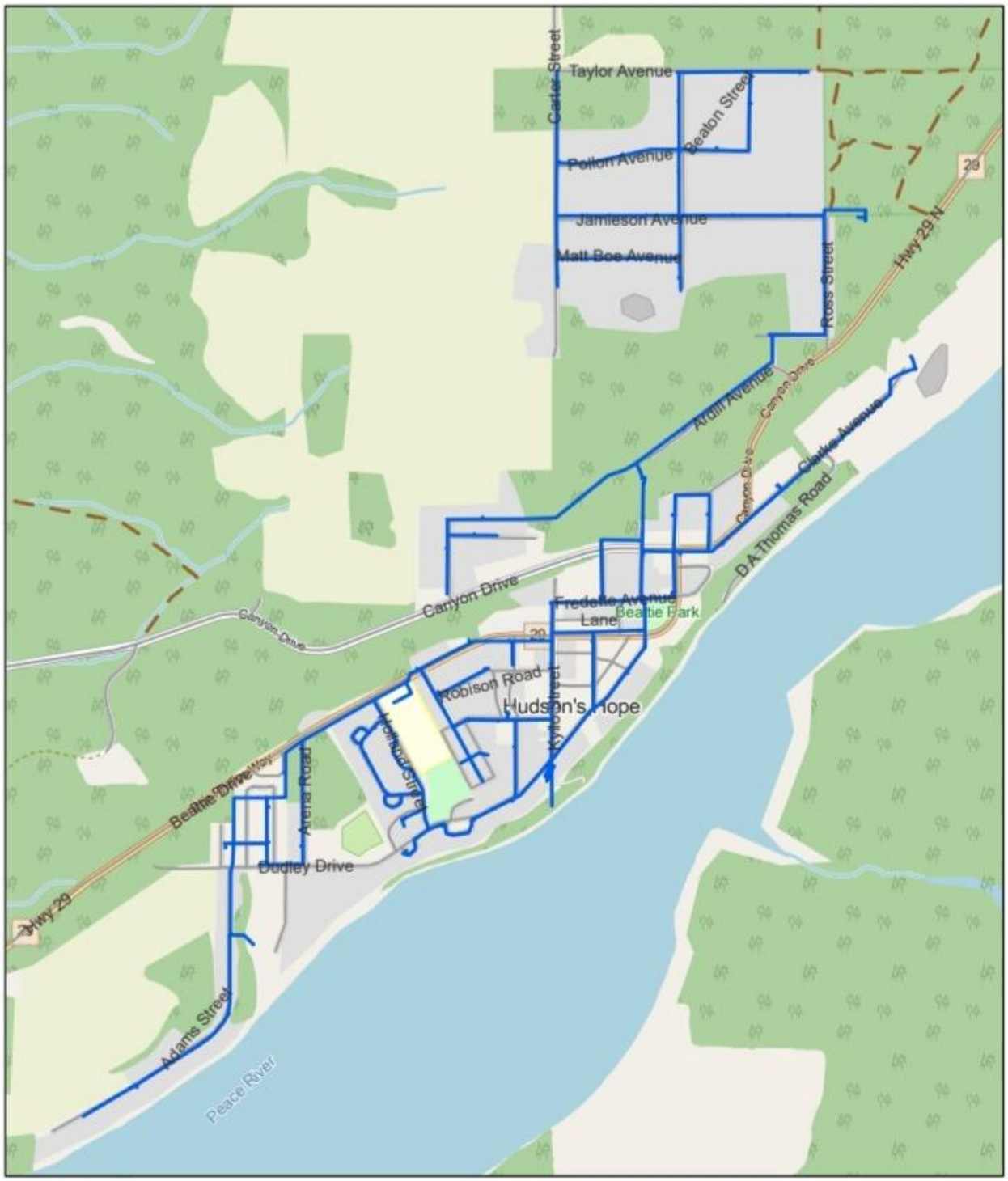

Figure 1: Hudson's Hope Water Distribution Network

2 Source Protection

A source Water protection plan was developed by Western Water Associates Ltd. for the District of Hudsons Hope. This plan describes key recommendations for the system in the process of achieving thorough source protection. These recommendations include, Planned Treatment, Water Quality Monitoring, Operator Training, Preventative Maintenance and Asset Management, Prevent Contamination from Other Utilities, Emergency Response Plan, Law/Bylaw Enforcement, Government Involvement, Cross Connection Control Program, Reporting to Northern Health Authority, Public Education and Signage.

The District of Hudon's Hope is in the process of overhauling the temporary clarification system for surface water collection to a more permanent system in 2026. As such, the completion of the new WTP process will require an updated Water Source Protection Plan as is required in the Water Operating Permit.

3 System Description

The Hudson's Hope Water Treatment Plant, Facility No. 2085, is located at 10001 Dudley Drive, Hudson's Hope BC. It is a class III surface water treatment plant currently utilizing a temporary ballasted flocculation clarifier, direct filtration and UV light to produce high quality potable water. Surface water is drawn from the Peace River, processed by the WTP and sent to the treated water reservoir via the water distribution system. There are a series of stages the incoming raw water passes through before it is deemed potable and fit for consumption by the public. Qualified water treatment operators oversee each stage by manually verifying inline results, ensuring the equipment is calibrated and maintained and submitting samples from key sampling points for testing by accredited laboratories. An outline and brief description of each stage is shown below.

3.1 Raw water Intake

The raw water source is ground water pumped from the peace river. A submersible pump discharges raw water into the Actiflo clarifier. Pump speed is controlled by the receiving tank level transmitter and setpoints established by the operators. The raw water discharge line is equipped with a magnetic flow meter, pH meter, temperature sensor and a turbidimeter for volume and quality measurement.

3.2 Clarification

In periods of high rainfall/melt water the peace river can give rise to high turbidity events which has the potential to overwhelm the WTPs sand or "media" filters resulting in poor quality and potentially unsafe distribution water.

An initial water clarification stage prepares the incoming raw untreated water for the sand media filtration process. Currently this is achieved with a temporary clarification unit provided by Veolia Water Technologies.

The process involves the addition of a coagulant, a flocculant with a weighting agent (micro sand) to remove the bulk of suspended material from the water as illustrated in figure 1.

