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MASTER PLAN ADDENDUM NO. 5

FOR THE

CITY OF PRIEST RIVER

SUBMITTED TO THE

CITY OF PRIEST RIVER

OCTOBER 2019

REVISIONS MAY 2020

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WELCH-COMER
ENGINEERS | SURVEYORS

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SUBMITTED TO THE:

CITY OF PRIEST RIVER

PROFESSIONAL ENGINEER
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11814
STATE OF IDAHO
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5/8/2020

OCTOBER 2019

REVISED MAY 2020

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1. INTRODUCTION

1.1. PURPOSE

The purpose of this Addendum is to analyze the City's current water system with respect to recent water system deficiencies identified by the City's Operators as well as by the Idaho Department of Environmental Quality (IDEQ) within the 2017 Sanitary Survey.

This document will provide an overview of current water system deficiencies and inform the reviewer of the basic elements and design criteria associated with improvements necessary to address the deficiencies identified. General design criteria follow the IDEQ Rules for Public Drinking Water Systems, IDAPA 58.01.08.

1.2. BACKGROUND

In August of 2017, IDEQ completed a Sanitary Survey of the water system and identified the following significant deficiencies which are addressed herein. (A copy of the sanitary survey and the City's response is provided in Appendix A.)

1. 1 Million Gallon Reservoir: *"in poor condition with severe corrosion and a complete failure of the interior coating."* The City is required to demonstrate *"adequate structural integrity and compliance with storage tank requirements in the Rules."*
2. Water Treatment Plant: *"Eliminate backwash settling pond discharge to the classified wetland."*

Additionally, IDEQ identified the following recommendations for the system which are also addressed herein:

3. Water Treatment Plant: *"Address backwash settling pond deficiencies to provide maintenance access, improve site security, restore infiltration function, control weeds and control discharge."*
4. Storage: *"Install isolation valves on [Industrial Park Standpipe] inlet/outlet lines so that check valves can be maintained without emptying the tank. Plan to complete this work at the next opportunity when the tank will be drained for other maintenance."*
5. Upper Zone Booster Station:
    a. *"In the event [Industrial Park Standpipe is offline, develop a plan to ensure the Upper Zone Pump Station can maintain adequate operating pressures in the upper zone as backup."*
    b. *"Repair or replace leaking reducer couplings in the Upper Zone Pump Station."*

2. EXISTING WATER SYSTEM

2.1. SYSTEM OVERVIEW

The City's existing water system includes the following system components:

1. Raw Water Intake Pumps
2. Water Treatment Plant
3. Finished Water Booster Pumps
4. 1 Million Gallon Storage Tank
5. Upper Pressure Zone Booster Pumps
6. Industrial Park Standpipe
7. Distribution Network comprised of 4-inch through 12-inch piping which currently services 827 current connections (residential, commercial and industrial service) within the City Limits.

Refer to Figure 3-1 for an overview of the water system and location of these components as well as the approximate boundary of the City's two pressure zones: Upper Zone and Lower Zone. Further information on the system components can be found in the October 2007, Water System Master Plan prepared by JUB Engineers and subsequent updates prepared by Welch Comer.

2.2. SYSTEM IMPROVEMENTS

A series of major system upgrades were completed between 2009 and 2014 on the water system utilizing a Revenue Bond that was passed by the City in 2009. Refer to Figure 3-2. Most notably, these improvements included:

1. Replacement of the Raw Water Intake Pumps.
2. Expansion/Updating of the Water Treatment Plant to provide up to 2,100 gpm with one filter out of service.
3. Addition of a Finished Water Booster Pump to transfer up to 2,100 gpm with one pump out of service.
4. Re-zoning of the water system to expand the Upper Pressure Zone to generally encompass the areas to the north, east and west of the Airport. This included the addition of a 700,000-gallon standpipe (Industrial Park Standpipe) to serve the expanded pressure zone.
5. Replacement of several thousand feet of depreciated steel water main.

The City invested over $5.8 million into the water system, accomplishing high priority improvements which brought the system into compliance with current State Drinking Water Rules and resulted in increased system reliability and improved water service to its customers.

2.3. Service Area

Refer to Figure 3-1 which provides an overview of the City's service area relative to the City limit. As will be discussed in the next section, the City currently provides water service to 827 connections. The primary location of water service is the City limit; however, the City also serves 16 services located outside the City Limit.

It is noted, as shown on the map, that the City limit currently includes a large area east of Priest River that is planned for de-annexation. The City does not currently provide water service to this area and has no plan to extend water service to this area. Thus, this area is excluded from the growth projections and water service plan.

The current parcel count within the water service area is 1,143: an estimated 898 parcels are in the City's Lower Pressure Zone and approximately 245 (20%) are in the City's Upper Pressure Zone. Figure 3 also depicts several hatched areas that the City anticipates may be further divided within the City's water service area. The City predicts that these hatched areas may add additional parcels if developed as anticipated:

1. Pend Oreille Water Frontage (Bonner Park) (parcel division/count unknown)
2. Area East of Cemetery Road south of the Cemetery: 64 residential units
3. Commercial Area south of Highway 2 and just west of Priest River (parcel division/count unknown)
4. Planned Subdivision South of Huckleberry (parcel division/count unknown)

Considering the current number of connections and the parcel count within the City Limit, the City has a fair opportunity for growth on the water system.

3. System Demand Analysis

Within this Section, we analyze current consumption and production data for the water system to determine if the system capacity is adequate to serve current demands. Additionally, we have prepared growth projections along with anticipated demand for the water system through a 20-year planning period.

3.1. Population and Connections

As of the 2010 Census, the current population of Priest River was 1,751. This was 3 citizens less than the 2000 Census. The 2010 Census reflected 2.45 people per household in the City of Priest River.

The most current estimate of population for the City of Priest River is 1,773 as of 2016 based on projections provided by the US Census Bureau. This represents an annual average growth from 2000 to 2016 of less than 0.06 percent.

As previously mentioned, the City currently serves a total of 827 connections, 16 of these connections are located outside of the City limit. Current customer classes include commercial, irrigation, residential, multi-unit commercial and residential, senior and outside city limit. The following table shows historic change in connections by customer class from 2010 through 2017:

Table 3-1: Summary of Priest River Water Service Connections December 2010-2017

	Dec-10	Dec-11	Dec-12	Dec-13	Dec-14	Dec-15	Dec-16	Dec-17
Commercial	106	104	104	103	104	104	113	110
Irrigation	5	7	7	8	12	15	16	16
Multi-Unit Commercial	11	10	10	9	10	9	9	9
Multi-Unit Residential	19	24	20	20	23	27	27	27
Outside	19	19	19	16	16	15	15	16
Senior	17	16	10	8	8	9	12	13
Residential	597	596	609	612	613	616	612	636
Totals	**774**	**776**	**779**	**776**	**786**	**795**	**804**	**827**

The table shows that most of the City's connections are residential. The City's total connections have grown at an average rate of just under 1 percent between 2010 and 2017. The largest jump in growth during this time frame occurred between 2016 and 2017 increasing 2.9 percent.

In addition to reviewing Priest River Census data, we also reviewed Bonner County Census data and the County's 2013 Comprehensive Plan. Population in the entire County grew at 1 percent per year between 2000 and 2010. Projections for the next 20 years (water system planning horizon for purposes of this report) are not provided.

Considering the above data, historic connection growth on the water system and potential for future development on vacant parcels within the City limit, we recommend using an annual average growth rate of 1.5 percent for the 20-year water system planning horizon.

3.2. Consumption Data

The City provided individual meter consumption data for 2016 and 2017. The City has been in the process of replacing meters throughout the City. For 2016, the City had individual meter data for 594 connections and for 2017, the City had meter data for 602 connections.

Based on the data provided, we were able to summarize the average demand per metered connection for each customer category:

Table 3-2: Service Connections

	Connections		Average gpd/connection		Max Month (gpd/connection)	
	2016	2017	2016	2017	2016	2017
Commercial	75	80	587	628	1,045	1,173
Irrigation	15	12	1,132	1,747	2,197	4,088
Multi-Unit Commercial	7	6	279	381	435	588
Multi-Unit Residential	25	24	336	387	578	691
Outside	13	14	278	618	850	1,501
Senior	9	10	148	184	359	365
Residential	451	456	205	234	383	447

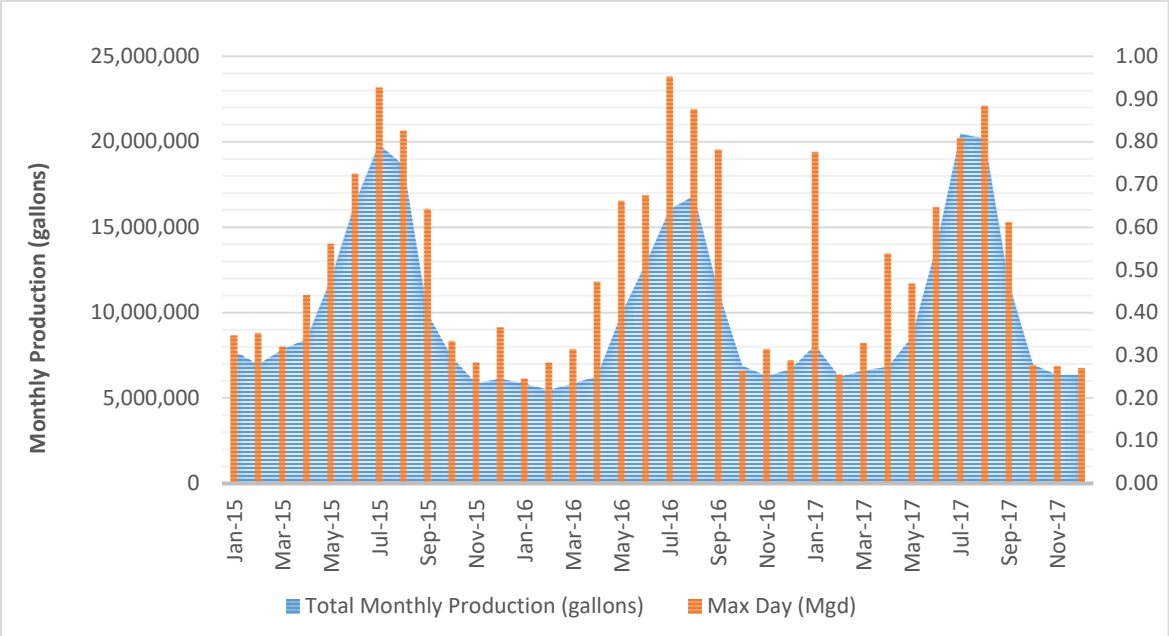
As shown, the average metered residence used 205 gpd in 2016 and 234 gpd in 2017. This demand is fairly low in comparison with other water systems. Typical average daily demands for northern Idaho and eastern Washington water systems range between 300 gpd to just over 500 gpd depending on location and parcel size. The low demand is likely an indication of smaller parcel size and conservative irrigation practices. As a comparison, the neighboring City of Newport, Washington has recently seen ADD demands of 448 gpd/ERU.

Because the metering project has not been completed, we are unable to estimate current system loss or utilize the consumption data for projections and will thus rely upon the City's production data.

3.3. Production Data

Production data from the Water Treatment Plant was obtained for the years 2015 through 2017. The data is shown in the following chart.

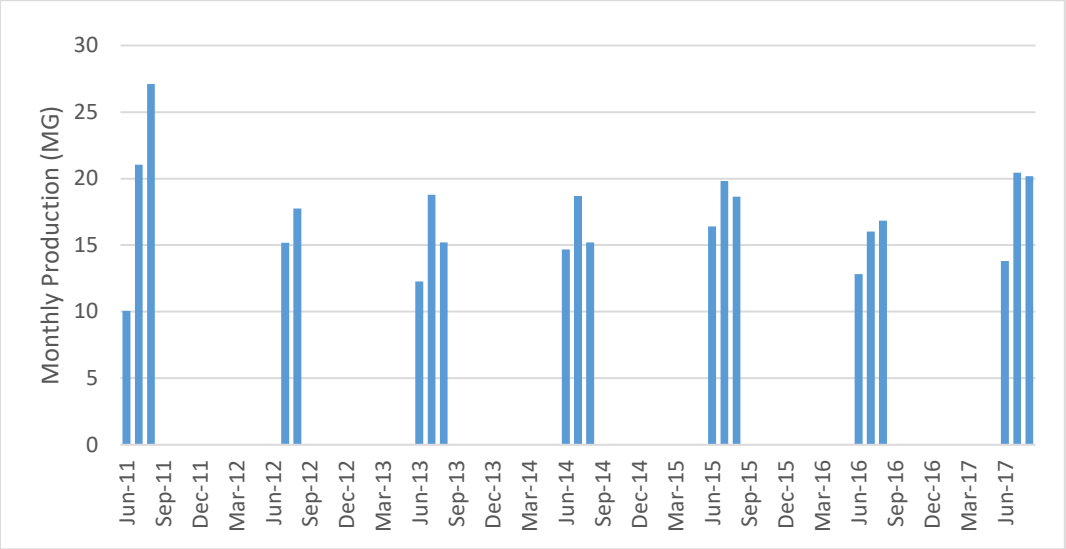
Figure 3-1: Monthly Production Data, 2015-2017



As shown, it appears that the City's water production has decreased while connections have increased over the last several years. This trend is anticipated to be a result of 1) improved water metering (replacement of individual water meters that were not registering) and 2) a reduction in system leakage due to water system improvements.

Historical data was also analyzed from the years 2011 through 2014. During the analysis, it was discovered that an existing meter was recording false data. For this reason, pump hours were used with average flow rates to calculate the actual production quantities. For comparison, production quantities for the summer months from 2011 through 2017 are depicted in the following graph.

Figure 3-2: Summer Production Data, 2011-2017



For the purposes of verifying storage requirements, the production data from the Water Treatment Plant (WTP) was analyzed from 2015 through 2017. Daily production data including metered water volume and pump hours are reported through the City's SCADA System and are based on meter readings for the finished water booster pumps.

Annual total production data for 2015 – 2017 is shown in the following table:

Table 3-3: Annual Production

Year	Annual Production (MG)
2015	127.1
2016	110.2
2017	122.2

For the purpose of sizing the reservoir, production data from the year 2017 will be projected forward for the 20-year water system planning horizon from 2018 through the year 2038.

3.3.1. Design Production Quantities

Production data for the years 2015 - 2017 was analyzed to determine current system demands. The current system has 1162 EDUs total, with an estimated 80 percent on the Lower Zone and 20 percent on the Upper Zone. The EDU count was derived as follows:

For the metered connections, we evaluated the average EDU's/connection based on the average gpd/residential connection for 2016 and 2017. The following table shows the estimated average EDU/connection for each user category based on billed connections.

Table 3-4: Estimated Average EDU/Connection

	Average Connections		Average gpd/conn		Average EDU/connection	
	2016	2017	2016	2017	2016	2017
Commercial	75	80	642	628	3	3
Irrigation	15	12	1,132	1,747	6	7
Multi-Unit Commercial	7	6	279	381	1	2
Multi-Unit Residential	25	24	336	387	2	2
Outside	13	14	278	618	1	3
Senior	9	10	148	184	1	1
Residential	451	456	205	234	1	1

We then applied the average EDU/connection to the total connections in each user category to get a total:

Table 3-5: Total EDUs

	Total Connections		Average EDU/conn		Total EDU's	
	2016	2017	2016	2017	2016	2017
Commercial	113	110	3	3	354	295
Irrigation	16	16	6	7	88	119
Multi-Unit Commercial	9	9	1	2	12	15
Multi-Unit Residential	27	27	2	2	44	45
Outside	15	16	1	3	20	42
Senior	12	13	1	1	9	10
Residential	612	636	1	1	612	636
Total	804	827			1,140	1,162

3.3.1.1. AVERAGE DAILY DEMAND

Average daily demand (ADD) is the average volume of water produced over the course of a year. ADD for the entire system in 2017 was 232 gpm, or 288 gpd/EDU.

3.3.1.2. MAXIMUM DAILY DEMAND

Maximum daily demand (MDD) is the maximum gallons of water produced in a one-day period over the course of one year. The MDD for each of the three years

analyzed was identified and the largest was used for this analysis. This occurred in 2016 and was a total of 951,300 gallons or 661 gpm. This equates to 834 gpd/EDU.

3.3.1.3. PEAK HOUR DEMAND

Peak hour demand (PHD) is the maximum gallons of water produced in one hour over a period of one year and is generally reported in gallons per minute. Equation 5-1 (provided below) from the Washington State Department of Health Water System Design Manual ("Design Manual") was used to estimate the peak hour demand.

Equation 5-1:

PHD = (MDD/1440) x [(C x N) + F] + 18

Where:

PHD = Peak Hourly Demand, (gallons per minute)

C = Coefficient Associated with Ranges of ERUs (1.6 for ERUs above 500)

N = Number of EDUs

F = Factor Associated with Ranges of ERUs (225 for ERUs above 500)

MDD = Maximum Day Demand, (gpd/ERU) (834 gpd/EDU)

Application of Equation 5-1 yields the following for 2017:

- PHD = 1,205 gallons per minute

3.4. PROJECTED SYSTEM DEMAND

As previously discussed, a growth rate of 1.5 percent annually will be utilized to project demand forward through the year 2038. Table 3-6 below summarizes the design production data through the 20-year planning period (21 years based on 2017 data):

Table 3-6: System Production Data

Year	Connections	Population	Total EDUs	Annual Production (MG)	Average Day Demand (ADD), gpm	Maximum Daily Demand (MDD), gpm	Peak Hour Demand (PHD), gpm1
2017	827	1,773	1,140	122.2	232	661	1,205
2038 Projection	1,131	2,460	1,589	167.1	317	921	1,621

Note 1: PHD Based on Equation 2-1

For the purpose of sizing the reservoir, the population, connections and EDUs were also increased at a 1.5 percent annual rate through the year 2038 as shown in the above table.

3.5. Projected Upper Zone Demand

Based on parcel/lot count, it is estimated that the Upper Zone makes up approximately 20 percent of the system demand. The Upper Zone is currently not metered, so actual production data is not available. Thus, it has been assumed within this analysis that the Upper Zone accounts for 20 percent of the total system demand. The following table summarizes the assumed EDU and demand distribution.

Table 3-7: Assumed EDU and Demand Distribution Summary

	Lower (80%)				Upper (20%)`				Total			
Year	EDU	ADD (gpm)	MDD (gpm)	PHD (gpm)	EDU	ADD (gpm)	MDD (gpm)	PHD (gpm)	EDU	ADD (gpm)	MDD (gpm)	PHD (gpm)
2017	930	186	491	895	232	46	123	224	1,162	232	614	1,119
2020	972	194	563	1,020	243	49	141	255	1,215	243	704	1,275
2025	1,047	210	607	1,090	262	52	152	272	1,309	262	759	1,362
2038	1,271	254	736	1,297	318	64	184	324	1,589	318	921	1,621

4. STORAGE RESERVOIR REPLACEMENT

The existing 1 Million Gallon Storage Reservoir (Reservoir) is approximately 500-feet west of the James Ave / 10th St intersection, and can be accessed off Highway 57 near the Bus Barn, see the attached system overview (Figure 1). The City's Upper Zone booster facility is located adjacent to the structure.

Refer to Figure 3-1. Water is pumped to the Reservoir from the Finished Water pumps at the WTP. This reservoir provides a gravity storage feed to the water system's Lower Pressure Zone. The City's Upper Zone Booster station is located adjacent to the Reservoir. The Upper Zone Boosters pump water from the Reservoir/Lower Pressure Zone to the Industrial Park Standpipe.

4.1. EXISTING FACILITY

4.1.1. FACILITY CHARACTERISTICS

The existing storage facility is a welded steel structure measuring 32 feet tall and 74 feet in diameter. The reservoir was constructed in 1964.

4.1.2. CURRENT CONDITION

In October of 2017, the City of Priest River authorized Welch Comer and their structural subconsultant to complete a visual structural roof inspection for the City's 1 million-gallon steel water storage facility and provide recommendation options for remediation and replacement. This analysis was presented to City Council in November (refer to Appendix B.) Since the foundation was not visible and could not be inspected, it was recommended that prior to investing in rehabilitation of the existing structure, the City complete a pot hole next to the existing structure to determine if a foundation existed.

The City excavated next to the tank and found no existing foundation, meaning the structure does not meet current codes/standards. Full replacement was recommended to provide the City with the longest term and most reliable solution that meets all current codes and standards and would therefore be eligible for funding.

4.1.3. SYSTEM IMPACT IF RESERVOIR WAS NOT REPLACED

If the Reservoir was taken off-line, the Industrial Park Standpipe could provide gravity storage to the entire town when the pumps (Finished Water and Boosters) were not operating. Pressure Reducing Valves are located between the Upper Pressure Zone and the Lower Pressure Zone, set to maintain a given pressure in the Lower Pressure Zone.

However, use of the Industrial Park Standpipe (Standpipe) assumes it could be filled. To fill the Standpipe with the Reservoir off-line, the City would have to manually operate the Finished Water pumps at the WTP and the Upper Zone Booster pumps simultaneously to fill the Industrial Park Standpipe. This would be a labor-intensive

endeavor for the City's operators who would have to be available around the clock to maintain water service.