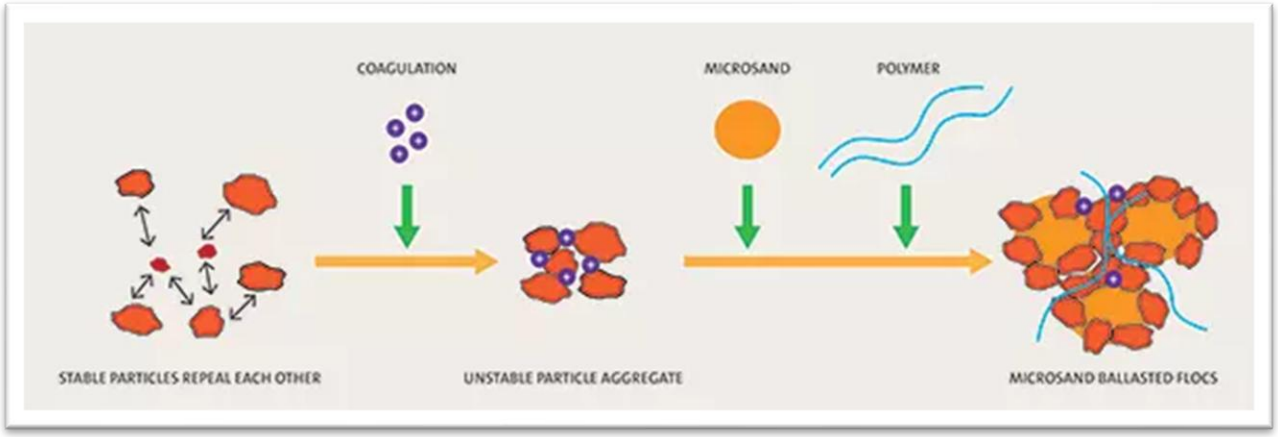

Figure 2: Diagram of Coagulation

The coagulant destabilizes the suspended particles in water by neutralizing their negative charge causing the material to aggregate and fall out of suspension. The Polymer and sand are added after to add bulk to these forming "flocs" to promote rapid settling. This strategy is often employed for a WTP that draws water from a low turbid clean source but still requires the water to be prepared for media filtration. As the water makes it to the final stage of clarification (right side of fig.3) the ballasted flocs move to the bottom of the settling tank and the remaining clarified water rises through a series of long tubes or "lamellas". This critical stage in the treatment of incoming water is illustrated best in Appendix A: 6.

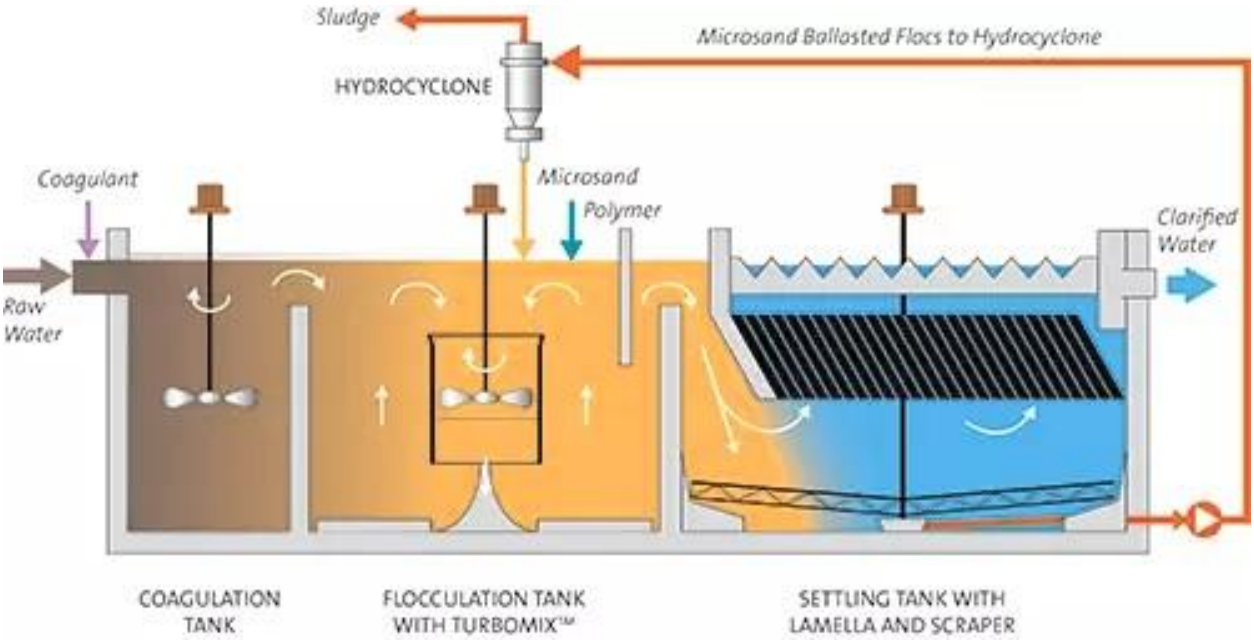

Figure 3: Veolia Rapid Sand Clarifier

The bottom of this tank collects the sludge for disposal to sewer and the lamellas (a series of angled tubes) utilise a process called "Stokes' law" to restrict the movement of suspended solids upwards through them (fig. 3). The dosage of chemicals at this stage is closely monitored and routinely tested to comply with the Guidelines for Canadian Drinking Water and remains far below the specified Maximum Acceptable Concentrations (MAC) for each coagulant aid (Aluminum). See section 5 Water Quality Results and Table 9: Total Metals Results for reference to safety precautions and residual results respectively.

After initial clarification, the clarified water which has been separated from the bulk of the suspended material is then sent to the media filtration stage.

3.3 Media Filtration

Media filtration is achieved by 4 filtration vessels supplied by Bi-Pure Water running in parallel as seen below, Figure 4: Media Filters. The media inside these is comprised of green sand which, while reducing suspended matter, also helps reduce the elevated iron and manganese content found naturally in the peace river as seen in Table 9: Total Metals Results. This is where much of the remaining suspended material is filtered from the water stream, post clarification.

Figure 4: Media Filters

3.4 Primary Disinfection

Figure 5: Chlorine Dosing

Chlorine is a tried and proven method of disinfection against a broad spectrum of pathogens. Chlorine used for the disinfection of water comes in 3 main forms: sodium hypochlorite, chlorine gas and calcium hypochlorite. The form used at the Hudson's Hope plant is sodium hypochlorite, a liquid form.

Sodium hypochlorite is dosed, by one of two pumps operating in a duty/standby configuration, into the water line after the media filters. A 12% concentration trade solution of sodium hypochlorite supplied by Brenntag is used as the primary disinfection solution. Dosing is flow based with a value of 1.40mg/L being maintained for the exiting distribution water. This allows for residual protection throughout the water network maintaining resistance against disease causing microbes that could grow and cause illness without it. A CL17 automatic chlorine analyser relays the dose rate to the feed pumps every 3 minutes to sustain this protection throughout our network. Should the detected chlorine in the distribution system rise or fall below the designated tolerances the WTP will shut down to prevent the distribution of potentially non potable water.

3.5 Cartridge Filtration

Two cartridge filters running in series provide a final filtering of the water to remove excess turbidity and color. While cartridge filtration provides a small reduction in water turbidity it is mainly used as an extra precaution to produce clearer water. The 1-micron and 3-micron filters currently used in these steel pots (fig 7) produce finished water that won't stain appliances over time and is what's known as an aesthetic objective (AO) with little bearing on turbidity reduction or potability. These units can also be used for redundancy in the event of a failure in the main filtration system by adapting the filter type. Figure 6 shows a typical biweekly filter changeover in cartridge filter 1 with 40, 3-micron filters. Figure 7 shows both cartridge filters sealed, in operation.

Figure 6: Cartirdge Filter Changeover

Figure 6: Cartridge Filters #2 & #1

3.6 Secondary Disinfection

Secondary disinfection is achieved by employing 2 TrojanUVSwift SC Ultraviolet Treatment chambers outputting UV-C light and running in a duty standby configuration. This process serves to inactivate any pathogens left after primary disinfection. UV disinfection prevents the replication of pathogens by disrupting their DNA and RNA. This method is effective at neutralising minute viral pathogens such a Giardia, Cryptosporidium, E. coli and Salmonella which could resist the action of our primary disinfection strategy (chlorine). Operators can observe the clarity and quality of the produced water through the systems control panel and make adjustments accordingly.

Figure 7: UV Filters

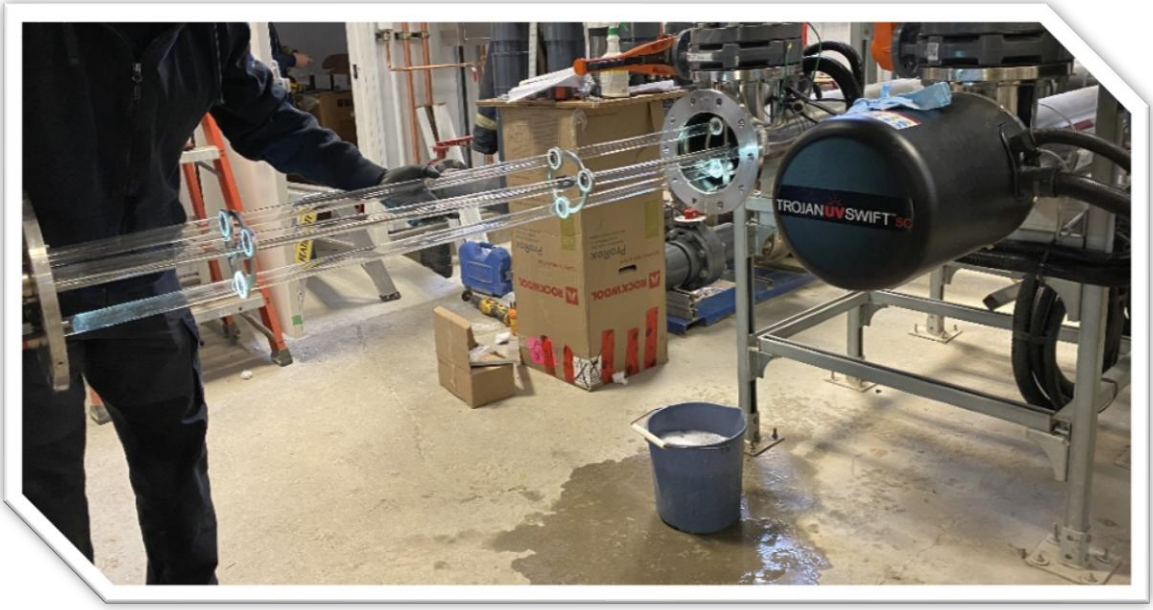

Figure 8: UV Scheduled Maintenance

3.7 Reservoir

The district has a 2600m^3 capacity concrete lined reservoir, located at 9403 Ardill Avenue, which supplies Jamieson and downtown Hudson's Hope. The water treatment plant sends treated potable water through the distribution system to the reservoir. The downtown area of Hudson's Hope's distribution system is gravity fed from this elevated point with the subdivision of Jamieson being fed via pump. The reservoir pump station being a Kilometer from the WTP distribution point also houses a booster chlorination point. The water in the reservoir is maintained at 1.10mg/L with inline chlorine measurements being relayed back to the WTP control interface and failsafe system. This water buffer allows for redundancy in the event of water disruptions with the water system or plant itself.

4 Water Quality Sampling and Testing Procedures

Operators carry out their respective responsibilities to monitor drinking water quality in line with regulatory requirements and industry best practices. Routine monitoring is conducted to ensure that water delivered to customers meets established potable water standards and to confirm that the overall system is operating safely and within normal parameters.

These monitoring activities follow the requirements of the Drinking Water Protection Act and Drinking Water Protection Regulation. They involve collecting discrete grab samples from various locations throughout the system, including water sources, transmission infrastructure, and distribution networks.

Samples taken are analysed at local accredited water testing facilities and are subject to strict test and holding times to maintain accuracy of results and retests.

4.1 Daily Sampling

An operational water testing program for the district measures key parameters such as free/total chlorine, pH, temperature, colour and conductivity. These results help verify the quality of the water and how the treatment process enhances potentially pathogenic water to potable. Measuring residual chlorine provides a quick and effective way to confirm that the water is safe to transition from WTP to the distribution systems end points. While water without a chlorine residual is not necessarily unsafe, more in-depth tests to ensure safety, such as bacterial analysis take three to four days for results. Low or absent chlorine

residual in the distribution system can indicate poor circulation and a need for increased flushing or verification of the chlorination strategy.

Water system operators regularly monitor free chlorine disinfection levels to maintain a target range of 0.8 to 1.1 mg/l in the reservoir and at least 0.2 mg/l at the outer edges of the distribution system. Chlorine residuals tend to be more stable in the winter months, as chlorine breaks down more quickly in warmer water and at higher flow rates during the summer period.

4.2 Biweekly Sampling

Bacteria testing is conducted biweekly at multiple locations throughout the distribution system to monitor for total coliforms E. coli. These sampling sites are strategically selected to provide broad system coverage.

Total coliforms are a broad group of bacteria commonly found in soil, vegetation, and surface water. While most are not harmful themselves, their presence in a distribution sample can signal that something has gone wrong. Issues like inadequate disinfection, regrowth within pipes, or intrusion of outside contaminants through leaks or pressure losses can all cause coliforms to be present. Total Coliforms are straightforward to detect, are not found in clean water, and their presence can signal potential contamination as a general warning sign that the system's integrity may be compromised.

Where Total Coliforms are a good indicator organism, *E. coli* is more specific. It originates in the intestines of warm-blooded animals, so it's detection points strongly to recent fecal contamination. This raises immediate health concerns because pathogens that cause illness (viruses, protozoa, or other bacteria) may also be present. Finding *E. coli* typically triggers urgent investigation and corrective action. These samples are sent to external health experts for independent testing under the direction of Northern Health to verify the water is devoid of any disease-causing microbes.

Samples are taken from the treated discharge of the waste lagoons and tested for Total Suspended Solids (TSS) and Carbonaceous Biochemical Oxygen Demand (CBOD). These tests ensure the receiving waters are not negatively impacted by the effluent water which would otherwise disturb the biodiversity in the Peace River. High TSS results could reduce light penetration and introduce pathogenic material whereas high CBOD could result in oxygen depletion having deleterious consequences on the habitat.