Within this plan, we have developed an operational control scenario to allow automatic operation of the Finished Water pumps and the Booster Pumps if the Reservoir were to be taken off-line. This scenario was developed for emergency purposes only, as it is not the most ideal or efficient system operation. Additionally, the Industrial Park Standpipe does not have sufficient capacity to serve the current and projected demands of the entire system.

4.2. Site Comparison

The City is considering two potential sites for construction of the new reservoir: the existing 1 Million Gallon Reservoir site and the Water Treatment Plant Site. Following is a brief discussion of each site.

Water Treatment Plant Site:

- Storage at this site would not provide gravity storage to the system and would increase the system's reliance on pumps
- Storage at this site would require a piping retrofit at the plant, including installation of additional pumps
- With no gravity storage, the finished water pumps would need to supply the entire fire flow with the largest pump out of service. The total capacity of the finished water pumps with the largest pump out of service is 2,100 gpm. This is significantly less than the fire flow requirement for the Lower Zone of 3,200 gpm.

Existing Site:

- Storage at this site is accessible to the Lower Zone by gravity
- Storage at this site would require very little piping work since the distribution system is already connected to the existing tank here
- Storage at this site provides for more growth than does storage at the WTP site

The storage volume required is the same at either site. Therefore, construction costs at the WTP site are likely to be higher due to the required piping retrofits and additional pumping equipment.

Based on the above, construction of a new storage facility at the existing site is recommended.

4.3. Proposed Improvement: New Reservoir at Existing Site

Since the existing Reservoir cannot be feasibly rehabilitated and since long-term operation of the water system is not feasible without the Reservoir, it is recommended that the City construct a new storage facility to replace the existing one.

4.3.1. Site Overview

The existing site has sufficient space to allow for a new reservoir to be constructed adjacent to the existing 1 million-gallon tank. Utilizing the existing site eliminates the cost and time associated with land acquisition and makes the most efficient use of the existing distribution system and transmission mains. The precise location of the new tank will be determined once a full topographic survey is conducted. Other utilities such as sewer and buried fiber do not appear to be within close proximity to the existing reservoir.

4.3.2. Surrounding Land Use

The existing reservoir is located on a 6.4-acre parcel owned by the City of Priest River. Surrounding land includes a mix of undeveloped parcels and residential lots.

4.3.3. Security

The existing site features a perimeter fence with a swing gate for Operator access. The existing 6-foot chain-link security fence will be modified to encompass the new reservoir.

4.3.4. Soil Characteristics / Groundwater

Soil conditions in this area are expected to be a clay mix. A geotechnical evaluation will be conducted as part of the reservoir design. Groundwater is not expected to be present at this site.

4.3.5. Reservoir Elevations

The following assumptions will be made for the tank sizing calculations:

4.3.5.1. Base Elevation

Since the new reservoir will be on the same site as the existing 1 million-gallon tank, the base elevation will match that of the existing tank. Several topographic points were taken around the site, all of which nearly match the base elevation of the existing tank. Elevations will eventually be refined based on the site characteristics.

4.3.5.2. Overflow Elevation

To avoid changing the operating point of the WTP Finished Water pumps, the existing overflow elevation will be maintained in the new reservoir.

4.3.5.3. 40 PSI Minimum Requirement

The highest residence served by the new reservoir is located at approximately 2,180 feet. Therefore, operating storage (OS), standby storage (SB), and equalization storage (ES) must be above 2,272 feet.

Approximate Reservoir Elevations are summarized in the following table:

Table 4-1: Reservoir Elevations

Reservoir Component	Elevation
Base Elevation	2,250 feet
Minimum OS, SB & ES Elevation (40 psi)	2,272 feet
Overflow Elevation	2,280 feet

4.3.6. Analysis and Sizing Criteria

The system analysis of source, storage, distribution, and treatment was performed in accordance with the Idaho Department of Environmental Quality (IDEQ) Rules for Public Drinking Water Systems, IDAPA 58.01.08. In addition, the Washington State Department of Health (WSDOH) Water System Design Manual is referenced as a design guide.

Table 4-2 below outlines the performance and design criteria used within this report to develop the required reservoir size.

Table 4-2: Analysis Criteria

Storage Component	Analysis and Design Criteria	Reference/ Rule
Equalization Storage	ES = (peak hour demand – Qs)*(150 min) but in no case less than zero Where: ES = Equalizing storage component in gallons peak hour demand = Peak hourly demand, in gpm. Qs = Sum of all installed and active source of supply capacities, except largest pump, in gpm.	WSDOH Water System Design Manual: Equation 9-1
Standby Storage	SBTMS = 8 hours of operation at average day demand	IDAPA 58.01.08, Section 003.
Fire Suppression Storage	FSS = (FF) * (tm) Where: FF = Required fire flow rate, expressed in gpm tm = Duration of FF rate, expressed in minutes	WSDOH Water System Design Manual: Equation 9-4
Distribution System	Water systems shall maintain a minimum pressure of forty (40) psi throughout the distribution system, during peak hour demand conditions, excluding fire flow.	IDAPA 552 .01 Quantity and Pressure Requirements
Distribution System	Water systems shall maintain a minimum pressure of twenty (20) psi throughout the distribution system, during maximum day demand conditions, including fire flow.	IDAPA 552 .01 Quantity and Pressure Requirements

4.3.7.Storage

The storage requirements for the water system will be discussed within this section. Storage within a system can be broken into the following components:

- Operating Storage (OS)
- Dead Storage (DS)
- Equalizing Storage (ES)
- Standby Storage (SS)
- Fire Suppression Storage (FSS)

Each of these components will be discussed in the following sections. These sections include the Design Manual recommended equations for estimating the minimum requirements for each storage type and any IDAPA rules applying to storage requirements.

It should be noted that projected demands for the year 2038 were utilized to size the reservoir. The new reservoir is expected to have a useful life of 50 or more years.

However, the City does not expect to see more than the projected growth in the areas that can be served by the proposed reservoir. The areas where significant growth potential exist, such as east of the City Limits, would require addition of storage in that area.

In addition, the City is considering installing a standby generator at the Water Treatment Plant (WTP). Therefore, storage sizing has been completed both with and without a generator at the WTP.

4.3.7.1.Operating Storage

Operating storage is the volume of water used from the time the pumps feeding the reservoir turn off until they turn back on. This volume is usually determined by one of two things; the manufacture's specifications on how frequently the pump can cycle, or the minimum water level change in the tank required by the pump control sensors.

The new reservoir will be fed by the Water Treatment Plant (WTP) transfer pumps. To provide a period of 30 minutes between pump operation during the future average day demand for the entire system (317 gpm), operating storage for the existing pump should be at least 10,000 gallons. For the purpose of this report, a working depth of 1 vertical foot (volume greater than 10,000 gallons) was used.

It is also noted that industry recognized, Washington Water System Design Manual, provides that operating storage may be "conservatively calculated as follows":

Pump supply Capacity (gpm) X 2.5 minutes. In this case, the transfer pumps do 1050 gpm each. Thus, operating storage should be 1050 gpm X 2.5 minutes = 2,625 gallons at a minimum. If two pumps are running during peak demands, the operating storage minimum would be 2,625 gallons X 2 = 5250 gallons.

4.3.7.2.Dead Storage

Dead storage is calculated as the volume of water located at a level that cannot provide a minimum service pressure of 20 psi to the highest resident during a fire or 40 psi during normal system operation. The elevation of the site is such that there will be no dead storage.

4.3.7.3.Equalizing Storage

Equalizing storage is required when peak hour demands for the water system cannot be met by the source pumping capacity (with the largest pump offline). Equalizing storage must be provided at an elevation that provides a minimum pressure of 40 psi to all service connections. Equalizing storage is determined using Equation 9-1 (below) from the Design Manual:

Equation 9-1:

ES = (peak hour demand – Qs)*(150 min) but in no case less than zero

Where:

ES = Equalizing storage component in gallons

peak hour demand (PHD)

Qs = Sum of all installed and active source of supply capacities, except emergency, in gpm. Qs

The system is supplied by treated surface water. Following is a brief summary of the capacity of the WTP:

- Raw Water Pumps: there are two pumps, each with a capacity of 2,100 gpm
- Filters: there are four filters, each with a capacity of 700 gpm
- Finished Water Pumps: there are three pumps, each with a capacity of 1,050 gpm

As can be seen, each of the above WTP components is capable of producing 2,100 gpm with the largest pump/filter unit offline. Thus, the source capacity available during peak hour is 2,100 gpm[1]. Based on this, equalizing storage is not required until the system reaches an estimated 2,104 EDUs (anticipated to occur in year 2057).

The projected PHD in 2038 is 1,621 gpm. No equalization storage is required to meet this demand.

4.3.7.4.Standby Storage

Standby storage should be provided in the event that one or more of the water system's sources fail and standby power is not available, or if unusual conditions impose higher demands than anticipated. The IDAPA Rule for Reliability and Emergency Operation requires standby storage sufficient to provide a minimum of eight hours of average day demand in addition to the required fire flow, if a generator is not present at the source.

If a generator is provided at the WTP, no standby storage is required.

If a generator is not provided at the WTP, 121,920 gallons of standby storage is required under projected year 2038 demands. (This estimate is based on providing 8

[1] The City of Priest River holds two active, municipal surface water rights:

Water Right	Type	Priority Date	Diversion Rate
97-4230	Statutory Claim	01/01/1925	3.21 cfs
97-7066	License	06/24/1975	2.79 cfs

Total instantaneous diversion from these water rights is 6 cfs or 2693 gpm.

hours of average day demand for the lower pressure zone only. The Industrial standpipe on the upper zone provides standby storage for that zone.)

As previously noted, standby storage, equalization storage and operating storage must be provided at a minimum of 40 psi. This means that if a generator is not provided at the WTP, the new tank must provide 121,920 gallons of standby storage and one foot of operating storage between the 40 psi elevation (2272') and the overflow elevation (2280'). This results in a reservoir diameter of 55 feet.

4.3.7.5. Fire Suppression Storage

The local fire authority sets fire flow requirements for a water system. Fire Suppression Storage (FSS) is calculated using Equation 9-4 (below) from the Design Manual. A minimum pressure of 20 psi must be maintained throughout the system during fire flow conditions. IDAPA requires that any pumping systems supporting fire flow must be designed to provide fire flow plus MDD with any pump out of service.

Equation 9-4:

$FSS = (FF) * (t_m)$

Where:

FF = Required fire flow rate from the reservoir, expressed in gpm.

t_m = Duration of FF rate, expressed in minutes. t_m = 180 minutes

During completion of the 2009 Water System Master Plan Addendum No. 2, the local fire authority established fire flows for the City of Priest River (refer to the letter included in Appendix F). The largest fire flow requirement for the Lower Zone (pressurized by the Reservoir) is 3,200 gpm for 3 hours, or 576,000 gallons, at the Beardmore Building.

Since the funding agency will not fund 576,000 gallons of fire suppression storage, the finished water pumps will be relied upon to supplement the required fire flow.

4.3.7.5.1. Storage Sizing without WTP Generator

As was discussed in the previous section, the minimum diameter of the tank will be 55 feet if no generator is installed at the WTP. Based on this, a total of 393,445 gallons, or 2,186 gpm over three hours, would be available for FSS (below the 40-psi elevation). The remaining fire flow, in addition to the MDD for the system, must be supplied by the finished water pumps with the largest pump offline. This calculation is summarized in Table 4-3 below.

Table 4-3: Storage Sizing without WTP Generator

FSS Available (gallons)	Fire Flow from FSS (gpm)	Fire Flow Req'd from Pumps (gpm)	2038 MDD (gpm)	Total Flow Req'd from Pumps (gpm)	Pump Capacity with Largest Offline (gpm)	Pump Capacity Surplus (gpm)
393,445	2186	1014	921	1935	2100	165

4.3.7.5.2.Storage Sizing with WTP Generator

If a generator is provided at the WTP, standby storage is not required and there is more storage available for FSS. Based on the demand projections for 2038, equalization storage is also not required. Therefore, all of the storage in the new reservoir, except for that required for operating storage, can be used as FSS. Table 4-4 below summarizes calculation of the minimum FSS required if a generator is installed at the WTP and the amount of fire flow provided by the finished water pumps is maximized.

Table 4-4: Storage Sizing with WTP Generator

Pump Capacity with Largest Offline (gpm)	2038 MDD (gpm)	Pump Capacity Available for Fire Flow (gpm)	Fire Flow Req'd from FSS (gpm)	FSS Required (gallons)
2100	921	1180	2,021	363,697

Assuming 1 foot of operating storage yields a tank diameter of 47 feet to provide the required minimum FSS. It should be noted that this is the minimum required FSS volume under the projected demands for the year 2038. The useful life of the new tank will extend much beyond the year 2038, however, so it is recommended that a larger (but fundable) tank be provided.

4.3.7.5.3. Fundable Storage Sizing

Based on discussions with the funding agency, USDA, it has been determined that a storage volume of approximately 440,000 gallons would be fundable. This size falls between the minimum volume required if a generator is provided and the volume required if no generator is required. Therefore, an analysis was completed to determine how many EDUs a volume of 440,000 gallons would support. The results of this analysis are summarized in Table 4-5 below and are compared to the sizing options discussed above.

Table 4-5: Fundable Storage Sizing[1]

	No WTP Generator	WTP Generator	440,000 Gallons & No Generator	440,000 Gallons with WTP Generator
Operating Storage (gallons)	17,771	12,977	14,687	14,687
Equalizing Storage (gallons)	0	0	0	7,808
Standby Storage (gallons)	121,920	0	96,616	0
Fire Suppression Storage (gallons)	393,445	376,344	329,305	418,114
Finished Water Pump Capacity Relied Upon (gpm)	1,935	1,197	1,371	878
Tank Diameter (feet)	55	47	50	50
Total Storage (gallons)	**533,136**	**389,322**	**440,608**	**440,608**
Total EDUs Supported (whole system)	**1,589**	**1,589**	**1,258**	**2,108**
Total EDUs Supported (Lower Zone)	1,271	1,271	1,006	1,686
Associated Year	2038	2038	2023	2057

1. Refer to sizing calculations in Appendix G.

As can be seen, the proposed volume of 440,000 gallons will support minimal system growth without installation of a generator at the WTP. However, adding a generator will allow for an additional 680 EDUs on the Lower Zone.

4.3.8. OVERFLOW PIPING

The proposed structure will feature internal overflow piping that collects water at approximately 2,280 feet. The overflow piping will daylight to an approved location. The overflow outlet will feature an expanded metal screen as required by IDAPA 58.01.08.

4.3.9. VENTS

The proposed reservoir will feature a 12-inch Schedule 40 welded steel vent riser, a 180-degree transition piece, and a mesh screen retainer to prevent bugs or wildlife from entering the tank.

4.3.10. CONSTRUCTION MATERIALS

At this time, the City is considering the following options for the reservoir:

1. Steel
2. Cast-in-place concrete
3. Pre-stressed concrete

The City will choose a material based on the overall cost and expected service life. The initial cost comparison between the structures indicates that a steel structure would be the most cost-effective option for this size of reservoir. However, as noted in Section 10, maintenance costs on steel reservoirs are higher than concrete structures given that steel tanks require regular coatings. A review of historical construction costs of similar sized facilities resulted in the following prices per gallon:

- Steel: $1.25 / gallon
- Concrete: $1.35 / gallon

These prices do not include mobilization, site grading, site piping and other related costs.

4.3.11. GRADING AND SITE WORK

Grading for the base of the new structure will be minimal, as it will be located directly adjacent to the existing reservoir and the existing ground appears to be very close to the base elevation required.

4.4. HYDRAULIC ANALYSIS OF PROPOSED RESERVOIR

The City's hydraulic model was updated to reflect current and projected demands and utilized to analyze and compare the proposed sites. The required fire flows are significant for both zones, as summarized below:

- Lower Zone: 3,200 gpm for 3 hours at the Beardmore Building
- Upper Zone: 3,500 gpm for 3 hours at the Safety Line Building

The limiting operating scenario for the system is to provide the required fire flows under maximum day demands while maintaining a minimum of 20 psi throughout the system. The model was utilized to determine if the proposed reservoir sizing will meet these requirements for both zones. The following sections summarize the results of this analysis.

4.4.1. *FIRE ON THE LOWER ZONE*

The Beardmore Building is located south of Highway 2 on Main Street and requires a fire flow of 3,200 gpm for 3 hours. This is the largest fire flow requirement on the Lower Zone. IDAPA requires that fire flow be provided in addition to MDD while maintaining 20 psi or more throughout the system. The extended period analysis feature was used to model the system over the full duration of a fire (three hours). The model was used to determine if fire flow could be provided without a generator at the WTP. Following is a summary of the settings used for this scenario:

- Demand – 2017 MDD
- Fire flow of 3,200 gpm placed at the Beardmore Building
- Upper Zone Standpipe at an initial elevation of 2383 feet (drained of operating and equalization storage)
- Lower Zone Reservoir at an initial elevation of 2277 feet (drained of operating and equalization storage2)
- Upper boosters on, fire pump off
- Finished water pumps off (simulating no generator at the WTP)

System pressures were reviewed at the beginning, middle and end of the fire (refer to Exhibits[3] 1-3). As can be seen, pressures throughout the system are adequate until the end of the fire. At this time there are localized areas at the extents of the system and on Shannon Lane with predicted pressures lower than 20 psi. As noted on Exhibit 3, the pressures at these areas range from 13 psi to 19 psi. Although these pressures are likely within the accuracy of the model, the lower end of the range may indicate a slight deficiency. It should be noted, however, that the new reservoir will maintain the same overflow and base elevation as the existing one and the City does not currently experience pressure issues. In addition, under normal operation of the system (or if a generator was added to the WTP), the finished water pumps will supplement the needed fire flow. Under this scenario, the model does not predict any substandard pressures, as can be seen in Exhibit 4.

4.4.2. *FIRE ON THE UPPER ZONE*

The Safety Line Building is located on Shannon Lane near the Upper Zone Standpipe and requires a fire flow of 3,500 gpm for 3 hours. This is the largest fire flow requirement on the Upper Zone. IDAPA requires that fire flow be provided in addition

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[2] No equalization storage is required for projected 2038 demands. However, the proposed 440,000-gallon reservoir will support the projected growth through the year 2054 at which time equalization storage is required (refer to Table 4-5). For the purposes of the model analysis, it was assumed that equalization storage accounts for 2 feet of volume. This is a conservative assumption.

[3] Exhibits 1-9 are provided in Appendix I.

to MDD while maintaining 20 psi or more throughout the system. The extended period analysis feature was used to model the system over the full duration of a fire (three hours).

The model was used to determine if fire flow could be provided without a generator at the WTP. Following is a summary of the settings used for this scenario:

- Demand – 2017 MDD
- Fire flow of 3,500 gpm placed at the Safety Line Building
- Upper Zone Standpipe at an initial elevation of 2383 feet (drained of operating and equalization storage)
- Lower Zone Reservoir at an initial elevation of 2277 feet (drained of operating and equalization storage[4])
- Upper booster station fire pump on
- Finished water pumps off (simulating no generator at the WTP)

System pressures were reviewed at the beginning, middle and end of the fire (refer to Exhibits 5-7). As can be seen, pressures are adequate until the end of the fire. At this time, most of Shannon Lane is deficient in pressure.

Under normal system operation (or if a generator is installed at the WTP), the finished water pumps would supplement fire flows. Under this scenario, the model did not predict any system pressure deficiencies for the full duration of the fire, as can be seen in Exhibit 8. This analysis indicates that a generator should be installed at the WTP.

4.4.3. PEAK HOUR DEMAND

IDAPA also requires systems to maintain a minimum of 40 psi during peak hour demand. The model was utilized to review the system's performance under this scenario, with the following settings:

- Demand – 2017 PHD
- Upper Zone Standpipe at an initial elevation of 2383 feet (drained of operating and equalization storage)
- Lower Zone Reservoir at an initial elevation of 2277 feet (drained of operating and equalization storage2)

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[4] No equalization storage is required for projected 2038 demands. However, the proposed 440,000 gallon reservoir will support the projected growth through the year 2054 at which time equalization storage is required (refer to Table 4-5). For the purposes of the model analysis, it was assumed that equalization storage accounts for 2 feet of volume. This is a conservative assumption.

- Upper boosters off, fire pump off
- Finished water pumps on (normal operation)

As can be seen in Exhibit 9, system pressures are over 40 psi except for in one localized area. Pressures here range from 34 to 36 psi, which is likely within the accuracy of the model. It should also be noted that the City does not have any known pressure issues.

5. TEMPORARY SYSTEM OPERATION WITHOUT 1 MILLION GALLON TANK

5.1.1 MILLION GALLON STORAGE RESERVOIR

5.1.1. TEMPORARY BYPASS PLAN

As previously discussed, the existing reservoir roof is in poor condition. Thus, it is extremely important that the City establish a temporary plan to bypass the existing reservoir is necessary should the tank become unusable.

In the event that the existing 1 million-gallon reservoir is taken offline, the existing WTP transfer pumps, existing booster pumps, and existing Industrial Standpipe can service the City following completion of several electrical communication improvements which are described below.