4.3 Monthly Sampling

Monthly testing of suspended material (turbidity) in Raw River water and WTP Treated water is conducted to independently verify the Treatment Plant's ability to perform efficiently on a

consistent basis. Turbidity is a measure of suspended material which could harbour harmful bacteria and serves as an important marker for safe drinking water.

4.4 Annual Sampling

A full suite of testing is done annually to assess a broad range of substances that could pose operational challenges to the water system. The water treatment process is a complex mix of variables which require in depth testing as well as a period of broad-spectrum analysis. Annual test results provide us with an opportunity to adapt our treatment process should the need arise due to a significant unforeseen change. The Permit to Operate requires full chemical/physical water quality analysis submitted to Northern Health annually. This analysis is highlighted in the appendix of this report: Figure 10: Permit to Operate.

4.5 Annual Flushing

To preserve water quality across the distribution system, the district carries out a water hydrant flushing program at regular intervals throughout the year. Flushing water mains is a key component of a comprehensive water management strategy, helping to prevent bacterial regrowth and reduce stagnation in areas with low water circulation.

5 Water Quality Results

The annual water quality testing for the district was conducted in March 2025 and is used as a snapshot representation for the purpose of this report. Operational permit requirements are adhered to throughout the year and the district strives to conduct in-depth testing as and when needed and consistently exceeds the requirements of these permits in both testing and the results generated. An abbreviations list and glossary are provided in table 1 for reference to highlight commonly used terms. Tables *Table 8: Routine Water Testing Results* and Table 9: Total Metals Results will be referenced throughout section 5.1 and 5.2 and can be found in the appendices at the end of this report.

Currently the WTP utilizes 3 chemical additives to enhance the reduction of turbidity during treatment. The first is Polyaluminum Chloride, supplied by Veolia Water Technologies Canada Ltd., which is an inorganic polymer used for coagulation, the mechanism of action is explained in section 3.2 Clarification, the laboratory results for aluminum can be found in the above referenced Table 9: Total Metals Results.

The second chemical used is polymer also supplied by Veolia used as a coagulant aid. The mechanism of action is explained in section 3.2. As polymer is an extremely low risk for adverse health implications and has no MAC according to the Guidelines for Canadian

Drinking Water it is not shown in the routine lab results. A specialized test called Ultraviolet-Visible spectroscopy (UV-Vis) at a 190nm wavelength can be conducted to determine minute residuals but it is unnecessary in this application.

The third chemical addition comes in the form of Sodium Hypochlorite commonly known as (the liquid form of) chlorine. This is used as the primary disinfection strategy at the WTP, the mechanism of which is explained in section 3.4. As Sodium Hypochlorite dosage is such a pivotal part of the treatment strategy, it is tested on site daily and across the distribution network on both inline automatic samplers and manually by the district's operators.

Table 1: Abbreviations

Abbreviations	
ALARA	As low As Reasonably Achievable
AO	Aesthetic Objective
CFU	Colony Forming Units
DBP	Disinfection By-Product
LT1/<1	Less than 1 (CFU)
OG	Operational Guidance
MAC	Maximum Acceptable Concentration
NH	Northern Health
NR	None Required (MAC)
NTU	Nephelometric Turbidity Units
RDL	Recommended Daily Limit
ROV	Remotely Operated Vehicle
PAC	Polyaluminum Chloride
WTP	Water Treatment Plant
TDS	Total Dissolved Solids

Aesthetic Objective: Established for parameters that may impair the taste, smell, or colour of water; or which may interfere with the supply of good quality water. They do not cause adverse health effects.

Colony Forming Units (CFU) is a measure used in microbiology to estimate the number of viable microorganisms in a sample, indicating the presence of living cells capable of formin g colonies. Samples smears are usually transferred to agar plates and incubated, colonies are then counted after a defined period.

Disinfection By-Product: Harmful compounds that may result from chemical reactions between organic matter and water treatment chemicals during the water treatment process.

Maximum Acceptable Concentration: A level that has been established for certain substances that are known or suspected to cause adverse health effects.

Indicator Organism: Microbiological indicators of water quality include bacteria such as fecal coliforms, Escherichia coli and enterococci, which indicate the risk of disease from bacteria, viruses, and other pathogenic organisms which could be harmful to human health.

Operational Guideline: An operational guidance value, provided by Health Canada in this case, used in water treatment processes which treated water must meet before it enters the distribution system.

5.1 Bacteriological

The biweekly water distribution system testing is primarily microbiological, sent directly to a Northern Health testing facility for analysis. Total Coliforms and E. coli results for the year 2025 have remained less than 1 CFU for all tests, highlighting the efficacy of the treatment. The Guidelines for Canadian Drinking water stipulate that there is to be no detectable trace of Total Coliforms or E. coli per 100ml of sample collected which the district has achieved in all samples submitted in accordance with the operating permit for the 2025 season. The absence of pathogenetic material in the distribution system coupled with low turbidity is a great sign that the water being produced is of high quality and safe to drink. A table of the microbiological tests conducted for the 2025 period as well as directions to Northern Health's declaration of Hudson's Hopes sampling results can be seen in the appendices of this report.

Raw surface water pumped from the peace river routinely sees low Total Coliform results averaging 1 CFU per sample. This positive test is to be expected from a surface water source however the testing for the 2025 season has seen the complete reduction of all coliforms in the preceding WTP Outlet stage as seen Appendix C – Bacteriological Results. This result is mirrored in all samples taken in the distribution network and is required as a condition of the Operating Permit ensuring a constant supply of clean, potable water throughout the distribution system.

E. coli tests within the Hudson's Hope distribution system and Beryl Prairie Well were negative exclusively throughout the 2025 period, as required by the Operating Permit and seen in Table 4: Distribution System Microbial Results.

5.2 Routine Water Testing

Annual detailed analysis of raw and treated water was conducted on March 12, 2025, by AGAT Laboratories. A full suite of routine water chemistry and total metals were done to observe potential changes in the water composition and adheres to the Canadian Drinking Water Guidelines and the district's Permit to Operate.

Overall, the water being drawn from the Peace River is of high quality for the intention of use as a potable source with a few exceptions. As the water source is fed by a variety of creeks, experiences a freshet, or spring run off, and is influenced by conditions from Williston Lake, a variability in quality is commonly seen. As this portion of the Peace River region has high concentrations of silt, clay and shale the water quality laboratory results reflect the typical findings of such a region and are discussed below.

5.2.1 Turbidity

A source water that routinely has less than 1.0 Nephelometric Turbidity Units (NTU) is considered a great starting point and as the annual testing shows *Table 8: Routine Water Testing Results*, a result of <0.2 NTU for raw (intake) water is exceptional. To highlight the variability however, the current turbidity as of writing (April 25) sits at over 6.0 NTU, which poses a challenge to adapt to and treat. This annual change necessitates the employ of a capable clarification unit as seen secured in 2025; Figure 10: Clarifier Delivery.

5.2.2 Dissolved Organic Carbon

Dissolved organic carbon at 1.7mg/L is slightly high but still within acceptable limits and is to be expected as the organic material from the flooded areas of Williston Lake degrades over time. The area of the Peace region is prone to water run off due to a soil/rock composition of silt, shale and sand which further increases organic deposits in the surrounding water bodies.

5.2.3 Calcium and Magnesium

High levels of the dissolved minerals calcium and magnesium are typical indicators of hard water which is naturally occurring in the peace river and is of low concern for adverse health effects. The raised bicarbonate, calcium, magnesium and total alkalinity value shown in all samples in *Table 8: Routine Water Testing Results* highlights this and is the result of meltwater percolating through the existing shale and silt pedology in the Peace region. Hard water can cause scale build up in pipes at home which can be negated by using a water softener typically installed at the water's point of entry into the home.

5.2.4 Manganese

Manganese is naturally occurring in most water sources. Moderate levels of manganese may cause plumbing and laundry staining with more serious effects seen from prolonged exposure above the MAC. Manganese in the Hudson's Hope distribution system was shown to be well below this threshold, Table 9: Total Metals Results. Two separate tests shown in Table 7 and 8 confirm that Manganese for Beryl Prairie Well was above the MAC of 0.12mg/L (at 0.17mg/L) set out in the Guidelines for Canadian Drinking Water and as such the water drawn from the well should only be used for bathing. Elevated manganese is primarily a risk to infants with long term consumption increasing the potential for neurological impairment. Adults are less susceptible to illness but should still avoid consuming water high in manganese.

5.3 Total Metals

The Table 9: Total Metals Results for the Hudson's Hope distribution system remain well below the threshold of the MACs established by the Guidelines for Canadian Drinking Water Quality. Many of the analyses reaffirm the nature of the water in the Peace River of being hard with a historical gradual increase in salinity seen around the region according to empirical studies as linked in appendix A 5: Water Quality Database and Analysis – GW Solutions Ltd: *Microsoft Word - PRRD Water Quality Report final Aug 12.docx*

6 System Classification and Operator Certification

Hudson's Hope Water Treatment plant is a class III surface water treatment plant run by a team of Environmental Operators Certification Program (EOCP) qualified water operators.

Our team consists of 3 qualified and experienced Water Operators. As part of the EOCP recognition, Operators are required to take part in continued professional development to maintain status with state exams required to achieve new levels of proficiency.

Table 2: Operator Certification

Operator	Position	Active EOCP Levels
K.R	WTP Supervisor	WT-1, WD-1, WWC-1
A.R	Treatment Operator	WT-1
K.T	Treatment & Distribution	MUWT-1, MUWD-1

7 Long-Term Improvement Plans

In the coming year planned upgrades will be undertaken to enhance Hudson's Hope's water system infrastructure including structural and process-oriented improvements. 2025 has afforded several significant upgrades to the town's infrastructure as highlighted below. These improvements will carry over into 2026 and serve to secure a safe supply of drinking water with industry standard systems and fail safes for the town of Hudson's Hope.

Figure 9: Clarifier Delivery

7.1 Completed Improvements

7.1.1 Water Treatment Plant (WTP)

7.1.1.1 Received Delivery of Veolia Systems

Shipment of new clarifier, polymer skid and control equipment received from Veolia as shown above, Figure 10: Clarifier Delivery.

7.1.1.2 Roof Upgrade

WTP Roof upgraded to BC code by Celtic Construction. Installation of new trusses and hurricane clips. Support column and beam installed and finished with blown insulation before the winter freeze.

7.1.1.3 Heating Ventilation and Air Conditioning (HVAC)

Installed radiant tube heaters and removed old HVAC system, completed by Canadian Western Mechanical (CWM). This provides the WTP with the temperature control needed to sustain operation during the colder months and ensures sensitive instruments stay in optimal functioning condition.

7.1.1.4 Foundation Strengthening, Catwalk and Chlorine Room

CWM completed the removal and installation of the new WTP foundation, pouring of concrete housekeeping pads, walkway footings and raised catwalk. Enclosed chemical

rated chlorine room constructed by CWM after removal of pre-existing, decommissioned stainless-steel tank obstruction.

7.1.1.5 Intake Screen Inspection

Cariboo Chilcotin Divers Ltd. employed the use of their Steelhead ROV to inspect the WTP raw water intake point for potential damage and intake screen deposits on April 17th, 2025. The intake caissons and Johnson Screens were found to be in good standing with minimal marine growth, anchors properly situation and infrastructure functioning as intended. A note was made about maintenance required on the backwash air flush line.

7.1.1.6 Receipt of Laboratory Equipment

To enhance our in-house testing capabilities a set of Eppendorf pipettes and a gang mixer provided by Velp Scientifica were acquired to verify in line processes and improve chemical dosing strategies. This allows us to refine our chemical usage and reduce residual elements of the coagulation process in the finished water.

7.1.2 Lift Station Improvements

7.1.2.1 Kendrick Lift Station Replacement

S. Young and Epscan undertook the new Kendrick sewer pump station overhaul with new control house and complete wet well infrastructure removal and replacement. This included the new building, pumps, wet well components, electrical upgrade, structural supports, control system and the management of a temporary bypass system during construction.

7.2 Planned Improvements

7.2.1 Water Treatment Plant

7.2.1.1 External Holding Tanks

Two external water tanks to be constructed next to the WTP. One cistern tank and one contact tank to be incorporated into the existing system. The tanks will serve as a dual-purpose upgrade adding structural rigidity and a functional aspect to the treatment process.

7.2.1.2 Laboratory Room

New dedicated clean room for laboratory testing to be completed by CWM in 2026. This will grant the WTP a dedicated space for in house testing and verification.

7.2.1.3 Veolia Clarifier

Veolia Water Treatment Technologies system to be commissioned in coordination with Veolia team and McElhanney. This includes a Clarifier, Polymer dosing skid, coagulant

dosing apparatus and corresponding control systems. Veolia team to commission and provide initial training on operation of newly installed system. Complete delivery of Clarifier and supporting infrastructure to be completed in 2026. Figure 10: Clarifier Delivery.

7.2.2 Reservoir

7.2.2.1 Reservoir Cleaning

Routine potable water reservoir cleaning planned in the coming year in coordination with the Environmental Health Officer. Despite constant flow of chlorinated water through the reservoir, sections of low flow especially, can form biofilms if preventative maintenance/cleaning is not conducted.