The Upper and Lower zones will be fed by the Industrial Standpipe; the Lower Zone will utilize the existing PRVs. Once demand draws the existing reservoir level below the selected elevation, the booster station and WTP will turn on to fill the reservoir and feed any system demand. The system will operate in the following sequence:

1. System will operate off existing reservoir working volume
    a. The lower zone will be fed through the existing PRVs
2. The reservoir level will decrease to a selected elevation, calling a single WTP pump to turn on
3. WTP pump will turn on, calling both booster station pumps to turn on
4. Reservoir will rise to selected elevation, calling booster station pumps to turn off
5. Booster station pumps will call WTP pump to turn off

It should be noted that under this operation, the fire pump would be disabled since there would not be storage on the Lower Zone for it to pull from.

5.1.1.1. PRESSURE TRANSMITTERS

Two (2) pressure transmitters will be installed to monitor system pressure and prevent pump/system damage. The first pressure transmitter will be installed just upstream of the booster pumps and will turn the booster pumps off should the pressure drop to a set value. The second pressure transmitter will be installed downstream of the WTP pumps and will turn both the WTP pump(s) and the booster station pumps off should the pressure rise to a set value.

5.1.2. *System Demand Scenarios*

The electrical modifications must meet the full range of demand scenarios. Two demand scenarios are described below.

Table 5-1: System Demand Scenarios

	Scenario #1 – Low System Demand	Scenario #2 – High System Demand
System Demand	90 gpm	1,400 gpm
WTP Pump(s)	776 gpm @ 249'	854 gpm (x2) @ 247'
Boosters	360 gpm (x2) @ 76'	350 gpm (x2) @ 86'

5.1.3. *Fire Flow*

As previously mentioned, the local fire authority has set the fire suppression standards to 3,500 gpm for 3 hours on the Upper Zone and 3,200 gpm for 3 hours on the Lower Zone. The table below summarizes the calculated available fire suppression without the 1 Million Gallon Reservoir. As can be seen, the system would be deficient with respect to fire flow without the reservoir. It is not intended that the system be operated for a significant period of time under this scenario, but rather as necessary to perform tank maintenance or in an emergency situation. The City should communicate with the Fire Department if the tank were to be taken offline.

Table 5-2: FSS with Existing Reservoir Offline

Fire Suppression Zone	Industrial Standpipe Available FSS (gpm)	Existing WTP Transfer Pumps – Largest Down (gpm)	Upper Booster Station Booster Pumps (gpm)	2017 System MDD[1] (gpm)	Available FSS – Surplus, (Deficit), (gpm)
Lower Zone	1,440	2,100	N/A	491	(159)
Upper Zone	1,440	N/A	640	123	(1543)

1. Refer to Table 3-5.

5.1.4. *Field Testing*

It should be noted that the above modeled results and operating points should be tested in the field to verify actual hydraulic characteristics.

5.2. Industrial Park Standpipe

Similar to a scenario requiring the 1 Million Gallon Reservoir to be taken offline, it is also important that the City have a plan in place to provide uninterrupted service to the Upper Pressure zone should the Industrial Park Standpipe need to be taken off line.

If the improvements to the Upper Zone booster facility are completed and the existing 15-HP booster pumps are replaced with similar sized pumps on variable frequency drives (VFD), the City would be able to pressurize the upper pressure zone while maintaining a set pressure. The pumps would slow down/speed up to meet the specified pressure and fluctuating system demand.

6. UPPER ZONE BOOSTER

As previously mentioned, the Upper Zone Booster is located adjacent to the existing 1 Million Gallon Reservoir. This booster station is currently used to fill the Industrial Park Standpipe which pressurizes the Upper Pressure Zone. A diesel fire pump is also located in this facility and may be operated in the event of a fire to supplement fire flows available by gravity from the Standpipe.

6.1. EXISTING FACILITY

6.1.1. FACILITY CHARACTERISTICS

The existing booster station was constructed in 1988 and features two 30-year-old 15 HP pumps that operate at approximately 320 gpm each at current head conditions. In addition to the two booster pumps, the booster station features a 30-year-old diesel fire pump capable of pumping approximately 2,100 gpm at current head conditions. The pump curves are located in Appendix C.

6.1.2. CURRENT CONDITION

The existing booster station has adequate capacity to meet current and projected demands on the Upper Pressure Zone. However, current concerns include:

1. Current DEQ rules require pump facilities to include flowmeters: No flowmeter is located in the booster facility, so the actual pump flows cannot be verified. Additionally, accurate information on the total amount of water utilized by the Upper Pressure Zone is not available.
2. The discharge piping includes what appears to be field fabricated fittings which are leaking at the weld seams. The facility also has miscellaneous abandoned electrical wiring and piping that should be removed from the facility. (This was also identified in the IDEQ Sanitary Survey.)
3. The existing booster pumps are 30 years old. Typical life expectancy of pumps and electrical equipment is 20 years.
4. The facility includes a diesel fire pump as well as a diesel generator. The City maintains these on an annual basis, but this equipment is also 30 years old.

6.2. PROPOSED IMPROVEMENTS

Given that the typical life expectancy of booster pumps and electrical equipment is typically +/- 20 years, it is recommended that the City replace the two 15 HP booster pumps and associated, outdated electrical equipment. New pumps would be placed on variable frequency drives (VFDs) to maximize efficiency and pump life. VFD's will also allow the pumps to efficiently pressurize the upper zone in the event that the Industrial Park Standpipe needs to be taken offline.

In order to address the leaking fittings, abandoned wiring and piping, and bring the facility into compliance with current Rules, we recommend that the abandoned wiring and piping be removed, and the leaking fittings be replaced. A flowmeter shall also be installed, which may require reconfiguration of the discharge piping.

No modification to the diesel fire pump and generator is recommended at this time based on the City's current maintenance plan and schedule. However, it is recommended that the City incorporate this asset into their replacement schedule and anticipate replacement within the next 10 years. It is also recommended that the City pursue a waiver to the fire flow redundancy requirement in the Rules, as discussed in the following section.

6.2.1. Analysis and Sizing Criteria

As required by the Rules, the new booster pumps will be sized to provide the maximum daily demand to the Upper Pressure Zone with the largest pump out of service. (Note that the Rules require booster facilities to be sized to supply peak hour demand with the largest pump down, if no equalization storage is available to the system. The Standpipe provided equalization storage to the Upper Zone.) In addition, the Upper Zone booster station must be capable of pumping the fire flow deficit (fire suppression storage that is not available in the standpipe) to the Upper Pressure Zone, with any pump out of service.

As previously indicated, the existing Upper Zone standpipe features approximately 259,600 gallons dedicated for fire flow. Based on the Fire Department's 3,500 gpm requirement for 3 hours, the fire storage deficit for the Upper Zone is approximately 2,060 gpm. This flow can be pumped by the City's diesel fire pump utilizing available storage from the 1 Million Gallon Reservoir. Thus, it is recommended that the City continue to utilize the diesel fire pump to supplement fire flows on the Upper Pressure Zone as may be required.

It should be noted, however, that the current fire pump does not meet the required fire flow redundancy requirements in the Rules, which state *"Pumping systems supporting fire flow capacity must be designed so that fire flow may be provided with any pump out of service."* Since there is only one fire pump, this requirement is not met. It is recommended that the City pursue a waiver to this requirement, as is outlined in Subsection 501.18.b of the Rules. Additionally, the City should consider adding a second fire pump at such time that the booster station is upgraded.

Using the estimated 20 percent of total system production for the upper pressure zone, the upper zone MDD at the year 2038 is approximately 184 gpm. Considering this and also considering the lack of available meter data for the upper zone, the minimum pump size recommendation for the Upper Pressure Zone would be two (2) 200 gpm boosters provided on variable frequency drives.

7. Water Treatment Plant

As previously discussed and shown in Figure 3-2, the City invested over $3 million into the Water Treatment Plant in 2012/13. The improvements completed at the Water Treatment Plant eliminated depreciated equipment and expanded the source and filter capacity.

7.1. Backwash Basin

Prior to the 2012/13 WTP improvements, backwash from the City WTP was designed to be discharged to the City's sanitary sewer system. Due to capacity issues at the City's wastewater treatment plant, the City modified the discharge to the storm sewer. This was an unpermitted discharge that was eliminated with the improvements at the WTP.

During the WTP expansion design, the City's Engineer reviewed options for disposal of the backwash. Options considered included the sanitary sewer, the storm sewer or on-site disposal via installation of a backwash basin and infiltration system.

Considering issues with the City's sanitary sewer which made it infeasible to accept additional flow and because the City did not wish to have another discharge permit for a stormwater discharge to manage. Thus, preliminary test pits and soils analysis conducted at the site were completed and indicated that on-site disposal was a feasible option. Thus, the City opted for the on-site disposal.

Following construction of the backwash basin and infiltration system, several issues occurred including run-off of stored soils from the site into the basin and unplanned (due to uncalibrated filter plant controls) backwash cycles which overwhelmed the basin and infiltration system. Though the stray soil materials were removed from the basin to restore drainage, the basin did not ever fully recover and has not fully drained since the original construction.

In years after the construction was complete, former City staff modified a location in the basin to allow it to overflow. The location of this overflow results in water entering an adjacent wetland which is an unpermitted discharge.It appears to be clear that the infiltration gallery does not have the long-term infiltrative capacity needed to properly dispose of all of the backwash and filter to waste water the treatment plant produces. On average the Facility backwashes every 80 hours and each cycle results in a discharge of 40,000 gallons. Additionally, the Facility discharges roughly 2,000 gallons each day in relation to startup. Thus, the continuous average discharge is 10 gpm. On February 25, 2020, the City received a Compliance Agreement Schedule (CAS) to correct the unpermitted discharge. The CAS is included in Appendix H. The CAS requires the City to complete the following by 5/12/2020:

1. Prepare and implement a plan to discharge treated wastewater designed to meet water quality conditions provided in the CAS:

a. The City previously acquired an easement from the adjacent property to allow the discharge from the to occur across their property. Additionally, the City prepared a Notice of Intent to EPA for coverage under the NPDES Wastewater Discharges from Idaho Drinking Water Treatment Facilities General Permit to allow the discharge. Refer to these documents included in Appendix H.

2. Prepare a sampling plan:. Refer to Appendix H.

Pending the ability of the City to secure funding, the City plans to complete additional improvements to the backwash basin and discharge. The minimum anticipated improvements will include the following:

1. Rip Rap the discharge outfall.
2. Addition of a small sump pump to allow the existing basin(s) to be pumped down.
3. Construction of an earth berm within the drywell basin to allow each side of the basin and corresponding drywells to be taken off line for improved maintenance.
4. Improved access ramps into each filter for improved maintenance.
5. Develop an access into the drywell basin(s) for improved maintenance.
6. Improvements to fencing (gates at access points)
7. Clean up and repair of broken piping in filter basins

With these improvements in place, the City will be able to more easily remove fines that have blocked off the filters, drywells and bottom of the drywell basin to improve drainage. However, it is assumed that even with these improvements and maintenance, the existing soils will not likely allow efficient drainage within the basin and thus the City will rely on the formal, permitted discharge for elimination of the wastewater.

The anticipated budget for these improvements is $40,000. We anticipate the City will have to dedicate up to 12 labor hours per month related to sampling and basin maintenance. Sampling costs are anticipated to average $100 per month. This translates into an estimated operating cost of $5,000 per year

A preliminary engineering report will be prepared, as required by the CAS, and the City will review additional improvement options which may have a higher capital cost but may reduce maintenance costs.

7.2. Standby Power

The existing WTP provides water to all customers within the City Limits. Currently, the plant does not feature a generator for standby power. In the event of a long-term power outage, the system would have to rely on the 2 existing water

reservoirs for water. Table 7-1 below shows the available storage above 40 psi working pressure, which includes equalization storage, standby storage, and operational storage.

Table 7-1: Reservoir Working Volume

Existing 1 Million-Gallon Tank	700,000 Gallon Industrial Standpipe	Total Storage Working Volume	ADD	Maximum Power Outage based on ADD
250,000 gallons Working Volume	175,000 gallons Working Volume	425,000 gallons	232 gpm	30 hours

As shown in the above table, the combined available water storage limits the maximum power outage to approximately 30 hours before customers would experience less than ideal working pressures. Based on this information, it is recommended that the City considers adding a diesel-powered generator to the WTP.

7.3. Proposed Reservoir Volume

Proposed reservoir sizing and location is discussed in Section 4 of this document.

7.4. Standby Power Options

WTP Standby power: In 2011, the City bid standby power for the WTP as an add alternate to the WTP project. The proposed generator sizing would allow the following equipment to operate: (1) transfer pump and (1) intake pump plus some smaller loads:

1. Connected base load consisting of 480V resistance heating of 160kW and miscellaneous 120/240V loads totaling 30kVA
2. Connected base load consisting of 125 HP motor on a solid state soft starter (finished water pump)
3. Start an additional 60 HP motor on a variable frequency drive (raw water pump)

Due to budget constraints and the existing system storage volumes at the time, the City opted not tto award standby power as part of the water treatment plant upgrades. The average bid price at the time (2011) for the generator and transfer switch was $150,000.

There are potential options to reduce the generator size to as low as 125kw, if the City is prepared to operate only one pump at a time. This would likely lower the cost of the generator. However, it would be more intensive from an operations/controls standpoint. For the purpose of this report, the average bid price from the water treatment plant upgrade project was used for budget pricing.

8. Distribution System

The City's Water System has nearly 24 miles of water main. An inventory of the distribution network is provided in the table below.

Table 8-1: Existing Distribution System Inventory

Size (Inches)	Steel (LF)	Asbestos Cement (AC) (LF)	PVC (LF)	Galvanized (LF)	Total (LF)	Total (Miles)
2	-	-	-	4,610	4,610	0.9
4	7,650	24,280	8,500	-	40,430	7.7
6	1,230	8,860	4,230	-	14,320	2.7
8	50	9,610	17,660	-	27,320	5.2
10	50	1,780	20,010	-	21,840	4.1
12	-	6,710	9,860	-	16,570	3.1
Total	**8,980**	**51,240**	**60,260**	**4,610**	**125,090**	**23.7**

Based on available drawings, it is believed that the Steel and AC lines are over 70 years old. (The typical life of steel pipe is 60 years pending soil conditions. AC pipe is typically 70 years or more, depending on disturbance around the pipe.)

The City has experienced numerous issues with the steel main line in recent years. It is not uncommon for the City to experience 15+ leaks on the steel main line each year that require repair. During repair, the City has noted that many of their existing steel mains are severely tuberculated. It is important to the City to develop an annual replacement program (pending funding) for the steel main.

The City has also identified, in conjunction with fire hydrant testing completed by the Fire District, that the 4-inch main line does not support current fire flow standards (typically 1,000 gpm for residential and 1,500 gpm for commercial).

It is highly recommended that the City develop, and begin to implement, a steel and 4-inch mainline replacement program. Likely, the highest priority replacements will be the 4-inch steel mains, as the City has experienced several low-pressure complaints from customers on existing 4-inch steel waterlines. Therefore, the costs presented in the Funding section of this document include those to replace the 4-inch steel mains.

Relative to near term distribution needs, the City has received funding for reconstruction of the Wisconsin and Highway 2 intersection. The City has an existing water main that has required several repairs within this intersection. Pending funding, the City wishes to replace this main line in conjunction with (or in advance) of the reconstruction project.

9. Improvement Summary and Prioritization

A summary of the improvement projects reviewed within this document are provided in Table 9-1.

Table 9-1: Improvement Summary

Priority	Project / Issue	Description	Need	Solution
1	1 Million-Gallon Reservoir	Replace 1 Million-Gallon Reservoir Adjacent to Existing Tank	Existing reservoir roof is deteriorated. Structure does not have adequate foundation; full reconstruction is required. Significant deficiency.	Construct new 440,000-gallon reservoir at the existing site
1	Backwash Basin	Pump from Existing Settling Pond to Sanitary Sewer Collection System	Current discharge into the Pend Oreille River is not allowed, as is noted in the Sanitary Survey.	The City secured an easement for the discharge pipe and is currently working to secure a permit for the discharge. Once the permit is in place, they will drain the filter beds and settling basin, clean out the fines from the filters, drywells and basin and restore the system to proper working order.
1	Single Tank Offline Operation	Operate System with Existing 1 Million-Gallon Tank Offline	Existing tank will need to be taken offline during construction of new reservoir. In addition, an emergency plan should be in place if the existing reservoir becomes unusable due to its deteriorated conditions.	Make electrical control modifications to prevent existing booster station pumps from operating while WTP pump are operating.
		Operate System with Existing 750,000-Gallon Industrial Standpipe Offline	Existing reservoir must be taken offline for regular maintenance such as cleaning and future re-coating.	Install VFDs in existing booster station (included as part of Booster Station improvements)

Priority	Project / Issue	Description	Need	Solution
1	WTP Generator	Install a Generator at the WTP	In a power outage situation, the WTP cannot currently operate. In a long-term power outage, the City would be without water once the reservoirs were drained. In addition, the generator is required to support fire flow on the Lower Zone.	Install new WTP generator
2	Upper Booster Station	Replace Booster Station Piping and Pumps, Install Flow Meter and Redundant Fire Pump	Existing booster station is not DEQ compliant as a flow meter is not present. Welded steel pipe makes component maintenance difficult. Existing pumps are beyond their expected service life. Single fire pump does not meet redundancy requirements.	Install flow meter, replace existing welded steel pipe with ductile iron, install new pumps on VFD drives to provide a long-term and efficient solution. Add second fire pump to meet redundancy requirements.
3	Add Isolation Valve @ Standpipe	Install an isolation valve to the existing Industrial Standpipe to allow the check valves to be isolated for maintenance.	DEQ has requested an isolation valve at the Industrial Standpipe.	Install isolation valve at Standpipe. This will be completed the next time the tank is taken offline.
4	4-Inch Steel Main Replacement	Replace existing 4-inch steel water lines	The existing steel main is deteriorated, tuberculated and beyond its service life span. The existing 4-inch main is undersized and does not support fire flows.	Develop replacement program and complete replacements as funding is available.

The above table shows the prioritization of the improvements discussed herein and proposed prioritization considering public, health and safety and Idaho Rules for Public Drinking Water Systems. The next section discusses costs and funding of the proposed improvements and anticipated rate impact.

10. FUNDING

10.1. OPINION OF COSTS: CAPITAL AND OPERATIONAL

Refer to Appendix D for the Engineer's Opinion of Probable Project Costs for the Priority 1 improvements. The following table summarizes the recommended improvements and anticipated capital and operational costs.

10.2. CURRENT WATER RATES

Refer to Appendix E for the City's most recent rate resolution. Following is a brief summary of current water rates. As shown below, customers are currently paying the monthly maintenance and operation charge along with the 2008 water improvement bond fee.

Table 10-1: Current Water Rate Overview

	Monthly Water Allotment	Minimum Monthly Water M&O Charge	2008 Water Improvement Bond	Total Monthly Water Rate
Single Family Residential	12,000 Gallons	$23.50	$17.82	$41.32
Multi-Family Residential	9,000 Gal/Unit	$23.50	$17.82	$41.32

10.3. PROPOSED RATE INCREASE

The table below lists the estimated rate increase for each proposed project. Assumptions for financing are listed below:

USDA:

- 3.25% for 40 Years
- Block Grant - $500,000
- Admin/Legal – 2.5%
- Interim Financing – 12 Months @ 3%

DEQ:

- 2% for 30 Years
- Admin/Legal – 2.5%
- Interim Financing – 24 Months @ 2%

Table 10-2: Estimated Rate Increase per Project

Priority	Project / Issue	Preliminary Opinion of Probable Project Costs	Estimated Monthly Rate Impact		Annual O&M Cost / 20-Year Average
			USDA RD + Block	USDA RD	
1	440,000 Gallon Reservoir and WTP Generator, and Backwash Basin[1]	$2,000,000	$4.80	$6.19	Steel Tank - Re-Coating - $70k / 20 Years = $3,500 / Year Generator Annual / Backwash Maintenance Approximately $5,000-$6,000 / year
1	Single Tank Offline Operation	Complete			
2	Upper Booster Station	$586,000	$1.96	$1.96	Annual Pump Maintenance - Approximately $500- $1000 / Year
3	Add Isolation Valve @ Standpipe	$16,000	Complete in House		N/A
4	4-Inch Steel Main Replacements	$1,147,150	Complete with Reserve $57,375 per year over 20 years $38,250 per year over 30 years		N/A

1. Includes budget for replacement of main within Wisconsin/Hwy 2 intersection.

As indicated, the City has current water system debt related to the 2009 Water Revenue Bond. This debt is being repaid through the monthly bond service payment at a rate of $17.82/month.

10.4. Funding Options

The table above considers three funding options for each proposed project:

1. USDA RD + Block Grant
2. USDA RD
3. DEQ Funding

10.5. Project Scoping and Anticipated Rate Impact

The table above prioritizes the projects based on compliance and/or system deficiencies. Rate impacts are noted for each project based on the separate funding options.