8 Emergency Response & Contingency Plan

The Emergency Response and Contingency Plan (ERCP) for the Hudson's Hope water system is in the process of development. The provisional ERCP includes emergency contact information, a communications plan, and detailed procedures for the following types of incidents:

- Broken Water Main
- Source Contamination
- Elevated Turbidity levels in Treated Water
- Fire
- Flood Conditions
- Loss of Source
- Power Failure
- Pump Failure
- Presence of Pathogens
- Low Chlorine Residuals

The Drinking Water Protection Regulation (2003), under Section 13, requires that water suppliers provide an ERCP to address any potential emergencies that may impact the delivery of water and health of those being supplied by the water system. The ERCP must be made accessible to the staff of the water supplier and a copy submitted to the local Environmental Health Officer. The district is in the process of working with our Environmental Health Officer to develop and fulfill this objective.

9 Advisories Issued

Table 3: Advisories

Notice/Advisory Type	Location	Dates in Effect	Reason
Water Quality Advisory	Beryl Prairie Well	September 09, 2024 - Current	High Manganese

10 Conclusions

As the existing water infrastructure ages, ongoing replacement programs, higher construction standards and routine maintenance will be required to address this degradation. Some of the major challenges are currently being remedied as seen in section 7, Long-Term Improvement Plans, but some remain undetected.

We would like to thank the residents of Hudson's Hope for their patience in dealing with the challenges past and present of improving our water system into a robust and reliable piece of infrastructure.

Appendices

Appendix A - Water Quality Guidance & Resources

1. Drinking Water Quality Guidelines – Chemical and Physical: *https://www.canada.ca/en/services/health/publications/healthy-living.html#a2.2*
2. Drinking Water Quality Guidelines – Bacteriological and Microbiological: *https://www.canada.ca/en/services/health/publications/healthy-living.html#a2.3*
3. Manganese Guidance – HealthLink: *Manganese in drinking water | HealthLink BC*
4. Manganese Guidance – Canada.ca: *Water Talk - Manganese in drinking water - Canada.ca*
5. Water Quality Database and Analysis – GW Solutions Ltd: *Microsoft Word - PRRD Water Quality Report final Aug 12.docx*
6. Clarifier Illustration – Veolia Water Technologies: Actiflo® Turbo - The Ultimate Clarifier - Veolia Water Technologies UK

Appendix B – District of Hudson's Hope Permit to Operate

PERMIT

TO OPERATE

A Drinking Water System with
301-10000 Connections

System Name: Hudson's Hope CWS
Physical Location: 9904 Dudley Drive
Hudson's Hope, BC

Owner Name: District Of Hudson's Hope

Conditions of Permit

- Permitted to operate: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
- Maintain a minimum free chlorine residual of 0.2 ppm throughout the distribution system
- Submit a minimum of bi-weekly bacteriological water samples from the locations that are representative of the distribution system, as approved by the Environmental Health Officer. This must include at least 1 raw water sample each month.
- Submit the results a full chemical/physical water quality analysis to of raw and treated water to Northern Health annually.
- Submit raw and treated water turbidity readings monthly to Northern Health.
- Operator(s) must be trained and certified to the level specified by the Environmental Operators Certification Program.
- An up-to-date Emergency Response and Contingency Plan, including drought response, shall be maintained, reviewed, and updated annually at minimum.
- Provide a report to Northern Health at least quarterly on progress of water system construction until upgraded treatment plant is fully commissioned.
- Operator must submit an annual report to Northern Health and make it available to water users within 6 months of each calendar year. Annual report must include at minimum:

  > Summary information for source protection, operator certification, water quality monitoring, long-term improvement plans (as needed), Emergency Response and Contingency Plan revision dates, operator education and training, any emergency situations or events that occurred.

Original Issue Date: July 26, 1994
Issuer: Ali Moore
Last Revised : April 03, 2025

northern health
Expires March 2026
2384

Place
Decal Here

This permit must be displayed
in a conspicuous place and is non-transferable

northern health
the northern way of caring

10-411-7011 (LC - Appr. - 06/11pc)

Figure 10: Permit to Operate

Appendix C – Bacteriological Results

Table 4: Distribution System Microbial Results

2025		Total Coliforms & E. coli - CFU/100ml							
Date		New Shop	Small Reservoir	Residential Water Stand	Commercial Water Stand	Municipal Hall	Treatment Plant Outlet	Arena	School
Jan	11	<1	<1	<1	<1	<1	<1	<1	<1
Jan	25	<1	<1	<1	<1	<1	<1	<1	<1
Feb	8	<1	<1	<1	<1	<1	<1	<1	<1
Feb	22	<1	<1	<1	<1	<1	<1	<1	<1
Mar	8	<1	<1	<1	<1	<1	<1	<1	<1
Mar	22	<1	<1	<1	<1	<1	<1	<1	<1
Apr	5	<1	<1	<1	<1	<1	<1	<1	<1
Apr	19	<1	<1	<1	<1	<1	<1	<1	<1
May	10	<1	<1	<1	<1	<1	<1	<1	<1
May	24	<1	<1	<1	<1	<1	<1	<1	<1
Jun	7	<1	<1	<1	<1	<1	<1	<1	<1
Jun	21	<1	<1	<1	<1	<1	<1	<1	<1
Jul	12	<1	<1	<1	<1	<1	<1	<1	<1
Jul	26	<1	<1	<1	<1	<1	<1	<1	<1
Aug	9	<1	<1	<1	<1	<1	<1	<1	<1
Aug	23	<1	<1	<1	<1	<1	<1	<1	<1
Sep	6	<1	<1	<1	<1	<1	<1	<1	<1
Sep	20	<1	<1	<1	<1	<1	<1	<1	<1
Oct	11	<1	<1	<1	<1	<1	<1	<1	<1
Oct	25	<1	<1	<1	<1	<1	<1	<1	<1
Nov	8	<1	<1	<1	<1	<1	<1	<1	<1
Nov	22	<1	<1	<1	<1	<1	<1	<1	<1
Dec	6	<1	<1	<1	<1	<1	<1	<1	<1
Dec	20	<1	<1	<1	<1	<1	<1	<1	<1

Table 5: Beryl Prairie Microbial Results

2025		Total Coliforms - CFU/100ml	E. coli - CFU/100ml
Date		Beryl Prairie	
Jan	25	<1	<1
Feb	22	<1	<1
Mar	22	<1	<1
Apr	19	<1	<1
May	24	<1	<1
Jun	21	<1	<1
Jul	26	<1	<1
Aug	23	<1	<1
Sep	20	<1	<1
Oct	25	<1	<1
Nov	22	<1	<1
Dec	20	<1	<1

Table 6: Treated Water Turbidity

2025		Turbidity -NTUs
Date		WTP - Treated
Feb	12	<0.2
Aug	27	0.5
Sep	24	<0.2
Oct	29	<0.2
Nov	26	<0.2
Dec	3	0.51
Dec	17	-

Table 7: Steps to view NH Bacteriological Results

All District of Hudson's Hope bacteriological test results are available on the Northern Health website:
https://www.northernhealth.ca/services/environmental-health/drinkingwater/water-sampling-and-results
1. Click on link to Bacteriological results by water system
2. Water Sample Results
3. Hudson's Hope
4. Hudson's Hope CWS (Community Water System)
All test results are displayed on this page, testing and reporting are completed independent of the district ensuring third party verification

Appendix D – Routine Water and Metals Testing Results

Table 8: Routine Water Testing Results

Description	REF	REF	REF	WTP Raw	WTP Treated	Beryl Prairie
Date Sampled				2025-03-12	2025-03-12	2025-05-28
Parameter	MAC	OG	Unit	March	March	May
Turbidity	1.0	0.3	NTU	<0.2	<0.2	-
Dissolved Organic Carbon	4	≤2	mg/L	1.7	1.7	-
Colour, True	NR	≤15 AO	Colour	<5	<5	-
pH	NR	7.0 - 10.5	pH	7.79	7.78	7.88
p - Alkalinity (as CaCO3)	NR	5	mg/L	<5	<5	<5
T - Alkalinity (as CaCO3)	NR	50 - 500	mg/L	93	90	420
Bicarbonate	NR	5	mg/L	113	110	512
Carbonate	NR	5	mg/L	<5	<5	<5
Hydroxide	NR	5	mg/L	<5	<5	<5
Conductivity	NR	200 - 800	uS/cm	198	211	718
Chloride	NR	≤ 250	mg/L	<1.0	3.6	1.7
Fluoride	1.5	None	mg/L	0.04	0.05	0.13
Nitrate	45	0.5	mg/L	<0.5	<0.5	<0.5
Nitrate-N	10	0.02	mg/L	<0.02	<0.02	<0.02
Nitrite	3	0.05	mg/L	<0.05	<0.05	<0.05
Nitrite-N	1	0.01	mg/L	<0.01	<0.01	<0.01
Nitrogen	45	0.02	mg/L	<0.02	<0.02	<0.02
Sulfate	NR	≤500	mg/L	16.2	16.7	13.4
Dissolved Calcium	NR	0.07	mg/L	32.5	32.5	98.3
Dissolved Magnesium	NR	0.05	mg/L	6.86	6.9	38.4
Dissolved Sodium	NR	0.05	mg/L	1.13	3.79	5.05
Dissolved Potassium	NR	0.05	mg/L	0.52	0.49	1.53
Dissolved Iron	NR	0.001	mg/L	<0.001	<0.001	0.009
Dissolved Manganese	0.12	≤0.02 AO	mg/L	0.00028	0.00029	0.141
Sodium Adsorption Ratio	NR	None	mg/L	0.05	0.16	0.11
Calculated TDS	NR	≤500	mg/L	113	118	410
Hardness, Total	NR	0.5	mg CaCO3/L	103	102	404
Ion Balance	NR	1	%	103	105	95

Table 9: Total Metals Results

Description	REF	REF		WTP Raw	WTP Treated	Beryl Prairie
Date Sampled				2025-03-12	2025-03-12	2025-05-28
Parameter	MAC	OG	Unit	March	March	May
Aluminum, Total	2.9	0.10	mg/L	0.023	0.097	0.005
Antimony	0.006	None	mg/L	<0.001	<0.001	<0.001
Arsenic	0.010 ALARA	None	mg/L	<0.001	<0.001	0.002
Barium	2	None	mg/L	< 0.050	< 0.050	0.20
Beryllium	NR	None	mg/L	<0.0005	<0.0005	<0.0005
Boron	5	None	mg/L	<0.01	0.01	0.02
Cadmium	0.007	None	mg/L	0.000016	0.000016	<0.000016
Calcium	NR	None	mg/L	29.9	29.5	98.4
Chromium	0.05	None	mg/L	0.0006	0.001	<0.0005
Cobalt	NR	None	mg/L	0.00003	0.00009	0.00037
Copper	2	1 AO	mg/L	0.0008	0.0011	0.0009
Iron	None	≤0.10 AO	mg/L	0.029	0.022	0.50
Lead	0.005 ALARA	N/A	mg/L	0.0003	0.0001	<0.0009
Lithium	NR	None	mg/L	0.002	0.007	0.013
Magnesium	NR	N/A	mg/L	6.87	6.96	40.9
Manganese	0.12	≤0.02 AO	mg/L	0.0018	0.0009	0.165
Mercury	0.001	N/A	mg/L	<0.0000025	<0.0000025	<0.00001
Molybdenum	NR	None	mg/L	<0.001	<0.001	0.005
Nickel	NR	<0.007	mg/L	<0.003	<0.003	<0.003
Potassium	NR	None	mg/L	0.483	0.437	1.50
Selenium	0.05	None	mg/L	<0.0005	<0.0005	<0.0005
Silver	NR	None	mg/L	<0.00005	<0.00005	<0.00005
Sodium	None	≤200 AO	mg/L	1.15	3.63	5.37
Strontium	7	None	mg/L	0.121	0.117	0.379
Thallium	0.002	None	mg/L	<0.0001	<0.0001	<0.0001
Tin	NR	None	mg/L	<0.0002	<0.0002	<0.0005
Titanium	NR	None	mg/L	<0.001	<0.001	<0.001
Tungsten	NR	None	mg/L	<0.0001	<0.0001	<0.0001
Uranium	0.02	None	mg/L	<0.001	<0.001	0.005
Vanadium	NR	None	mg/L	<0.001	<0.001	<0.001
Zinc	NR	≤5.0 AO	mg/L	<0.004	<0.004	<0.004