APPENDIX A:

IDEQ SANITARY SURVEY

AUGUST 2017

WELCH-COMER
ENGINEERS | SURVEYORS

clearwell
Storage

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2110 Ironwood Parkway, Coeur d'Alene, ID 83814 (208) 769-1422

C. L. "Butch" Otter, Governor
John H. Tippets, Director

September 15, 2017

Laurel Knoles, Administrative Contact
City of Priest River
PO Box 415
Priest River, ID 83856

Subject: Sanitary Survey for City of Priest River, ID1090107
Survey Dates: August 8 and August 16, 2017 Last Survey Date: March 28, 2013

Dear Laurel:

I thank Robert Troxler and Tyler Smith for assisting me in the field inspection for the Sanitary Survey that is normally required every three years for this public water supply system. The purpose of the Sanitary Survey is to document a detailed record of the water system, evaluate current operating procedures, provide recommendations, and identify deficiencies that require correction. The Sanitary Survey Report is enclosed for your files consisting of 24 pages of narrative description including this cover letter and 25 pages of photographic documentation.

Requirements and recommendations are listed on page(s) 22-24 in order to protect public health, prevent future problems, minimize contamination potential, maximize safety, and promote effective system operation. The water system is advised to implement solutions to these noted deficiencies as soon as practical. **Discuss the report findings and submit a written Plan of Correction to the Idaho Department of Environmental Quality (DEQ) within 30 days after the date of this report. Complete the Significant Deficiency corrections within 120 days and submit documentation of the corrections to DEQ within 150 days after the date of this report.** If a Significant Deficiency cannot be corrected within this timeframe, the water system must be in compliance with a DEQ-approved plan. Failure to comply with any of these requirements may result in violations and public notification.

With the exception of noted deficiencies, the water system appears to be substantially in compliance with Department requirements and Idaho Rules for Public Drinking Water Systems (Rules).

Sincerely,

Jim Williamson
Drinking Water Analyst
Jim.Williamson@deq.idaho.gov

Enclosures

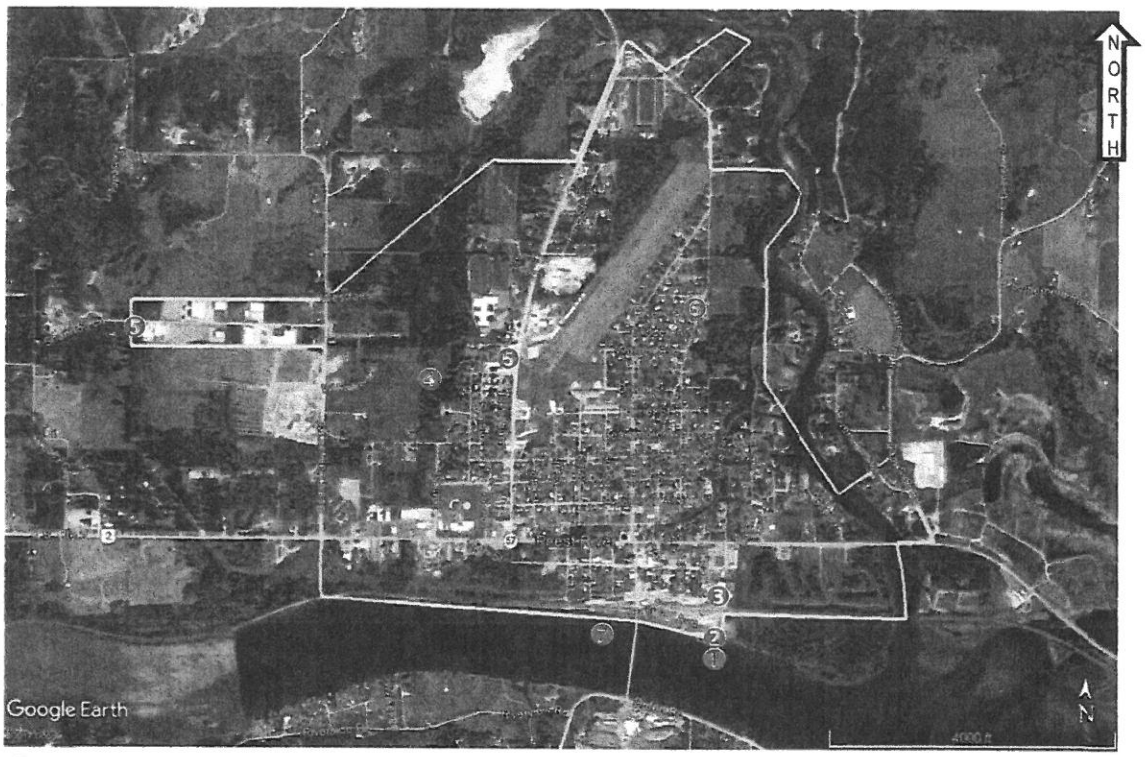
c: Anna Moody, Drinking Water Program Supervisor, anna.moody@deq.idaho.gov
Rex Rolicheck, Director of Public Works, rrolicheck@priestriver-id.gov
Robert Troxler, Operator, rtroxler@priestriver-id.gov *
TRIM file: ID1090107, City of Priest River

DRINKING WATER SUPPLY REPORT

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

System:City of Priest River **PWS #:** ID1090107 **County**: Bonner
Surveyor(s): Jim Williamson
Survey Dates: August 8 and August 16, 2017
Primary Sources: Pend Oreille River (surface water)
PWS Type: Community **Population**: 2,173 **Connections**: 829

AERIAL VICINITY MAP



1. PEND OREILLE RIVER INTAKE
2. INTAKE PUMP STATION
3. WATER TREATMENT PLANT
4. WTP CLEARWELL PUMP STATION
5. BACKWASH POND FACILITY
6. STORAGE TANK #1 (1,000,000 GAL)
7. TRANSFER PUMP STATION
8. STORAGE TANK #2 (700,000 GAL)
9. PRESSURE REDUCING VALVE STATION
10. NPDES WW OUTFALL

OVERALL SYSTEM FACILITIES

The City of Priest River is an incorporated city with a mayor and four city council members. The drinking water system is supplied by one pumped surface water intake on the Pend Oreille River. Treatment consists of upflow clarification and direct filtration in four packaged units, and disinfection contact time is provided in a clearwell under the water treatment plant. Storage

floats on the system and is provided in two storage tanks totaling 1.7 million gallons, and two transfer pump stations convey water between storage facilities. Two pressure zones are controlled by storage tank elevation and two pressure reducing stations. Distribution mains total nearly 20 miles in length. In general, water system infrastructure ranges in age from the 1960's to 2012.

WATER SYSTEM HISTORY

The City of Priest River is located in the southwest corner of Bonner County, Idaho near the confluence of the Priest River and the Pend Oreille River approximately five air miles east of the Washington state border and Newport, Washington. The water system service area encompasses the city limits of Priest River.

The railroad and timber industries first drew settlers to the area in the 1890's. The City was incorporated in 1949 and presently encompasses a town site of approximately 1.6 square miles north of the Pend Oreille River and west of the Priest River. Current area development is primarily residential in nature with a mix of local businesses. The City has experienced a growth rate of 1-2% since 1990. The City utilizes filtered surface water from the Pend Oreille River for the potable drinking water system.

The Pend Oreille River is a reservoir-like body of water due to Albeni Falls Dam, which in conjunction with Cabinet Gorge Dam on the Clark Fork, regulates minimum and maximum water levels in Lake Pend Oreille. The Priest River drains the Selkirk Mountains and is regulated by a dam located at the Priest Lake outlet near Coolin, Idaho.

In 1976, a Keystone filtration plant was constructed with pre-chlorination, aluminum sulfate coagulation, a flocculation chamber, four filter units, and a clearwell disinfection chamber. Between 1994 and 2007, improvements were constructed under a Voluntary Consent Order (VCO) to bring the drinking water system into compliance with State and Federal Regulations stemming from the newly-implemented Surface Water Treatment Rule (SWTR) in the early 1990's. Improvements made to the plant as a result of the VCO included: turbidity and chlorine monitoring equipment, clearwell baffling for improved disinfection contact time, filter-to-waste capabilities, filter control valves and meters, and a Supervisory Control and Data Acquisition (SCADA) system with alarms and automated plant shut down. This configuration of the treatment plant was in service until replacement in 2012.

In March 2002, a Comprehensive Performance Evaluation (CPE) was conducted at the City water treatment plant. The CPE was conducted by State drinking water programs in Idaho, Washington, and Alaska, the EPA, the Army Corps of Engineers, and private consultants. This was not a regulatory initiative and the objective of the CPE was to train regulatory staff and assist the City to optimize the water treatment and filtration process without additional capital expenses.

In 2007-2010, a water system Master Plan and four amendments identified water system deficiencies with respect to service pressure, storage capacity, and supply capacity over a 20-

year projection. By 2012, several projects to address these issues were designed and constructed. In 2011, a 700,000 gallon welded-steel storage tank was constructed and pump station improvements were completed resulting in an increase to service pressures in the upper zone and a total storage capacity of 1.7 million gallons. In 2012, construction was completed for a replacement treatment plant with increased surface water intake capacity, new Roberts direct filter units, an expanded clearwell disinfection chamber, and a backwash settling pond.

In 2008-2009, groundwater sources were explored and two test wells were constructed. The test well constructed east of the Priest River was determined to be a viable source with acceptable water quality, and the test well constructed near the water treatment plant was determined to have undesirable water quality and low capacity. Groundwater sources were not developed further for use in the water system.

SOURCE FACILITIES

Pend Oreille River Intake:

Original Construction Date: 1976 **Lat / Long**: 48.17634 / -116.90413

The surface water intake is the only source in the potable drinking water system. The confluence of the Priest and Pend Oreille Rivers is approximately one half mile upstream, and the intake is within the typical plume of increased turbidity during seasonal runoff conditions. Estimated costs to relocate the intake are excessive, and filtration treatment to date has not been adversely impacted enough to justify completing the work.

The intake is located approximately 200 feet offshore at a 90 degree angle to the north river bank approximately 3 feet off the bottom of the river. A 12-inch transmission pipe extends from the intake to a wet well (8 feet diameter by 32 feet deep) under the pump house. Two 60 hp vertical line shaft turbine pumps in the pump house transfer raw water from the wet well to the water treatment plant through approximately 560 feet of 12-inch transmission main (constructed in 1976). Pumps operate in lead / lag alternation and each is capable of 300 - 2100 gpm through a variable frequency drive controller. Pump control is provided by the new Roberts Process Control System, and activation is initiated according to transducer level sensors in the treatment plant clearwell.

Each pump discharge pipe features an air vacuum release (Clay Val), a globe-style silent check valve (Val Matic 1812), and a 12-inch butterfly isolation valve prior to joining together in a common header.

The pump house is constructed as a main concrete floor over a wet well with concrete walls. The pump house generally appears to direct local runoff away, provides adequate protection from the weather, and prevents unauthorized access. The wet well is designed with access in the pump house floor for cleaning and inspection by divers.

In the past, the electrical conduit between the water treatment plant and pump house was discovered to be susceptible to groundwater ingress (conduit sections were apparently not glued

together during installation). Collected groundwater has the potential to drain into the pump house interior through the control panel.

Source recommendations were noted at the time of inspection:

Evaluate the source of pump oil leaks around the top flange of the discharge header. Inspect the pump bearing and oil level reservoir for abnormal conditions.

Inspect the intake pump wet well on a regular basis and clean as necessary.

TREATMENT FACILITIES

Surface Water Direct Treatment Plant:

Original Construction Date: 1976 **Lat / Long**: 48.17848 / -116.90387
Replacement Construction Date: 2012

The water treatment plant is located near the south end of Trent Street just north of the railroad tracks. The plant building houses filtration equipment, a clearwell, the clearwell transfer pumps, and an office area for water operator staff. The plant is typically staffed seven days a week.

Surface Water Treatment Process:

Treatment is in the following order and consists of:

1) Inflow from the surface water intake pumps.
2) Continuous raw water turbidity monitoring (Hach 1720E).
3) Raw water inflow branches to each side of the plant. With the exception of minor differences, each side of the plant has an equivalent process.
4) A pre-chlorination port is available for future use.
5) A polymer coagulant port is available for future use.
6) Inline static mixing (Westfall 2800).
7) Aluminum sulfate coagulant injection at the static mixer.
8) Streaming current monitoring (ChemTrac SCM 2500, Dura-Trac SCC3500) with automatic feedback adjustment for aluminum sulfate dosing.
9) Roberts filter unit clarifier chamber though upflow (high rate adsorption) filter media. Clarifier chambers are forward-washed with raw water.
10) Roberts filter unit polishing chamber through downflow (rapid rate gravity) filter media. Polishing chambers are backwashed with finished water from Storage Tank #1 through distribution.
11) Continuous finished water turbidity monitoring (Individual Hach 1720E).
12) Sodium hypochlorite injection.
13) Disinfection with contact time in the baffled clearwell.
14) Continuous filtered water residual chlorine monitoring (Hach CL17)
15) Discharge to distribution through the clearwell transfer pumps.
16) Filter-to-waste flows are conveyed to a settling pond. No processes use recycled flows.

Treatment Capacity:

The surface water treatment plant is designed for raw water turbidities up to 200 NTU and a peak flow rate up to 2100 gpm with one component out of service.

1) One raw water intake pump operating at a maximum of 2100 gpm. (The 2nd intake pump was not designed to operate concurrently.)
2) Three filter units operating at 700 gpm each or a combined maximum of 2100 gpm. (Design capacity does not rely on the 4th filter unit.)
3) Two clearwell chambers (hydraulically connected) with 50% baffling to provide a contact volume of 120,854 gallons.
4) One clearwell transfer pump operating at the maximum design rate of 1100 gpm. (The 2nd and 3rd transfer pumps operate in alternating fashion.)

According to the 2007 Water System Master Plan, the City has a water right claim to divert 3.21 cfs or 1440 gpm from the Pend Oreille River.

Chemical Treatment:

The chemical treatment process features inline static mixing, multiple ports for chemical injection, multiple ports for process sampling, and automated control through the Roberts Process Controller.

Ports for pre-chlorination and polymer injection are available but were not used at the time of the survey. Improvements to the clearwell contact time has made pre-chlorination unnecessary; and raw water has been of sufficient quality that polymer coagulant has not been applied. Minor water system improvements would be necessary to accommodate the equipment and solution-tank footprints for these processes if used in the future.

Aluminum sulfate (48%, Cascade Columbia brand, certified to meet the ANSI/NSF 60 standard) is used as a primary coagulant in the process stream. With the exception of minor differences, each side of the plant has an equivalent chemical feed process. The chemical coagulant process consists of chemical storage in two 500 gallon polyethylene storage tanks, chemical feed through peristaltic pumps (FlexFlo A1N30V-7T), injection into raw water streams through static mixer ports, and streaming current monitoring (ChemTrac SCM 2500 & SCC 3500). The signal output from the streaming current monitor is used to automatically adjust feed rates through the peristaltic pump. A solenoid valve on the streaming current monitor sampling line is concurrently energized with the source water intake pumps.

The manufacturer indicates the Roberts filter system requires less chemical feed rates (up to 50%) than conventional processes with dedicated sedimentation chambers, and this is an important consideration as the plant's operation becomes optimized. Operators should understand the contribution of raw water pH, temperature, and alkalinity to the treatment process, and maintain operating records for appropriate aluminum sulfate adjustment values. The manufacturer has specified typical aluminum sulfate dosing per the Operation & Maintenance guidance, and the values below have been abbreviated for reference.

Raw Turbidity	Color Units	Alum Dose
0-5 NTU	No color	4-10 mg/L
6-15 NTU	No color	6-12 mg/L
5 NTU	10-25	9-30 mg/L
5 NTU	26-50	20-45 mg/L

Filtration Sequence:

Filtration units are located on the main floor of the treatment plant building above the clear well. The equipment is physically orientation in two major sections of the plant:

West Half	East Half
Filter #1 (north side)	Filter #3 (north side)
Filter #2 (south side)	Filter #4 (south side)

Packaged filtration units are manufactured by Roberts Water Technologies, Inc. as Pacer II® modular filters with options for the ContaClarifer® (high rate adsorption) filter, Dual-Media polishing (rapid rate gravity) filter, Aries® Managed Air Scour system, and the Infinity® Underdrain.

Roberts Modular Pacer II Model P-700AI

Filter Capacity: 700 gpm

Clarifier Filter Chamber

Area:	70.6 SF
Bed Volume:	282.4 CF
Hydraulic Loading:	10 gpm/SF
Air Scour Rate:	6 CFM/SF = 420 CFM
Rinse Rate:	Max = 700 gpm
Upflow Media Retention:	Aluminum bar grate with 304 SS screen
Rinse Source	Raw water from the intake

Polishing Filter Chamber

Area:	140.0 SF
Filter Rate:	5 gpm/SF = 700 gpm
Air Scour Rate:	3 CFM/SF = 420 CFM
Backwash Rate:	Max = 20 gpm/SF = 2800 gpm
Backwash Volume:	Max = 21,000 gallons @ 7.5 minutes
Backwash Source	Finished water from distribution / Storage Tank 1

Dual-Media Polishing Filter Bed

Anthracite Coal (1.0-1.2mm):	21 inches
Silica Sand (0.45-0.55 mm):	9 inches
Silica Gravel (3/8 x 3/16):	3 inches
Silica Gravel (3/4 x 3/8):	3 inches

Silica Gravel (1-1/2 x 3/4):	3 inches
Infinity PVC Underdrain:	6 inches

The treatment plant is configured to rotate the operation of filters on weekly schedules so that two filters operate at a time (one from each side of the plant), resulting in a maximum offline period of one week for inactive filters. When brought online after periods of inactivity, filters are first cycled through a forward rinse and a backwash.

The clarifier filter process is intended to both flocculate the coagulated water and to remove a portion of the solids load. After coagulant chemical injection at the static mixer, the inflow process stream passes up through a bed of coarse non-buoyant media (supported on a screen) which coagulates, flocculates, and removes up to 95% of turbidity. The clarified water is collected in a trough above the clarifier bed and transferred to the polishing filter chamber. Each filter unit is constructed with double wall separation between the clarifier and polishing filter chambers.

The polishing filter process consists of a coarse anthracite layer over sand and gravel that removes remaining particles. Finished water is collected in the underdrain system at the bottom of the subfill. Filter effluent is then discharged through a modulated butterfly valve controlled by a level controller to maintain the water level in the filter. After this, the filtered water discharges from the treatment units through hypochlorite injection and gravity flow into the clearwell.

Backwash Sequence:

Filter backwash sequences are normally automated by the Roberts Process Controller with an option for manual initiation by the operator. When multiple filters are active, each filter unit operates independently so that only one backwash process occurs at any given time.

The clarifier filter chamber is forward-washed between 400 to 700 gpm with raw water approximately every 4 to12 hours depending on water quality. The wash sequence is automatically triggered by accumulated headloss or maximum service time. With air scouring and upflow, the media will be cleansed for 3 to 4 minutes with the waste valve open and discharge through flow-to-waste piping. Following the air scour cycle, raw water continues to rinse the clarifier filter chamber for an additional 3 to 4 minutes. The waste valve then closes and diverts the process stream back through the polishing filter. It is noted that the clarifier effluent does not need to be completely clear after a rinse cycle, and the system may perform better with "seed" turbidities after a rinse according to the manufacturer.

The polisher filter chamber is backwashed at 2,800 gpm with finished water from distribution and Storage Tank #1. The backwash sequence is automatically triggered by accumulated headloss, excessive turbidity, or maximum service time. After water levels have been drawn down to just above the media, the media is cleansed with air scouring for 3 to 4 minutes. Following the air scour cycle, finished water back-rinses the polishing filter media for an additional 5 to 7 minutes with the waste valve open and discharge through flow-to-waste piping. The waste valve then closes and diverts the stream forward through the polishing filter. At this

point, because the filter bed may have larger voids than normal, the filtered process stream is forward-rinsed through flow-to-waste piping for a minimum of 5 minutes. If turbidity measurements are within acceptable limits, control valves are actuated and the filtered effluent is directed through hypochlorite injection and gravity flow into the clearwell. If turbidity measurements are not within acceptable limits, forward-rinsing continues until turbidity falls within acceptable limits or a set time expires and signals an alarm for treatment shutdown.

Backwash and flow-to-waste piping discharges to an uncovered settling pond located adjacent to the treatment plant building on the northeast side. Flows are split into two parallel upper basins where solids are allowed to settle. A sand bed and gallery of perforated pipes conveys clarified water from the upper basins into a common infiltration basin with five open-bottom drywells penetrating subsurface to a depth of eight feet. A pond overflow channel has been graded into the east embankment toward the adjacent wetland. The pond area is surrounded by security fencing with multiple entrance points for access and maintenance.

In 2015, the settling pond complex was inspected by Panhandle Health District under contract with the Idaho Department of Water Resources. Inspection notes indicated the complex appeared to have deficiencies with missing fence sections, silted in or clogged infiltration features, weed overgrowth, and discharge into the adjacent wetland. Online mapping resources with the US Fish and Wildlife Service National Wetland Inventory indicate the wetland is classified Freshwater Emergent Wetland (PEM1F: System Palustrine, Class Emergent, Subclass Persistent, Semi-Permanently Flooded), 6.99 acres in size.