Appendix E – Additional Pictures

Figure 11: New Chlorine Room

Figure 12: WTP Concrete Foundation Pour

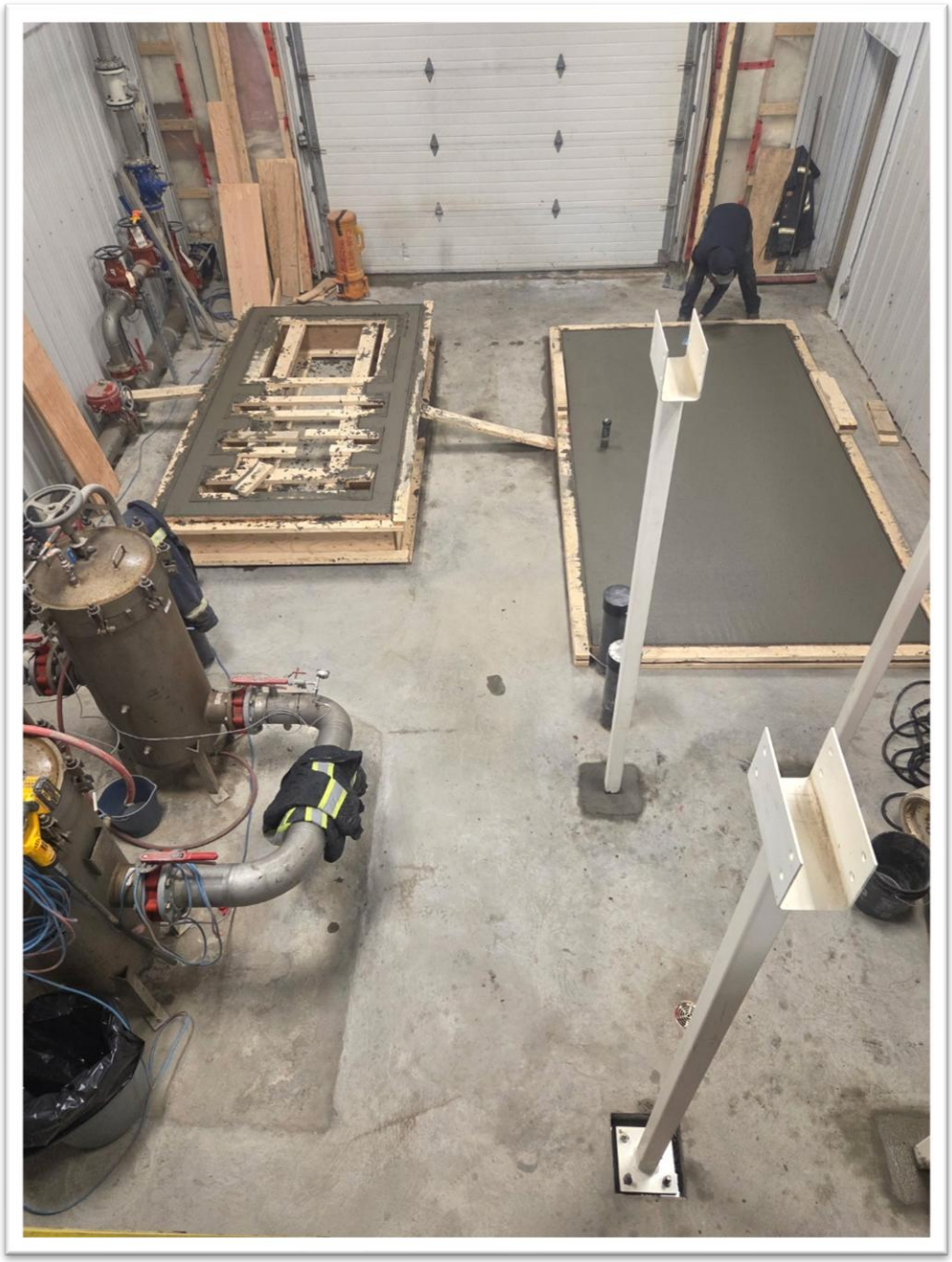

Figure 13: Housekeeping Pads & Walkway Footings

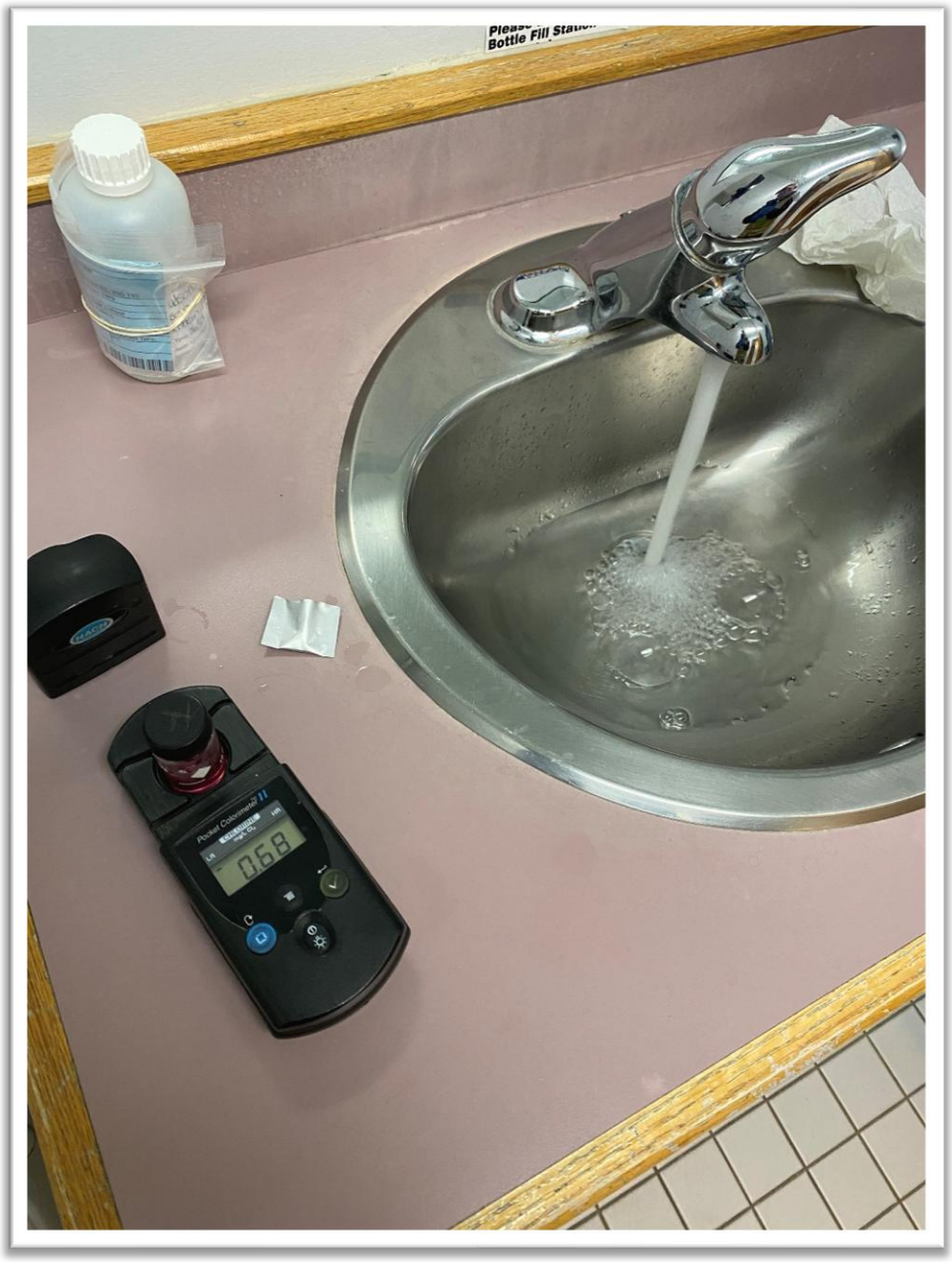

Figure 14: NH Sampling & Chlorine Testing

Figure 15: Reservoir Inline Chlorine Monitoring System

Figure 16: Distribution Pumps

Figure 17: Raw Intake Pipes

Figure 18: Beryl Prairie Well

Figure 19: Verifying Reservoir Inline Chlorine Value