Disinfection:

Disinfection is accomplished with sodium hypochlorite injection (12.5%, Cascade Columbia brand, certified to meet the ANSI/NSF 60 standard) into the process stream after filtration and before the clearwell. Hypochlorite is stored undiluted in one 500-gallon polyethylene tank in a storage room near the center of the plant on the north side, and there is no dedicated water supply line for preparing dilutions. Two LMI chemical feed pumps (C731-410SI, 0.008-8.0 gph, 60 psi max) deliver hypochlorite through dedicated PVC lines to their respective points of injection, and a replacement LMI pump is available for unplanned failures.

The chemical feed pumps are automatically controlled with feedrates that are proportional to measured flow, and chemical feed will stop if there is a lack of flow. Hypochlorite is injected in the process stream after filtration and prior to entry into the clearwell. There is one location for Filter Units #1 and #2 in the west portion of the plant, and there is also another location for Filter Units #3 and #4 in the east portion of the plant. In the case of the west injection point, conveyance of hypochlorite from the pumps to the point of injection follows a long route (approximately 50 feet) in small diameter PVC pipe through a high point above the floor (approximately 10 feet) in the middle. Ball valves at the injection points are used to manually prevent the hypochlorite lines from draining into the depressurized filtrate pipe during pump maintenance efforts.
Disinfection contact time is accomplished through the west clearwell (constructed 1976) and the east clearwell (constructed 2012) located on the lower level of the treatment plant building. The west and east clearwells are hydraulically connected, and the bottom of the east clearwell is 3

feet lower than the west clearwell. Water depth inside the west clearwell is 8 feet, and water depth inside the east clearwell is 11 feet. Transducer level sensors in the clearwell monitor water levels, and the Roberts Process Controller initiates source and treatment processes according to demand within a drawdown range of 26 inches between 9.2 and 10.3 feet. There is 1 foot of freeboard above the maximum clearwell water level, and vertically-oriented internal overflows discharge through a pipe segment terminating in a duckbill flapper above the wetland east of the plant building. Chlorinated discharge into the wetland is expected to be rare and only for emergency purposes.

DEQ files indicate a tracer study using sodium chloride conductivity from 1998 (City of Priest River SWTR Compliance Evaluation, S. Baker) conducted on the west clearwell determined the baffling factor to be 0.50 (39 minutes @ 1,100 gpm). Because of similar construction, the DEQ has also accepted this baffling factor for the east clearwell without further justification. According to the tracer study results and information submitted to DEQ by Welch-Comer Engineers, the following table indicates contact times for the various modes of clearwell operation:

	West Clearwell	East Clearwell	West + East
Combined			
Total Volume:	86,200 gallons	155,509 gallons	241,709 gallons
Baffling Factor:	0.50	0.50	0.50
Contact Volume:	43,100 gallons	77,754 gallons	120,854 gallons
Contact Time @ 1100 gpm:	39.2 minutes	70.7 minutes	109.9 minutes

Alarm Functions:

The Roberts Process Controller monitors treatment plant processes, can detect numerous fault conditions, and is programmed to shutdown critical processes automatically. In the event of a process fault, operators are contacted first through an autodialer function to cellphones, and alternate contacts are automatically dialed if operators do not respond. The Roberts Process Controller has limited connectivity to the separate SCADA system.

Treatment Monitoring and Reporting:

Daily monitoring and monthly reporting of treatment process parameters is conducted to satisfy filtration and disinfection requirements in the Rules. Each day the system is in operation, the water system must determine the total inactivation of *Giardia* (minimum 99.9%, 3-log) and viruses (minimum 99.99%, 4-log). Monthly operating reports (MOR) are submitted to this DEQ office no later than the 10th of the month following the reporting period.

Monitoring for individual filtered effluent turbidity is accomplished through a Hach 1720E online turbidimeter installed on each Roberts filter unit upstream to the clear well. A solenoid valve utilizes head from the filter unit to supply gravity flow to each turbidimeter. Monitoring for combined filtered effluent turbidity is accomplished by reporting the highest individual turbidity. The measurements are displayed on continuous digital readout with recording

capability in the Hach SC200 controller. Reported values for turbidity typically range between 0.1 NTU to 0.3 NTU.

Continuous chlorine disinfectant residual monitoring is accomplished through Hach CL17 online analyzers, and data is monitored by a split feed to both the Roberts Process Controller and the SCADA system. Probes for the chlorine analyzers are located in discharge piping from each side of the clearwell. A chorine test kit is available to verify the accuracy of the CL17 measurements. Reported values for chlorine typically range between 1.0 to 2.5 NTU.

Continuous pH and temperature monitoring is accomplished through a Hach analyzer and readout mounted on the west wall, and probes are located in discharge piping from each side of the clearwell. Temperature and pH monitoring for compliance is accomplished by grab sample from the office sink one time each day. Grab samples are collected after flows have been discharged for approximately 10 minutes. Reported values for pH typically range between 7.7 to 8.0. Reported values for temperature typically range between 5 to 24 C.

Filter Maintenance and Troubleshooting:

Frequent observation of the media beds during filtration and especially backwash processes is an important operator practice. Any unusual appearances such as uneven filter surface, slugs of air during backwash, or uneven distribution of backwash water may indicate that significant problems have developed.

1) Both the filter and underdrain system should be checked annually at a minimum.
2) Filter media loss should be less than one inch per year when compared to original depths.
3) Backwash water only should be used to refill a filter after water levels have drained below the top of the media bed.
4) Mudballs. Mudballs are formed when grains of filter media are not cleaned thoroughly; the sticky floc residue forces the grains to clump together. As the mudballs grow, their weight causes them to sink into the filter bed during backwashing. Mudballs clog the filter bed, altering normal filtration. As water continues to flow through the filter, the filtration rate in areas that are not clogged by mudballs increases to make up for the inactivity in the clogged areas. The water that is forced through the filter at an accelerated rate is not filtered as effectively as it would be at the optimum filtration rate. This causes poor effluent quality, early floc breakthrough, and short filter runs.
5) Cracks and Separation. When the filter bed becomes excessively dirty, it compacts, causing small cracks in the bed and separation of the media from the filter walls. Water flows rapidly through the resulting cracks, receiving little or no filtration. Well maintained beds don't compact because the grains of media rest directly against each other. Larger cracks occur when the filter media is compacted, then backwashed without auxilliary wash. The media tends to heave upward as a unit and then crack. The backwash water then flows through the crack rather than acting to disintegrate the mud accumulation.
6) Holes. The appearance of holes in the surface of a filter following a backwash is an indication of serious subfill or underdrain damage. Holes usually occur when media is lost through a displaced area of the subfill or through a break in the underdrain. The hole may disappear after the next backwash, and then reappear during the service run.

Initial aluminum sulfate dosing established during construction is a good place to start, and ongoing operational adjustments are necessary for adequate plant operation. It is important to understand that appropriate dose rates may vary according to the time of year or when water quality differs. Generally, more aluminum sulfate will give a better quality effluent, but this performance may be at the cost of shorter filter runs.

In addition, when aluminum sulfate is added to water it forms an acid (lowering the pH), and waters with a higher alkalinity will change less for a given dose than waters with low alkalinity. Waters with low alkalinity or moderate alkalinity with high sediment loads may require more aluminum sulfate than the natural alkalinity can neutralize, and additives may be needed to keep the pH in the proper range. Because the water system has historically observed moderate-low alkalinity (approximately 80 mg/L) in the source water, it is important to account for these potentials as the process adjustments are investigated.

Treatment requirements were noted at the time of inspection:

Inspect sealant failure leaks in the corners of the clearwell and correct any known or potential cross connections that are discovered. Utilize materials certified to meet the standards of NSF 61 for repairs. Coordinate with consultants as necessary to determine repair and maintenance procedures.

Backflow prevention assemblies must be tested annually by a certified backflow assembly tester. The Wilkins 375 RPZ backflow assembly in the treatment plant was not labeled with current annual testing results. Address the requirement by confirming the testing was completed and adding the test information to the assembly certificates.

Install J-style nipple extensions and 24-mesh screens on manual air release valves.

Eliminate backwash settling pond discharge to the classified wetland. Contact Idaho Fish and Wildlife Office in Spokane, Washington (509-891-6839) to determine regulations for discharge and potential restoration requirements to the wetland.

Treatment recommendations were noted at the time of inspection:

Determine coagulant chemical feed rates through dosing cylinder measurement and streaming current detector settings. Record chemical feed rates with notes on associated process performance through the change in seasons to determine historic trends for source water quality changes.

Clean biological growth from the upflow clarifier screens. Physical removal may be necessary. Consult with the manufacturer on best management practices to avoid screen damage and prevent recurrence.

Evaluate the fine tan-colored biological growth on the surface of the anthracite polishing filter media and determine if it has a detrimental effect on water quality, filter performance, or taste

and odor. Consult with the manufacturer on best management practices to clean from the filter surface and prevent recurrence.

Address backwash settling pond deficiencies to provide maintenance access, improve site security, restore infiltration function, control weeds, and control discharge.

Conduct treatment optimization special studies to monitor media depth, media expansion during backwash, jar testing for alum dosing, filter rotation, rinse and backwash duration, etc. Utilize the information to automate processes and optimize plant performance for lower cost of operation and maximum plant performance.

Inspect interior features and clean the clearwell every five years or more frequently as necessary. Utilize different inspection strategies to evaluate both below the water line and above the water line. Repair failed coatings, corroded surfaces, and other defects as they are identified. Remove sediment accumulations that may contribute to turbidity and chlorine residual demand.

Re-route the clearwell emergency overflow discharge pipe away from the classified wetland and into the backwash settling pond complex. Avoid the potential for direct discharge of chlorinated water into the wetland.

FINISHED WATER STORAGE FACILITIES

Storage Tank #1

Original Construction Date: 1965 **Capacity**: 1,000,000 gal
Type: Ground-Level Welded Steel

Storage Tank #1 is located at an elevation of 2,249 feet near the west-center of the town site. Finished floor elevation differences are approximately 200 feet above the water treatment plant, and approximately 10 feet below Storage Tank #2. The storage tank site is located on land owned by the City with private roadway access and a locked gate. The site is secured by perimeter security fencing. Residential housing occupies the lower regions surrounding the tank site.

The round welded-steel tank is approximately 76 feet in diameter and 32 feet high with a crowned roof, two man-way access points, a central roof vent, and an external overflow. The storage tank is understood to functionally float on the distribution system with a common inlet / outlet. The vent on the tank roof was double screened with both large grid and fine mesh screening. The man-way access on the roof was an overlapping shoebox style hatch that projected a couple inches above the roof.

A transducer level sensor mounted inside the tank measures tank levels and controls the activation of the clearwell transfer pumps with conveyance of finished water from the clearwell. Typical drawdown in the tank is approximately three feet.

A video inspection report indicates divers inspected the tank in 2014 and confirmed seriously degraded conditions of major portions of the tank. The dive report recommends repair efforts include a complete surface blast and recoat after describing a total failure of the tank coating, interior rust grade zero (poor condition), exterior rust grade five (fair condition), a complete absence of interior roof coating, large rust nodules on wall and floor surfaces, major rust nodules at wall seams, cracks in the wall, ladder rung rust nodules, drain outlet nearly choked with rust nodules, large sheets of ceiling coating on the floor (one square foot sections, typical), approximately two to four inches of tank debris accumulation, and in general "absolutely horrible condition." In combination with the results of the previous dive inspection in 2009, it is evident that tank conditions are worsening and maintenance has not been performed.

Storage Tank #2

Original Construction Date: 2010 **Capacity**: 700,000 GAL
Type: Ground-Level Steel

Storage Tank #2 is located at an elevation of 2,261 feet west of Storage Tank #1. Finished floor elevation differences are approximately 210 feet above the water treatment plant and approximately 10 feet above Storage Tank #1. The storage tank site is located on land owned by the City with maintenance driveway access from the public roadway. The site is secured by perimeter security fencing.

The round welded-steel tank is 125.5 feet high, 31 feet in diameter, and features a crowned roof, three man-way hatches, a central roof vent, and an external overflow. The storage tank is understood to functionally float on the distribution system with a design for passive mixing. The overflow discharged into a constructed concrete vessel that featured a U-shaped, downturned air gap above the downstream conveyance pipe.

A transducer pressure sensor mounted in the tank discharge line measures tank levels and controls the activation of the upper zone transfer pumps for conveyance of finished water from Storage Tank #1. Typical drawdown in the tank is approximately one foot.

Passive mixing is accomplished by an engineered pipe configuration. The common inlet / outlet line branches into two lines, each with a check valve. The check valves are oriented so that inflows are directed into a vertical pipe segment inside the tank, and outflows are discharged from the bottom of the tank. It is important to note that isolation valves were not installed between the valve vault and the tank, and this will require a complete draining of stored water in order to maintain the valves.

At the time of inspection, the facility appeared to be newly constructed and in substantial conformance with the approved plans and specifications. The top of the storage tank was not accessed for inspection due to safety requirements for fall-restraint.

Storage Significant Deficiencies were noted at the time of inspection:

Proper protection shall be given to metal surfaces by paints or other protective coatings. The 2014 dive report indicates Storage Tank #1 is in poor condition with severe corrosion and a

complete failure of the interior tank coating. This condition is a defect in maintenance that meets the definition in Rule of a Significant Deficiency. Address the Significant Deficiency by demonstrating adequate structural integrity and compliance with storage tank requirements in the Rules. Consultation with a qualified coatings inspector and a structural engineer may be necessary. IDAPA 58.01.08(544)(15)

Storage recommendations were noted at the time of inspection:

Inspect the visible exterior features of storage facilities quarterly. Inspect interior features and clean the storage facilities every five years or more frequently as necessary. Utilize different inspection strategies to evaluate both below the water line and above the water line. Repair failed coatings, corroded surfaces, and other defects as they are identified. Remove sediment accumulations that may contribute to turbidity and chlorine residual demand.

Install isolation valves on Storage Tank #2 inlet / outlet lines so that check valves can be maintained without emptying the tank. Plan to complete this work at the next opportunity when the tank will be drained for other maintenance.

Repair or replace corroded hatch bolts on Storage Tank #2. Maintain coatings on exposed fasteners to prevent corrosion and preserve function.

PUMPS AND CONTROL FACILITIES

There are three basic mechanisms that maintain and control pressure in the water system:

1) Transfer pumps convey finished or stored water through distribution to storage tanks at elevated locations.
2) Storage tanks float on the distribution system and maintain adequate pressures from elevations above the service areas.
3) Pressure reducing valves reduce pressures from elevated storage and define transitions between distribution segments.

Lower Pressure Zone:

The Lower Pressure Zone is roughly the south half of the service area below Warren Street with one service south of the river to the mill. Finished water is conveyed by transfer pumps from the clearwell to services through the lower distribution system with eventual storage in Storage Tank #1. Storage Tank #1 supplies finished water to services in the Lower Pressure Zone when the clearwell pumps are inactive. Filter unit backwash water is also supplied from distribution and Storage Tank #1.

The Clearwell Transfer Pump Station #1 is located in the water treatment plant adjacent to the clearwell. Pump equipment consists of three lead-lag-lag alternating 125 hp centrifugal pumps rated for 1100 gpm each. The newest pump dates from 2012 when there were major revisions to the 12-inch intake and discharge manifolds that also features spools, check valves, and isolation valves. A discharge flow meter was relocated in 2012 to a vault outside the treatment plant, and

Control valves are maintained as needed by the city. Maintenance should conform to schedules as recommended by the manufacturer with complete records kept in the water system files of valve settings and repair details.

Pump and control recommendations were noted at the time of inspection:

In the event Storage Tank #2 is offline, develop a plan to ensure the Upper Zone Pump Station #2 can maintain adequate operating pressures in the upper zone as backup. Future population growth and demand for services may eventually exceed the current pump station's capacity to maintain adequate pressure if it is needed.

Repair or replace leaking reducer couplings in the Upper Zone Pump Station #2. Consider replacing the custom-manufactured couplings with standard commercial offerings while utilizing a spool to complete the spacing requirements.

DISTRIBUTION FACILITIES

The distribution system consists of over 100,000 lineal feet of 2-inch to 12-inch water main pipe. DEQ files indicate a portion of the distribution system was constructed with asbestos concrete pipe and other portions were constructed with ductile iron and C900 PVC pipe. Individual service connections are metered. There were no apparent automatic air / vacuum relief valves in distribution, but numerous fire hydrants were installed at both high and low points. Remaining dead-end distribution branch services terminate with flushing hydrants, and the distribution system has typically been flushed by public works staff at least annually. Valves in distribution are exercised annually on a rotating basis.

The 2007 Water System Master Plan and Amendments identified areas of primary and secondary concern regarding insufficient system pressure and insufficient fire flows. Improvements were identified to increase water main size within backbone areas (primary) and to increase efficiencies by looping mains and eliminating dead ends (secondary). A number of water main replacement and extension projects have been completed.

MONITORING, REPORTING, AND DATA VERIFICATION

Monitoring Schedule

This water system is classified as a Community public water system with a population of greater than 3,300. EPA's current standard monitoring framework is within the Third Cycle (2011-2019) and the 3rd Period (2017-2019).

Online tools for reviewing currently updated monitoring schedules are available for viewing on the web: *http://www.deq.idaho.gov/water-quality/drinking-water/pws-switchboard.aspx* Water systems are encouraged to review their monitoring schedules on a quarterly or annual basis.

years, and records of chemical analyses are to be kept for not less than ten years. The water system is advised to review all applicable statutes for additional requirements.

Monitoring Requirements were noted at the time of inspection:

An updated total coliform sample site plan is required to be developed and submitted to DEQ for review within 30 days of the date of this report. An RTCR Sample Site Plan template is available through the DEQ PWS Switchboard website at http://www.deq.idaho.gov/water-quality/drinking-water/revised-total-coliform-rule/. IDAPA 58.001.08(100)(01) and 40 CFR 141.853(a)

SYSTEM MANAGEMENT AND OPERATION

Fees

The City of Priest River currently bills water users for a variety of water services. Base monthly user fees are billed at $23.50 for in-city meters, with additional charges for use exceeding the base allotment of 12,000 gallons. Sewer monthly fees are billed separately.

The water system appears to be current with drinking water program fees paid annually to the Department.

Cross Connection Control Program

A Cross Connection Control (CCC) program is required by Department Rules to protect the water system against contamination and pollution from cross connections, and the public works department is actively performing all requirements. The following are minimum standards required of Community water systems per IDAPA 58.01.08(552)(06):

a) An inspection program to locate cross connections and determine suitable protection;
b) Installation and operation of adequate backflow prevention assemblies;
c) Annual inspections and testing of installed assemblies by a licensed tester;
d) Discontinue service where suitable protection is absent for a cross connection;
e) Repair, replace, or isolate failed or defective assemblies within ten business days.

The water system may find these measures to be helpful in keeping the CCC program actively implemented:

1) Train coordinators and operators to be familiar with Pacific Northwest Cross Connection Control Manual, American Water Works Association, University of Southern California, and Uniform Plumbing Code guidance documents;
2) Train coordinators and operators to understand backflow prevention measures and to properly determine adequate protections;
3) Conduct initial cross connection surveys of every property in the service area;
4) Follow up and act upon issues of non-compliance;
5) Maintain adequate records of all program activities and results;

Water system owners are responsible for ensuring that public drinking water systems are adequately supervised by properly licensed operators, and it is the Department's responsibility to provide oversight. The Idaho Bureau of Occupational Licenses (IBOL) is responsible for administering the system of licensure for public drinking water operators.

Department database records indicate John Griffin (license DWT4-17603) is the responsible charge operator for the treatment system and Patrick Reidt (license DWD2-16952) is the responsible charge operator for the distribution system. Robert Troxler (license DWT1-20064 and DWD1-20107) is another operator on record.

OTHER ELEMENTS

Source Water Assessment Report

Source Water Assessment describes the public drinking water wells, the well recharge zones, and potential contaminant sites located inside the recharge zone boundaries for a public water supply. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for the public water system. The *Priest River City of. (PWS# 1090107), Source Water Assessment Report was* completed by May 30, 2012 and updated August 11, 2016. The report contains information for the Pend Oreille River intake. The reports are available online at the following web address: http://www2.deq.idaho.gov/water/swaOnline/

Drinking Water Protection Plan

Source water protection (synonymous with the term drinking water protection) is a voluntary effort a community can implement to help prevent contamination of the source water that supplies its public water system. The drinking water protection plan outlines the management tools local committees can use to protect drinking water sources, and describes the implementation of regulatory and/or non-regulatory management practices. The Drinking Water Protection Plan builds upon the work completed in the Source Water Assessment.

1) Regulatory tools include items such as zoning ordinances, overlay districts, or site plan review requirements;
2) Non-regulatory tools include items such as educational or pollution prevention activities and implementation of Best Management Practices;
3) Every plan should also include a public education and information component.

Other recommendations were noted at the time of inspection:

1) Complete the Source Water Protection Plan in 2017 and certify it through the Department in 2018. This process will continue to provide protection of the source and may enhance the water system's qualification for some types of funding. Continue to work with John Jose at 208.666.4620 or john.jose@deq.idaho.gov to complete the process.

SIGNIFICANT DEFICIENCES:

Significant Deficiency: As identified during a sanitary survey, any defect in a system's design, operation, maintenance, or administration, as well as any failure or malfunction of any system component, that the Department (DEQ) or its agent determines to cause, or have potential to cause, risk to health or safety, or that could affect the reliable delivery of safe drinking water.

For Significant Deficiencies, the water system is required to:

1) Prepare a written Plan of Correction and meet with DEQ within 30 days of the report date;
2) Correct deficiencies within 120 days of the report date;
3) Submit documentation of corrections within 150 days of the report date;
4) If a deficiency cannot be corrected within 120 days, propose an alternate completion timeline.

Storage:

1) Proper protection shall be given to metal surfaces by paints or other protective coatings. The 2014 dive report indicates Storage Tank #1 is in poor condition with severe corrosion and a complete failure of the interior tank coating. This condition is a defect in maintenance that meets the definition in Rule of a Significant Deficiency. Address the Significant Deficiency by demonstrating adequate structural integrity and compliance with storage tank requirements in the Rules. Consultation with a qualified coatings inspector and a structural engineer may be necessary. IDAPA 58.01.08(544)(15)

End of Section: Significant Deficiencies

RULE REQUIREMENTS

Scope: The purpose of the Idaho Rules for Public Drinking Water Systems rules is to control and regulate the design, construction, operation, maintenance, and quality control of public drinking water systems to provide a degree of assurance that such systems are protected from contamination and maintained free from contaminants which may injure the health of the consumer.

For Rule Requirements, the water system is required to:

1) Prepare a written Plan of Correction and consult with the Department within 30 days of the report date.

Treatment:

1) Inspect sealant failure leaks in the corners of the clearwell and correct any known or potential cross connections that are discovered. Utilize materials certified to meet the standards of NSF 61 for repairs. Coordinate with consultants as necessary to determine repair and maintenance procedures.
2) Backflow prevention assemblies must be tested annually by a certified backflow assembly tester. The Wilkins 375 RPZ backflow assembly in the treatment plant was not labeled with current annual testing results. Address the requirement by confirming the testing was completed and adding the test information to the assembly certificates.
3) Install J-style nipple extensions and 24-mesh screens on manual air release valves.

4) Eliminate backwash settling pond discharge to the classified wetland. Contact Idaho Fish and Wildlife Office in Spokane, Washington (509-891-6839) within 30 days to determine regulations for discharge and potential restoration requirements to the wetland.

Monitoring:

1) An updated total coliform sample site plan is required to be developed and submitted to DEQ for review within 30 days of the date of this report. An RTCR Sample Site Plan template is available through the DEQ PWS Switchboard website at http://www.deq.idaho.gov/water-quality/drinking-water/revised-total-coliform-rule/. IDAPA 58.001.08(100)(01) and 40 CFR 141.853(a)

End of Section: Rule Requirements

RECOMMENDATIONS:

Source:

1) Evaluate the source of pump oil leaks around the top flange of the discharge header. Inspect the pump bearing and oil level reservoir for abnormal conditions.
2) Inspect the intake pump wet well on a regular basis and clean as necessary.

Treatment:

1) Determine coagulant chemical feed rates through dosing cylinder measurement and streaming current detector settings. Record chemical feed rates with notes on associated process performance through the change in seasons to determine historic trends for source water quality changes.
2) Clean biological growth from the upflow clarifier screens. Physical removal may be necessary. Consult with the manufacturer on best management practices to avoid screen damage and prevent recurrence.
3) Evaluate the fine tan-colored biological growth on the surface of the anthracite polishing filter media and determine if it has a detrimental effect on water quality, filter performance, or taste and odor. Consult with the manufacturer on best management practices to clean from the filter surface and prevent recurrence.
4) Address backwash settling pond deficiencies to provide maintenance access, improve site security, restore infiltration function, control weeds, and control discharge.
5) Conduct treatment optimization special studies to monitor media depth, media expansion during backwash, jar testing for alum dosing, filter rotation, rinse and backwash duration, etc. Utilize the information to automate processes and optimize plant performance for lower cost of operation and maximum plant performance.
6) Inspect interior features and clean the clearwell every five years or more frequently as necessary. Utilize different inspection strategies to evaluate both below the water line and above the water line. Repair failed coatings, corroded surfaces, and other defects as they are identified. Remove sediment accumulations that may contribute to turbidity and chlorine residual demand.

7) Re-route the clearwell emergency overflow discharge pipe away from the classified wetland and into the backwash settling pond complex. Avoid the potential for direct discharge of chlorinated water into the wetland.

Storage:

1) Inspect the visible exterior features of storage facilities quarterly. Inspect interior features and clean the storage facilities every five years or more frequently as necessary. Utilize different inspection strategies to evaluate both below the water line and above the water line. Repair failed coatings, corroded surfaces, and other defects as they are identified. Remove sediment accumulations that may contribute to turbidity and chlorine residual demand.
2) Install isolation valves on Storage Tank #2 inlet / outlet lines so that check valves can be maintained without emptying the tank. Plan to complete this work at the next opportunity when the tank will be drained for other maintenance.
3) Repair or replace corroded ground-level hatch bolts on Storage Tank #2. Maintain coatings on exposed fasteners to prevent corrosion and preserve function.

Pump and Controls:

1) In the event Storage Tank #2 is offline, develop a plan to ensure the Upper Zone Pump Station #2 can maintain adequate operating pressures in the upper zone as backup. Future population growth and demand for services may eventually exceed the current pump station's capacity to maintain adequate pressure if it is needed.
2) Repair or replace leaking reducer couplings in the Upper Zone Pump Station #2. Consider replacing the custom-manufactured couplings with standard commercial offerings while utilizing a spool to complete the spacing requirements.

Drinking Water Protection Plan:

1) Complete the Source Water Protection Plan in 2017 and certify it through the Department in 2018. This process will continue to provide protection of the source and may enhance the water system's qualification for some types of funding. Continue to work with John Jose at 208.666.4620 or john.jose@deq.idaho.gov to complete the process.

End of Section: Recommendations

APPENDIX B:

EXISTING 1 MILLION GALLON STEEL RESERVOIR EVALUATION

WELCH-COMER
ENGINEERS | SURVEYORS

WELCH-COMER
ENGINEERS | SURVEYORS

www.welchcomer.com
208-664-9382
877-815-5672 (toll free)
208-664-5946 (fax)
350 E. Kathleen Avenue
Coeur d'Alene, ID 83815

Memorandum

PROFESSIONAL ENGINEER LICENSED 11814 10/20/17 STATE OF IDAHO NECIA M MAIANI

TO:	ROBERT TROXLER, CITY OF PRIEST RIVER
FROM:	NECIA MAIANI, PE
PRJ. #:	44036
SUBJECT:	PRIEST RIVER 1 MILLION GALLON STEEL RESERVOIR EVALUATION
DATE:	OCTOBER 20, 2017
CC:	MAYOR JIM MARTIN, CITY OF PRIEST RIVER

The City authorized Welch Comer to lead a visual structural inspection of the roof of the City's 1 million gallon steel water storage facility. Staff had noted concerns of the condition of the roof and roof support beams. Welch Comer hired a structural engineering firm, Eclipse Engineering, to complete the visual inspection and provide recommendation options for remediation and replacement. The structural engineer's report is attached to this memo for review.

Background

Based on the nameplate, the facility was constructed in 1964 by General American Transportation Corporation. The storage facility is a welded steel structure measuring 32 feet tall and 74 feet in diameter. There are no available structure drawings for the facility, but the nameplate indicates that the facility was constructed per the AWWA code.

Summary of Inspection

As indicated in the attached report, the I-Beams supporting the roof structure are "structurally compromised" and need to be addressed.

The structural engineer was unable to complete a visual inspection of the walls due to the water level. Additionally, the foundation is not visible and was not inspected.

It is anticipated based on experience with storage facilities of this type/age, that there is likely not a concrete foundation/footing for this facility. We recommend that the City complete a pothole along the perimeter of the tank to confirm this.

Based on the visual inspection of the exterior of the tank, we anticipate that the walls and floor of the tank are likely not structurally compromised.

Options for Repair/Rehabilitation

The structural report provides potential options for repair/rehabilitation of the structure. We have provided a cost comparison of repair/rehabilitation options in Table 1 on the attached page based on discussions with a Steel Storage Rehab Contractor and recent storage facility pricing.

Table 1: Summary of Rehabilitation/Replacement Options

	Option 0: Do Nothing	Option 1: New Roof Structure	Option 2: Repair Roof Structure	Option 3: New Steel Tank	Option 4: New Concrete Tank
Description	Do Nothing	Remove the Existing Roof Structure and Build a New Roof with Steel Columns; Sandblast and Coat Interior and Exterior of Structure	Replace I Beams Supporting Existing Roof; Sandblast and Coat Interior and Exterior of Structure	Construct a New Tank (Steel)	Construct a New Tank (Concrete)
Discussion		It is suspected that the existing facility does not have footings that meet current standards. In this option the roof would be replaced with a support structure and foundation that meets code. The rest of the tank/foundation would not be addressed.	This option would be a true "band-aid". The existing I beams supporting the roof would be replaced. There would be no support structure/foundation installed for the roof or the remainder of the tank.	This option would include constructing a new storage facility next to the existing facility. Allowing the existing facility to stay on line until completion of the new tank.	This option would include constructing a new storage facility next to the existing facility. Allowing the existing facility to stay on line until completion of the new tank.
Additional Structure Analysis Required?	No	Yes-Complete exploratory excavation along the base of the storage facility to confirm presence of a footing. Inspect structure interior to confirm wall/floor thickness has not been compromised.	Yes-Complete exploratory excavation along the base of the storage facility to confirm presence of a footing. Inspect structure interior to confirm wall/floor thickness has not been compromised.	No	No
Estimated Cost of Additional Analysis/Inspection?	0	$5,000-$10,000	$5,000-$10,000	0	0
Preliminary Opinion of Probable Project Costs (for Budget Purposes Only)	0	$500,000	$250,000	$1,471,000	$1,525,000
Anticipated Useful Life Gained	0	10-20?	10-20?	Up to 100 years with Regular Maintenance: Cleanings and Coatings (if steel) every 20+/- years.	Up to 100 years with Regular Maintenance: Cleanings, Roof Sealant
Structure will Meet Current Code	No	?	?	Yes	Yes
Operational Disruption	0	4 months	3 months	None to Minimal (Only During Change Over)	None to Minimal (Only During Change Over)
Estimated Operating Cost Investment[1]	0				
Summary of Concerns	Failure of Roof is Imminent, Operations Hazard	The viability of this option is contingent upon the existence of an “adequate” footing.	The viability of this option is contingent upon the existence of an “adequate” footing.	Highest capital cost. Not as many local contractors to construct.	Highest capital cost. Current Construction Climate for local Contractors is not conducive to competitive bids.
Benefits		Mid-range cost and would provide for a stable roof structure.	Lowest cost that adds some additional life to the structure.	Eligible for funding assistance, Meets code, Longest Life, Minimal to No Operating Disruption	Eligible for funding assistance, Meets code, Longest Life, Minimal to No Operating Disruption

1. This is to be determined. We are in the process of evaluating a temporary/permanent operating alternative with the 1-million-gallon tank off line.

Next Steps

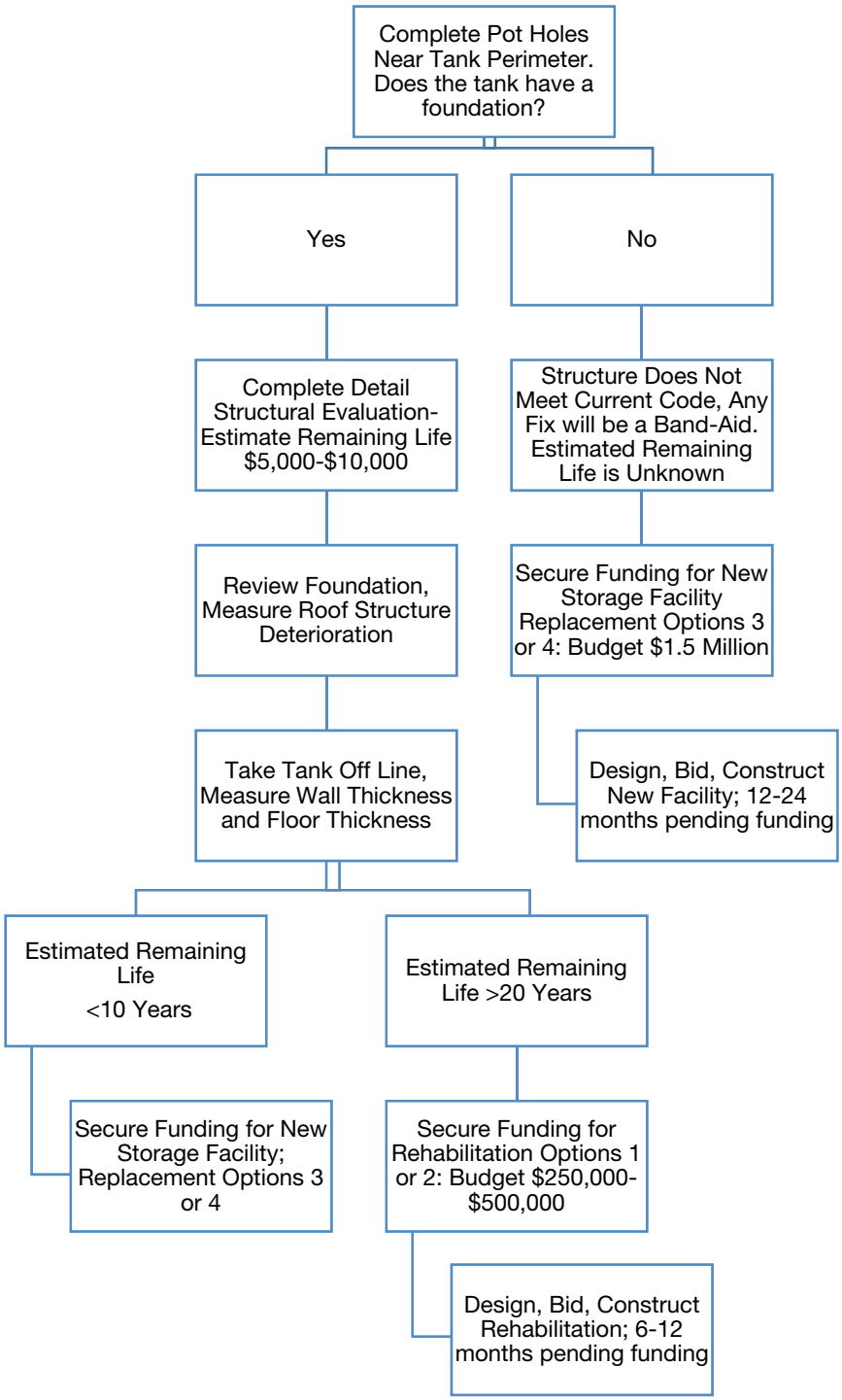
It is known that the roof structure requires rehabilitation. We do not know the condition of the foundation or walls. In order to determine the viability of Options 1 or 2, which are the lower cost, repair options, we recommend that the City complete a pothole at the perimeter of the structure to determine the presence of a foundation/footing.

If a footing is located, additional inspection/testing of the structure would be necessary to determine if repair Options 1 or 2 (Table 1), would add life to the structure and if the structure would meet current code.

If a footing is not located, the structure will not meet current codes/standards and thus any work to the tank would be viewed as a “band-aid” and we would be unable to provide any sort of accurate assessment of how much additional life could be expected of the structure. Additionally, repair of a structure that doesn’t meet current codes is likely to be ineligible for State/Federal funding/assistance. Thus, the recommended path would be full replacement.

We have outlined the recommended decision path in the following Figure 1.

Figure 1: Priest River Storage Facility Next Steps-Decision Path



Summary

In conclusion, based on the information we have, we know that the existing roof structure is structurally compromised. We cannot speculate as to how many days, months or years are left in the current roof structure as it sits. Considering this, our recommendation is that the City prioritize the development and implementation of an alternative operating plan (system operation without the 1 million gallon tank) should a partial or full failure of the roof before the structure can be replaced/rehabilitated.

It is noted that Welch Comer is currently in the process of developing two alternative operating options. Option 1 would be a very short-term operating plan (less than 1 month). Option 2 would be a longer term operating plan. This will be presented under separate cover.

Attachment 1: Eclipse Engineering Site Observation

October 16, 2017

Necia Maiani
Welch Comer
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815

Re: Priest River Water Reservoir
Priest River, ID

Necia,

Eclipse Engineering conducted a site observation of the Priest River Water Reservoir. The purpose of this site observation was to determine the structural integrity of the water tank and propose some options for remediation if necessary.

The reservoir was originally built in the 1964, and it is a steel reservoir with a rough diameter of 50 feet. The reservoir stands approximately 30 feet tall, and has a metal roof. The roof is constructed of a series of steel plates that are welded to each other all the way around each plate. The plates are supported by steel C shapes that are approximately 10 inches deep.

During the site observation, the following were noted:

1) There were creaking sounds coming from the roof while walking around the perimeter. It sounded similar to rust cracking.
2) Upon opening the roof hatch, it was immediately apparent that there was serious rust and degradation of the C shapes. Some of the C shapes had their flanges almost complete rusted through. See Figure 1
3) The liner of the tank was cracked all over the area that was visible.
4) The metal roof had a lot of rust and pieces of the liner flaking off. See Figure 2
5) The connection of the C shape to the tank wall had significant amounts of rust present. See Figure 3

Fig. 1

Fig. 2

Fig. 3

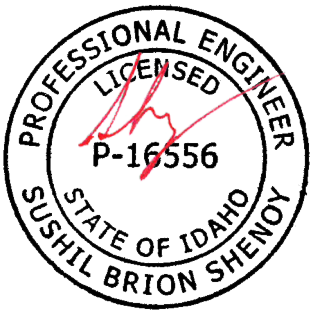
Based on our observations, it is our opinion that the roof of the tank is structurally compromised and in need of remediation. In our opinion, the following are options for remediation:

1) Remove the existing roof structure and build a new roof using new steel columns and framing members. This option will require the tank to be drained so the new columns can be placed on appropriate footings and to re-line the existing wall and new roof.
2) Remove the existing roof and reroof using the existing tank wall to support the new roof. This option would be dependent on the actual condition of the tank wall. The current condition of the wall was not visible at the time of the observation. The tank would need to be drained and the wall cleaned to determine if this is a viable option.
3) Abandon the current tank and replace it with a new one.

Eclipse performed a site observation of the above noted project, and our report is based on what was visible at the time of the observation. The water was too high to observe the condition of the tank of the wall, and the foundation of the tank was not visible. It should be noted that there was no information available about the foundation of the tank, and it is likely to have several structural deficiencies. The structural observation of the tank does not imply any sort of warranty about the condition of the tank, and its ability to resist the loads applied to it.

Sincerely,
Eclipse Engineering, Inc.

Sushil Shenoy, P.E.
Project Manager



APPENDIX C:

PUMP CURVES

WELCH-COMER
ENGINEERS | SURVEYORS

WTP Transfer Pumps

Pump Data Sheet - AURORA PUMPS

Company: Priest River WTF Transfer Pump
Name: J.R. Vaupell
Date: 1/5/2012

Series 413 vertical split case pumpw/ 15.0625" impeller to match existing pump (Ser

AURORA Pentair

Pump:

Size: 5x6x17

Type: 410 1 STG SPLIT CASE
Synch speed: 1800 rpm

Speed: 1775 rpm
Dia: 15.0625 in

Curve: 2PC-144788A

Impeller: 444A329

Specific Speeds:

Ns: 863
Nss: 5825

Dimensions:

Suction: 6 in
Discharge: 5 in

Pump Limits:

Temperature: 275 °F
Pressure: 250 psi g
Sphere size: 0.688 in

Power: —
Eye area: —

Search Criteria:

Flow: 1400 US gpm

Head: 230 ft

Fluid:

Water
SG: 1
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: —

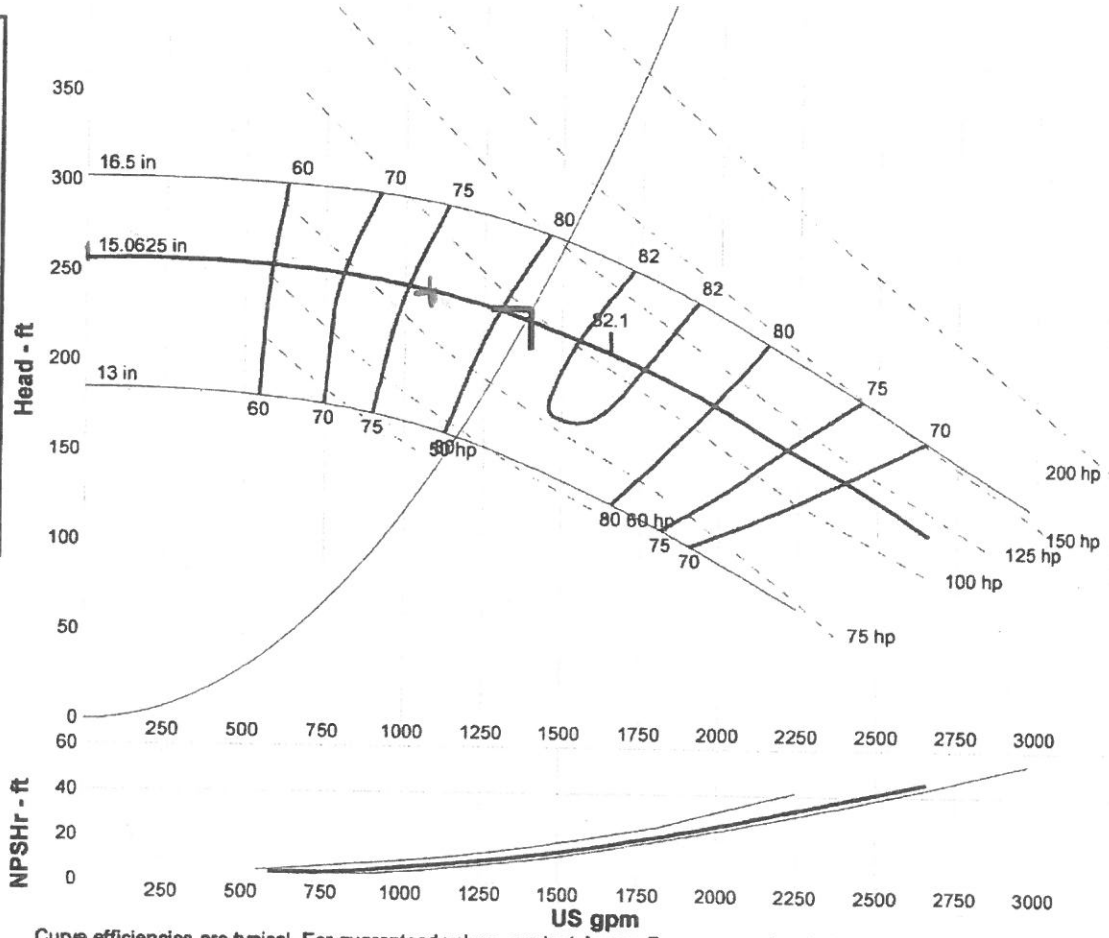
Motor:

Standard: NEMA
Enclosure: TEFC

Size: 100 hp
Speed: 1800
Frame: 405T

Sizing criteria: Design Point

— Data Point —	
Flow:	1400 US gpm
Head:	223 ft
Eff:	81%
Power:	97.3 hp
NPSHr:	12.3 ft
— Design Curve —	
Shutoff head:	256 ft
Shutoff dP:	111 psi
Min flow:	—
BEP:	82% @ 1652 US gpm
NOL power:	118 hp @ 2396 US gpm
-- Max Curve --	
Max power:	155 hp @ 2977 US gpm



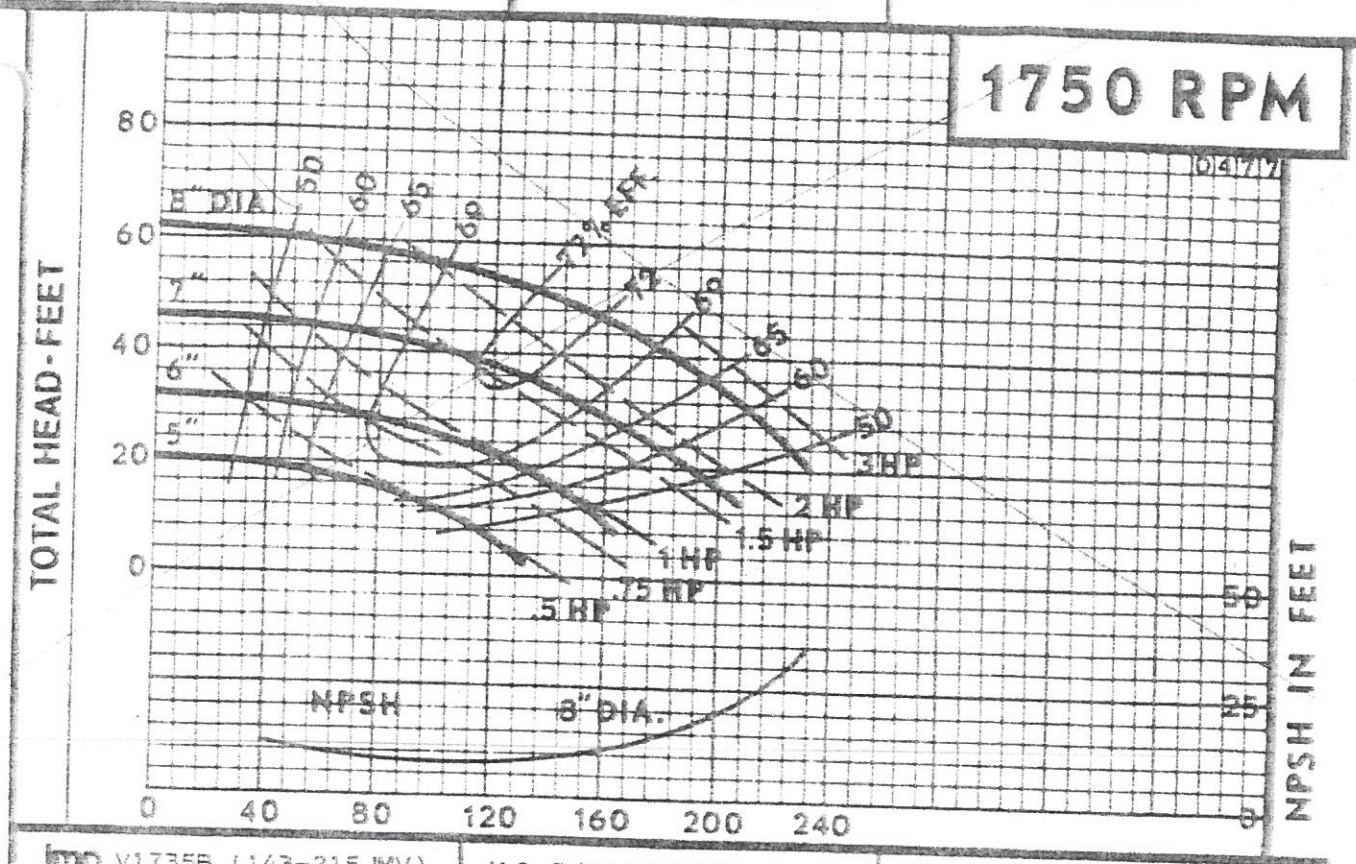
Curve efficiencies are typical. For guaranteed values, contact Aurora Pump or your local distributor. Las eficiencias en curvas son tipicas. Para valores garantizados contacte a Aurora Pump o a su distribuidor local.

Performance Evaluation:

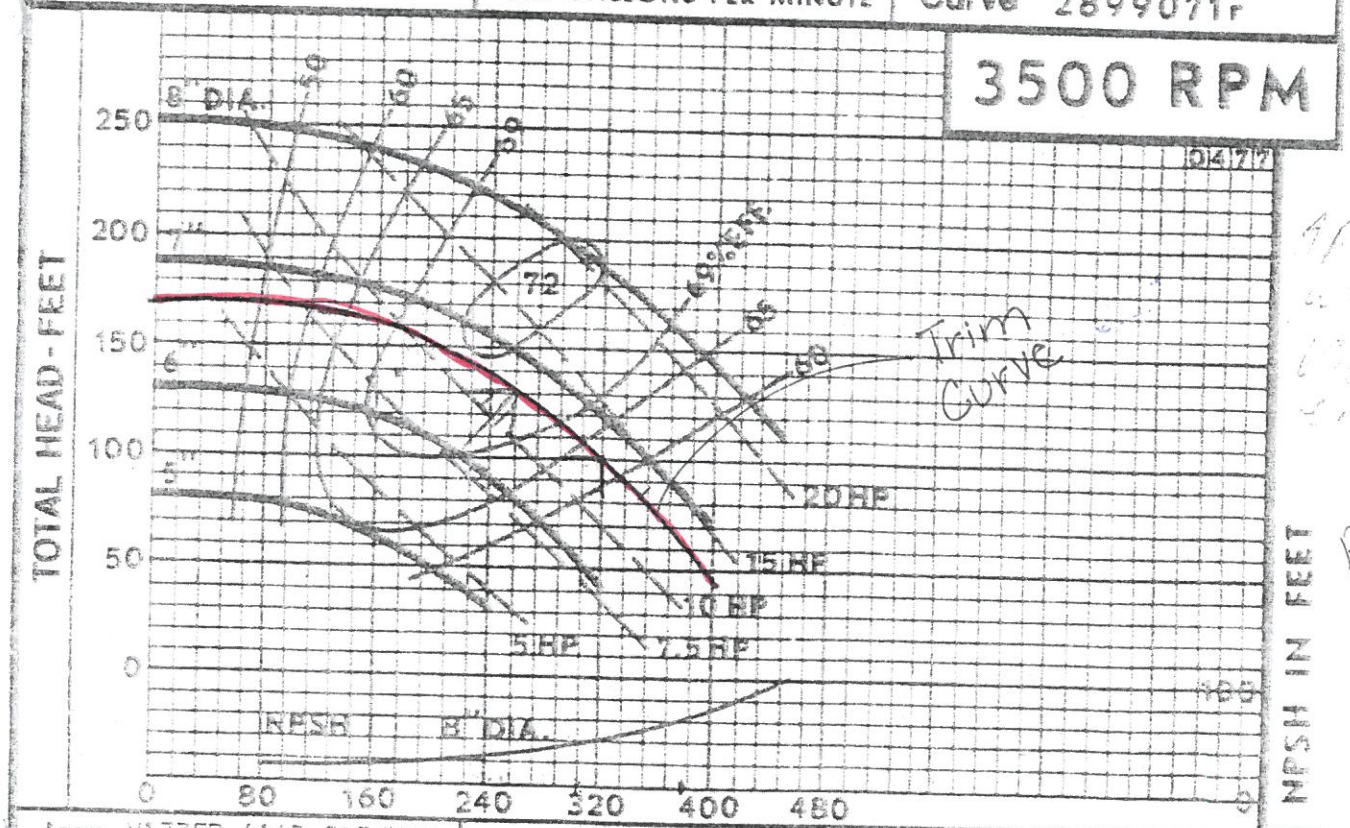
Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
1680	1775	204	82	105	17.9
1400	1775	223	81	97.3	12.3
1120	1775	238	77	87	8.22
840	1775	248	71	74.1	4.87
560	1775	253	59	61.1	4.05

Selected from catalog: Aurora Pumps.60 Vers: 4.2

SECTION 2240	INLINE PUMPS TYPE 2½x2½x8A	PEERLESS PUMP INDIANAPOLIS



Imp V1735B (143-215JMV) | U.S. GALLONS PER MINUTE | Curve 2899071r



Booster

Imp V1735B (143-215JMV) V3289B (254-256JMV) | U.S. GALLONS PER MINUTE | Curve 2897842r

CUSTOMER _____ JOB NAME Booster Station

P. O. NO. _____ ITEM NO. _____ S. O. NO. _____ SERIAL NO. _____

PUMP TYPE & SIZE _____ H.P. _____ RPM _____ G.P.M. _____ TOTAL HD. FT. _____

CERTIFIED FOR ☐ APPROVAL ☐ CONSTRUCTION

BY _____ DATE _____

APPENDIX D:

ENGINEERS OPINION OF PROBABLE PROJECT COST

WELCH-COMER
ENGINEERS | SURVEYORS

CITY OF PRIEST RIVER
440,000 GALLON RESERVOIR
ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Taylor Tompke	Date:	January 8, 2020		
Project Manager:	Necia Maiani, PE				
	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 100,000.00	$100,000
	Site Control	LS	1	$ 15,000.00	$15,000
	440,000 Steel Reservoir w/ Base	Gal	440000	$1.65	$726,000
	Site Piping	LS	1	$ 40,000.00	$40,000
	Demo Existing Tank	LS	1	$ 30,000.00	$30,000
	Site Prep / Grading / Excavation	LS	1	$ 25,000.00	$25,000
	Access Road	SY	1600	$ 10.00	$16,000
	Fencing	LF	400	$ 25.00	$10,000
	Overflow/Drainage Channel	LS	1	$ 30,000.00	$30,000
	Site Restoration	LS	1	$ 20,000.00	$20,000
	WTP Telemetry Panel & Generator	LS	1	$ 175,000.00	$175,000
	WTP Backwash Basin	LS	1	$ 80,000.00	$80,000
	Re-route Telemetry Controls	LS	1	$ 48,000.00	$48,000
	Wisconsin Waterline	LS	1	$ 66,000.00	$66,000
	Davis Bacon/AIS (4%)	LS	1	$ 56,000.00	$56,000
				Subtotal =	$ 1,437,000.00
				15% Contingency =	$216,000.00
				Total Estimated Construction =	$ 1,653,000.00
ADMIN/LEGAL, INTERIM FINANCING					
	Admin / Legal (2%)				$38,300.00
	Interim Financing (2.5%)				$47,900.00
ENGINEERING					
	Permitting, Environmental Services				$5,000.00
	Topographic Survey				$15,000.00
	Right or Way				$5,000.00
	Preliminary Design Phase Services				$15,000.00
	Design Phase Services				$68,000.00
	Geotechnical Subconsultant Materials Testing				$15,000.00
	Bidding Phase Services				$8,000.00
	Construction Admin				$70,000.00
	Construction Observation				$50,000.00
	Construction Staking				$8,000.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					$ 2,000,700.00

APPENDIX E:
CURRENT RATE RESOLUTION

WELCH-COMER
ENGINEERS | SURVEYORS

RESOLUTION NO. 16-052

A RESOLUTION OF THE CITY OF PRIEST RIVER, A MUNICIPAL CORPORATION OF IDAHO, AMENDING RESOLUTION 16-044, THE CURRENT WATER AND WASTEWATER UTILITY RATE SCHEDULE; EXPRESSING APPROVAL OF THE FOLLOWING RATE SCHEDULE OF FEES FOR THE WATER AND WASTEWATER UTILITIES; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, in accordance with City Code 8-2-5, the Priest River City Council has reviewed the current Rate Schedule, and;

WHEREAS, the City Council has determined that a comprehensive guideline detailing the City's utility improvement bond assessment policy should be part of the Rate Schedule, and;

WHEREAS the City Council has determined that basing equivalent residence ratings on plumbing fixture counts would, for certain classes of commercial occupancies, provide a more equitable method of determining user fees, and;

WHEREAS the City Council has determined that a water meter replacement fund is a necessary requirement to insure that all water meters are functional and accurate, and;

WHEREAS the City Council has determined that a rate increase for sewer base and overage is necessary to fund utility system operation and maintenance, and;

WHEREAS the City Council has determined that is it necessary to have an exception for sewer overages based on water usage for certain categories of commercial accounts based on the fact that accounts in those categories historically only have increased water usage in the summer months which corresponds with water usage for irrigation purposes, and;

WHEREAS, the City Council has determined this proposed Rate Schedule to be fair and equitable.

NOW, THEREFORE, BE IT RESOLVED, THAT the Rate Schedule for utility services is hereby amended and adopted as follows:

UTILITY SERVICE CHARGES:

Method Of Determining Water And Sewer Charges: Monthly base water and base sewer allotments and maintenance & operation charges shall be determined by occupancy classification from the UTILITY RATE TABLES contained herein. Occupancy classification shall be determined in accordance with the EQUIVALENT RESIDENCE TABLE FOR WATER AND SEWER CONNECTION FEE, WATER AND SEWER FACILITY FEE AND MONTHLY WATER AND SEWER USER FEE CALCULATIONS, Appendix A of this Rate Schedule (hereinafter "APPENDIX A").

Surcharge For Water And Sewer Use Outside The City Limits: There shall be a surcharge, as determined by the Council, to all water base unit charges, overage water charges, sewer base unit charges, sewer overage charges, fire hydrant meter consumption charges, and non-metered tank truck filling charges to all customers who are either located outside the city limits or are using the product of these services outside the city limits.

Senior Citizen Low Income Utility Service Charges Discount Program: City residents over the age of 65 are eligible for a discount of 10% of the base unit charge of the water and wastewater utility service charges of their personal residence providing they meet the following criteria:

1. The head of the household, or their spouse, is over the age of 65;

2. The total household annual income does not exceed seventeen thousand eight hundred twenty dollars ($17,820) (150% of the federal poverty level for a one person household);

3. The utility account is in the name of the applicant or their spouse;

4. They do not live in subsidized housing.

5. The utility account is within the City Limits.

In order to remain eligible for this discount program, an application, or reapplication, must be made every calendar year by April 1st. This discount applies to the base unit charge of the water and wastewater service charges only. Allowable water consumption under this discounted service charge is 12,000 gallons/month. Overage consumption charges will not be discounted. The discounted water and wastewater service base unit charges are in the UTILITY RATE TABLES contained herein.

SEWER OVERAGES- EXCEPTIONS

Specific categories of commercial accounts, denoted in Appendix A, shall not be charged for sewer overages based on water usage. This is exception will be reviewed annually to ensure that it is necessary. The exception is applied to commercial accounts with sewer overages, which currently and historically only have sewer overages during the summer months due to increased water usage for irrigation purposes.

WATER EVAPORATION ALLOWANCE FOR COIN LAUNDRIES:

Commercial coin laundry operators shall be granted a 5% Water Evaporation Allowance on the monthly sewer base unit charge.

UTILITY CONNECTION FEES:

Water Service Connection Fees--Water service connection fees shall be determined by either the water meter size or the Equivalent Residences (ER) deemed appropriate as calculated from APPENDIX A, whichever is the greater. Water service connections fees determined on an ER calculation shall be the ER total times three thousand dollars ($3,000) per ER. In the case of a partial ER, i.e. 3.65, the number of ER's calculated shall be rounded up to the nearest half unit, i.e. 4.00. Water service connection fees determined by water meter size are as follows:

WATER SERVICE CONNECTION FEE TABLE

WATER METER SIZE	WATER SERVICE CONNECTION FEE
5/8" x ¾"	$3,000
1"	$4,500
1 ½"	$6,000
2"	$9,000
3"	$21,000
4"	$60,000
6"	$108,000
8"	$198,000

Water service connection fees for out-of-city applicants shall be one hundred thirty-three percent (133%) of the calculated in-city water service connection fee.

Fire Service Connection Fees--Fire service connection fees are based on the fire service line size. The fee for fire service connections shall be as follows:

FIRE SERVICE SIZE	CONNECTION FEE
2″	$900.00
3″	$2,100.00
4″	$6,000.00
6″	$10,800.00
8″	$19,800.00

All fire service lines must be equipped with an approved backflow prevention device in accordance with City Code 8-6. The City does not perform fire service connections larger than 2″. For fire service connections 2″ and smaller, the installation fee shall be the same as detailed in the Water Service Installation Charge section.

Irrigation-Only Water Service Connection Fees—Irrigation-only service connections are considered surplus-only connections and, as such, pose minimal demand on the water system. The City may, at any time deemed necessary, discontinue service to irrigation-only services. Irrigation-only water service connections are only available as secondary lines and will not be installed as a primary water connection for any lot. The connection fee for secondary irrigation-only water service connections shall be $1,000.00. Water facility fees will be charged if applicable. The user fee for irrigation-only water services is found in the UTILITY RATE TABLES contained herein. Irrigation-only services shall be protected from backflow in accordance with Title 8-6 of the City Code. Irrigation-only service accounts are not subject to bond payments.

Sewer Service Connection Fees--Sewer service connection fees are based on the number of Equivalent Residences (ER) deemed appropriate for the occupancy. APPENDIX A shall be used to determine to appropriate ER for a sewer connection fee determination. The sewer connection fee shall be the ER total times four thousand five hundred dollars ($4,500). In the case of a partial ER, i.e. 3.65, the number of ER's calculated shall be rounded up to the nearest half unit, i.e. 4.00. Sewer service connection fees for out-of-city applicants shall be one hundred thirty-three percent (133%) of the calculated in-city sewer service connection fee.

Sewer Lateral Backflow Valve Installations: When a property owner retrofits an existing sewer lateral line with a backflow valve, the City shall supply the check valve and associated parts. The City shall also rebate to the property owner an amount not to exceed two hundred-fifty dollars ($250.00) for the installation of the valve upon presentation of a paid backflow valve installation bill to the City Clerk.

BOND PAYMENTS:

COMMERCIAL AND MULTI-UNIT COMMERCIAL:

A full assessment for all legally enacted water utility improvement bonds shall be assessed against each commercial and multi-unit commercial utility account receiving water utility service. A full assessment for all legally enacted sewer utility improvement bonds shall be assessed against each commercial and multi-unit commercial utility account receiving sewer utility service.

SINGLE-FAMILY RESIDENTIAL:

A full assessment for all legally enacted water utility improvement bonds shall be assessed against each single-family residential utility account receiving water utility service.

A full assessment for all legally enacted sewer utility improvement bonds shall be assessed against each single-family residential utility account receiving sewer utility service.

MULTI-FAMILY RESIDENTIAL:

A seventy-five percent (75%) assessment for all legally enacted water utility improvement bonds shall be assessed against each unit of a multi-family residential utility account receiving water utility service.

A seventy-five percent (75%) assessment for all legally enacted sewer utility improvement bonds shall be assessed against each unit of a multi-family residential utility account receiving sewer utility service.

WATER SERVICE INSTALLATION FEE:
If an applicant chooses to have the City install a water service connection, a deposit equal to the City's estimate of the cost of the service lateral and meter installation will be required of the applicant before the water service connection is installed. If the actual cost of such connection is in excess of the deposit, the applicant will be billed and shall pay for the difference. If the actual cost is less than the deposit, the applicant will be refunded the difference. Installation cost shall be based on the cost of installation as established by the City. Said charges shall be available for inspection at the City Clerk's office. The City does not perform the installation of water services larger than 2". A water service installation fee shall include all of the material and labor necessary to install a water service and meter from the city water main line to the applicant's property line.

SERVICE INSTALLATION DEPOSIT:
There shall be a deposit required for all water and sewer service installations performed within a City right-of-way except for water and sewer service installations performed in developments not yet accepted by the City. Such deposit shall warranty compaction and any necessary asphalt repairs and the amount shall be one thousand dollars and zero cents ($1,000.00) for each water and sewer service installation. Such deposit shall be refunded to the applicant if compaction and any necessary asphalt repairs are completed to the satisfaction of the City. If compaction and any necessary asphalt repairs are not completed to the satisfaction of the City, the City will have the compaction and any necessary asphalt repairs completed and shall deduct such costs from the deposited amount. The remainder shall be refunded to the applicant. If the amount of the deposit does not compensate for the cost of compaction and any necessary asphalt repairs, the City shall bill the applicant for the remainder. If the remaining amount is not paid, the City shall discontinue water service until such remaining amount is paid in full.

WATER METER REPLACEMENT FEE:
Each utility account utilizing City water service shall be charged a Water Meter Replacement Fee. Such fee shall be determined by the size of the water meter and in accordance with the Water Meter Replacement Fee table found in the UTILITY RATE TABLES contained herein.

MISCELLANEOUS CHARGES:
Water Service Size Increase/Reduction Requests: For water service connection size increase requests, the cost shall be determined from the water service connection fee table above. The applicant shall also be charged the difference between the sewer connection fee for the smaller service and the sewer connection fee for the larger service. The installation charge shall be the actual cost incurred by the city.

For water meter size reduction requests, the charge shall be the actual cost incurred by the city. Credit shall be given for the salvage of the old meter except that no credit shall be given for meters in excess of two (2) years old or for meters that are determined by the city to be damaged beyond salvage.

Fire Hydrant Meter Rental Charges: The charge for a fire hydrant meter rental shall be twenty-five dollars ($25.00) per month. There is also a fire hydrant meter setting charge of fifteen dollars ($15.00) for each time the fire hydrant meter is set or moved. The city may also charge a refundable fire hydrant meter and fire hydrant damage deposit of three hundred dollars ($300.00) for each fire hydrant meter rented. Such deposit shall be refunded upon inspection by the city of the fire hydrant used and payment in full of all water service charges and any damages to the fire hydrant and fire hydrant meter.

Fire Hydrant Meter Consumption Charge: The charge for water metered through a fire hydrant shall be three dollars ten cents ($3.10) per one thousand (1,000) gallons for water used inside the city limits and four dollars forty cents ($4.40) per one thousand (1,000) gallons and for water used outside the city limits.

Non-metered Tank Truck Filling Charge: The non-metered tank truck filling charge shall be three dollars ten cents ($3.10) per one thousand (1,000) gallons for water used inside the city limits and four dollars forty cents ($4.40) per one thousand (1,000) gallons and for water used outside the city limits. Tank trucks filling

from non-metered fire hydrants shall be of a proven capacity and all tank loads shall be recorded on a tank load tally card supplied by the city. The city may also charge a refundable fire hydrant damage deposit of three hundred dollars ($300.00). Such deposit shall be refunded upon inspection by the city of the fire hydrant used and payment in full of all water service charges and any damages to the fire hydrant.

Emergency Water Service Turn Off/Turn On Charge: There is no charge for one emergency water service turn off/turn on per calendar year. For all other emergency water service turn off/turn ons in the same calendar year, the charge for each emergency water service turn off/turn on shall be fifteen dollars ($15.00) each during normal working hours. The charge for after hours and weekend emergency water service turn off/turn on shall be twenty-five dollars zero cents ($25.00).

Seasonal Water Service Turn Off/Turn On: The charge for seasonal or short-term non-emergency water service turn off/turn on made during normal working hours shall be twenty-five dollars ($25.00) per occurrence. The charge for after hours and weekend seasonal or short-term water service turn-off/turn-on shall be thirty-seven dollars fifty cents ($37.50) per occurrence. Each turn-off or turn-on shall constitute one occurrence.

Late Fee Assessment: A charge of five dollars ($5.00) will be assessed to all utility accounts that are not paid in full by the 15th of each month. This charge will be assessed at 5:00 pm on the 15th due date.

Twenty-Four Hour Turn-Off Notice Delivery Charge: The charge for delivery of a twenty-four (24) hour turn off notice shall be thirty-five dollars ($35.00).

Water Service Recontinuation Fee: The charge for water service recontinuation shall be twenty-five dollars ($25.00) if water service has been discontinued in accordance with section 8-1-4 of the City Code. Water service recontinuation will be performed between the hours of seven thirty o'clock (7:30) A.M. and three thirty o'clock (3:30) P.M. on regular workdays only.

PASSED and APPROVED this 19 day of SEPTEMBER, 2016. This rate schedule amendment shall become effective on the 1st day of October, 2016.

Councilmember George	AYE	Councilmember Connolly	AYE
Councilmember Edwards	ABSENT	Councilmember Wagner	AYE

Signed:

James L. Martin
Mayor

Attest:

Laurel Knoles, CMC
City Clerk/Treasurer

UTILITY RATE TABLES

SINGLE FAMILY RESIDENTIAL	MONTHLY WATER ALLOTMENT	MINIMUM MONTHLY WATER M&O CHARGE*	WATER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT	MINIMUM MONTHLY SEWER M&O CHARGE**	SEWER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT
IN CITY	12,000 GALLONS	$23.50	$3.10	$29.00	NONE
SENIOR CITIZENS		$21.15	$3.10	$26.10	
OUT OF CITY		$31.25	$4.10	$36.70	

MULTI-FAMILY RESIDENTIAL	MONTHLY WATER ALLOTMENT	MINIMUM MONTHLY WATER M&O CHARGE*	WATER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT	MINIMUM MONTHLY SEWER M&O CHARGE**	SEWER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT
IN CITY	9,000 GAL/UNIT	$17.65/UNIT	$3.10	$21.75/UNIT	$3.70
OUT OF CITY		$23.50/UNIT	$4.10	$27.53/UNIT	$4.95

IRRIGATION	MONTHLY WATER ALLOTMENT	MINIMUM MONTHLY WATER M&O CHARGE	WATER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT
IN CITY	12,000 GALLONS	$23.50	$3.10
OUT OF CITY		$31.25	$4.10

COMMERCIAL***	MONTHLY WATER & SEWER ALLOTMENT	MINIMUM MONTHLY WATER M&O CHARGE*	WATER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT	MINIMUM MONTHLY SEWER M&O CHARGE**	SEWER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT
IN CITY	12,000 GAL/ER (AS DETERMINED FROM APPENDIX A)	$23.50/ER (AS DETERMINED FROM APPENDIX A)	$3.10	$29.00/ER (AS DETERMINED FROM APPENDIX A)	$3.70****
OUT OF CITY		$31.25/ER (AS DETERMINED FROM APPENDIX A)	$4.10	$36.70/ER (AS DETERMINED FROM APPENDIX A)	$4.95****

*--PLUS $17.82/MONTH/UNIT FOR 2008 WATER IMPROVEMENT BOND

**--PLUS $7.90/MONTH/UNIT FOR 2001 SEWER IMPROVEMENT BOND AND PLUS $10.60/MONTH/UNIT FOR 2016 SEWER IMPROVEMENT BOND

***--ALL OCCUPANCIES NOT CLASSIFIED AS SINGLE-FAMILY RESIDENTIAL OR MULTI-UNIT RESIDENTIAL OR MULTI-UNIT COMMERCIAL OR INDUSTRIAL SHALL BE CLASSIFIED AS COMMERCIAL

****--BANKS, CHURCHES AND LIBRARIES SHALL NOT BE CHARGED SEWER OVERAGE BASED ON WATER USAGE

UTILITY RATE TABLES (CON'T)

MULTI UNIT COMMERCIAL	MONTHLY WATER & SEWER ALLOTMENT	MINIMUM MONTHLY WATER M&O CHARGE*	WATER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT	MINIMUM MONTHLY SEWER M&O CHARGE**	SEWER OVERAGE CHARGE PER 1,000 GAL OVER ALLOTMENT
IN CITY	12,000 GAL/ER	$23.50/ER	$3.10	$29.00/ER	$3.70
OUT OF CITY		$31.25/ER	$4.10	$36.70/ER	$4.95

WATER METER REPLACEMENT FEE TABLE

WATER METER SIZE	MONTHLY WATER METER REPLACEMENT FEE
5/8 X ¾, ¾ OR 1	$1.00
1 ½	$2.00
2	$3.20
3	$7.00
4	$15.00
6	$30.00
8	$45.00

*--PLUS $17.82/MONTH/UNIT FOR 2008 WATER IMPROVEMENT BOND

**--PLUS $7.90/MONTH/UNIT FOR 2001 SEWER IMPROVEMENT BOND AND PLUS $10.60/MONTH/UNIT FOR 2016 SEWER IMPROVEMENT BOND

***--ALL OCCUPANCIES NOT CLASSIFIED AS SINGLE-FAMILY RESIDENTIAL OR MULTI-UNIT RESIDENTIAL OR MULTI-UNIT COMMERCIAL SHALL BE CLASSIFIED AS COMMERCIAL

****--BANKS, CHURCHES AND LIBRARIES SHALL NOT BE CHARGED SEWER OVERAGE BASED ON WATER USAGE

APPENDIX A

EQUIVALENT RESIDENCE TABLE FOR WATER AND SEWER CONNECTION FEE, WATER AND SEWER FACILITY FEE AND MONTHLY WATER AND SEWER USER FEE CALCULATIONS		
OCCUPANCY	UNIT OF MEASURE	ER PER UNIT
Automotive Repair & Maintenance Store	By Fixture Unit count	1.0 ER/25 FU*
Bank	By Fixture Unit count	1.0 ER/25 FU**
Bar/Tavern/Cocktail Lounge	Per 10 Seats	0.25
Barber/Beauty Shop	Per Operator Station	0.50
Business office	By Fixture Unit count	1.0 ER/25 FU*
Car Wash--Automatic	Per Bay	2.00
Car Wash--Hand-held wand	Per Bay	1.00
Church (Rectories or other living areas are additional)	Per 100 Seats	1.00**
Convenience Store-with or without gas pump	By Fixture Unit count	1.0 ER/25 FU*
Day Care, Pre-School (Counted in addition to any other use the day care or preschool facility is housed in)	Per 10 Students and Staff	0.25
Nursing Home and Extended Care Facility	Per Bed	0.50
Fitness Center	By Fixture Count	1.0 ER/25 FU*
Grocery store	By Fixture Unit count	1.0 ER/25 FU*
Hospital	Per Bed	0.60
Laundromat/Self Service	Per Machine	0.33
Library	By Fixture Unit count	1.0 ER/25 FU**
Medical or Dental office	Per Doctor or Dentist	1.00
Mobile home park	Per Unit	0.75
Motel, Hotel, Rooming House-with efficiency	Per Room	0.50
Motel, Hotel, Rooming House-without efficiency	Per Room	0.15
Multi-Unit Commercial Property (with a shared meter)	Per Unit	0.50
Residence--Apartment or Condominium	Per Unit	0.75
Residence--Duplex	Per Unit	0.75
Residence--Single Family	Per Unit	1.00
Restaurant/Cafeteria	Per 10 Seats	0.25
Restaurant-Fast Food	Per Seat	0.05
Retail Sales Store	By Fixture Unit count	1.0 ER/25 FU*
RV Park or Campground with water hookups and shower facilities	Per Space	0.25
RV Park or Campground with water hookups but without shower facilities	Per Space	0.15
School--Without Gym and Without Cafeteria	Per 50 Student and Staff	1.00
School--Without Gym and With Cafeteria or With Gym and Without Cafeteria	Per 30 Students and Staff	1.00
School--With Gym and Cafeteria	Per 25 Students and Staff	1.00
Service Station--Without Convenience Store	Per Restroom Toilet	0.25
Theater	Per 25 Seats	0.25
Industrial--With showers. Use 0.115/employee for building portion & Restaurant/Cafeteria for any food service portion. Industrial flows will have the ER determined by Fixture Unit count. 1.0 ER/25 FU		
Industrial--Without showers. Use 0.050/employee for building portion & Restaurant/Cafeteria for any food service portion. Industrial flows will have the ER determined by Fixture Unit count. 1.0 ER/25 FU		
Warehouse/Office--Use 0.1 ER for warehouse portion, Business Office for office portion, Retail Store for any retail portion & Restaurant/Cafeteria for any food service portion		
Miscellaneous--Any sewer use that cannot be classified in one of the above classes shall have its ER computed on an individual basis by the City		
*-- Fixture Units increments shall be 1-13 = 0.50 ER, 14-25 = 1.0 ER, etc.		
**--Banks, churches, and libraries shall not be charged for sewer overages based on water usage.		

APPENDIX F:

FIRE FLOW REQUIREMENT LETTER

WELCH-COMER
ENGINEERS | SURVEYORS

West Pend Oreille Fire District
P.0. Box 1267
Priest River ID 83856
Phone and Fax 1-208-448-2035

April 8, 2009

Ms. Karen Osterdock, EIT
Welch-Comer Engineers
kosterdock@welchcomer.com

Re: Fire Flow Requirements
City of Priest River, ID

Dear Ms. Osterdock,

Chief Kokanos and I have reviewed the fire flow requirements for the City of Priest River and have identified the following structures that have the largest fire flow requirements.

1. Safety Line, located in the industrial park is a timber frame structure that is not sprinklered and requires a fire flow of 3500 gpm for 3 hours.
2. The Beardmore building located 1 block west of city hall has a fire flow of 3200 gpm for 3 hours.
3. The High School on Highway 57 has a fire flow of 2750 for 2 hours.
4. The elementary school has a fire flow of 1750 gpm for 2 hours.

Residential flows in the city should be considered at a minimum of 1000 gpm. We are seeing a lot of multi-family and multi-unit housing development that requires fire flows greater than 1000 gpm in many of the newly developing areas of the city.

Please feel free to contact us at any time if you have questions.

Sincerely,

Bob Hatfield
Assistant Chief

APPENDIX G:
STORAGE CALCULATIONS

WELCH-COMER
ENGINEERS | SURVEYORS

2009 Letter from Fire Chief (MP Add. 2):

EDUs in 2038: 1,589

% of Total: 20% 80%

	Flow Rate (gpm)	Duration (min)	Volume (gal)	Zone
Safety Line	3500	180	630,000	Upper
Beardmore Bldg	3200	180	576,000	Lower
High School	2750	120	330,000	Upper
Elementary School	1750	120	210,000	Lower

2038 Total System ADD (gpm)	MDD (gpm)	PHD (gpm)	2038 Upper Zone ADD (gpm)	MDD (gpm)	PHD (gpm)	2038 Lower Zone ADD (gpm)	MDD (gpm)	PHD (gpm)
318	921	1,621	64	184	324	254	736	1297

1.020605 gpm/EDU

	Lower Zone	Whole System
2017	929.6	1,162
2018	944	1179
2019	958	1197
2020	972	1215
2021	987	1233
2022	1001	1252
2023	1016	1271
2024	1032	1290
2025	1047	1309
2026	1063	1329
2027	1079	1349
2028	1095	1369
2029	1111	1389
2030	1128	1410
2031	1145	1431
2032	1162	1453
2033	1180	1475
2034	1197	1497
2035	1215	1519
2036	1234	1542
2037	1252	1565
2038	1271	1589
2039	1290	1612
2040	1309	1637
2041	1329	1661
2042	1349	1686
2043	1369	1711
2044	1390	1737
2045	1410	1763
2046	1432	1789
2047	1453	1816
2048	1475	1844
2049	1497	1871
2050	1519	1899
2051	1542	1928
2052	1565	1957
2053	1589	1986
2054	1613	2016
2055	1637	2046
2056	1661	2077
2057	1686	2108
2058	1712	2140

No Generator at WTP:

Existing Site Storage Option:

Based on 2038 Demands:

PHD:	1621.252223	gpm	whole system
Finished Water Pumps:			
1	1050	gpm	
2	1050	gpm	
3	1050	gpm	
Total:	3150	gpm	
Total, largest down:	2100	gpm	
Raw Water Pumps:			
1	2100	gpm	
2	2100	gpm	
Total:	4200	gpm	
Total, Largest down:	2100	gpm	
WTP Filter Capacity:			
1	700	gpm	
2	700	gpm	
3	700	gpm	
4	700	gpm	
Total:	2800	gpm	
Total, largest down:	2100	gpm	
ES:	**0**	**gal**	PHD is less than pump capacity with largest down
ADD:	254	gpm	Lower Zone
SB:	**121,920**	**gallons**	assuming no WTP generator
OS:	1	foot	assumed 17417.14
Height for SB:	7	feet	
Gallons per VF Needed:	17,417	gal	
Diameter:	55	feet	
Volume per VF:	17,771	gal	
Height above 40 psi:	8	feet	
Volume above 40 psi:	142,170	gal	139,337
Height base to 40 psi:	22	feet	base is above 20 psi line
Volume base to 40 psi:	390,966	gal	
Total Volume:	**533,136**	**gal**	

No Generator at WTP (calc continued):

FSS Available (gallons)	Fire Flow from FSS (gpm)	Fire Flow Req'd from Pumps (gpm)	2038 MDD (gpm)	Total Flow Req'd from Pumps (gpm)	Pump Capacity with Largest Offline (gpm)	Pump Capacity Surplus (gpm)
393,445	2186	1014	920.5411	1935	2100	165

FSS Available:	393,445	gal	
Lower Zone Fire Flow:	3200	gpm	
Duration:	180	min	
FF Provided by Storage:	2186	gpm	
Deficit:	1014	gpm	
MDD:	921	gpm	
Total Flow Req'd from Pumps:	1935	gpm	
Finished Water Pump Capacity:	2100	gpm	per IDAPA, pumps have to provide fire flow with largest pump down
Surplus:	165	gpm	

Generator at WTP:

ES:	**0**	**gal**	PHD is less than pump capacity with largest down
SB:	**0**	**gallons**	WTP at generator: ADD can be supplied
Lower Zone FF:	3,200	gpm	
Duration:	180	min	
Finished Water Pump Capacity:	2100	gpm	per IDAPA, pumps have to provide fire flow plus MDD with largest pump down
MDD:	920.5410684	gpm	

Pump Capacity with Largest Offline (gpm)	2038 MDD (gpm)	Pump Capacity Available for Fire Flow (gpm)	Fire Flow Req'd from FSS (gpm)	FSS Required (gallons)	
2100	920.5411	1179.459	2,021	363,697	

Pump Capacity Avail. For FF:	1179.458932	gpm	
Flow needed from Storage:	2,021	gpm	
FSS Needed:	**363,697**	**gal**	This is the minimum
OS:	1	foot	assumed
Height for FSS:	29	feet	
Diameter:	47	feet	
Volume for FSS:	376,344	gal	12977.39 gal/VF
Total Volume:	**389,322**	**gal**	376,675

Existing Site

	No WTP Generator	WTP Generator	440,000 Gallons & No Generator	440,000 Gallons with WTP Generator
Operating Storage (gallons)	17,771	12,977	14,687	14,687
Equalizing Storage (gallons)	0	0	0	7,808
Standby Storage (gallons)	121,920	0	96,616	0
Fire Suppression Storage (gallons)	393,445	376,344	329,305	418,114
Finished Water Pump Capacity Relied Upon (gpm)	1,935	1,179	1,371	878
Tank Diameter (feet)	55	47	50	50
Total Storage (gallons)	**533,136**	**389,322**	**440,608**	**440,608**
Total EDUs Supported (whole system)	1,589	1,589	1,258	2,108
Total EDUs Supported (Lower Zone)	1,271	1,271	1,006	1,686
Associated Year	2038	2038	2023	2057

680

2020 assumed year of construction
50 assumed life

2070 last year of "life"

WTP Site

	WTP Generator	440,000 Gallons with WTP Generator
Operating Storage (gallons)	12,977	14,687
Equalizing Storage (gallons)	0	0
Standby Storage (gallons)	0	0
Fire Suppression Storage (gallons)	376,344	425,921
Finished Water Pump Capacity Relied Upon (gpm)	1,179	908
Tank Diameter (feet)	47	50
Total Storage (gallons)	**389,322**	**440,608**
Total EDUs Supported (whole system)	1,589	2,057
Total EDUs Supported (Lower Zone)	1,271	1,646
Associated Year	2038	2050

Back Into 440k Gallons, No Generator:

Total "Fundable" Volume:	440000	gallons		
Diameter:	50	feet		
Total Height:	30	feet	14686.94566	gal/VF
Volume:	440,608	gallons		
OS:	1	foot	assumed	
Height Avail. For SB:	7	feet		
Volume:	102,809	gallons		
ADD:	288	gpd/EDU		
SB per EDU:	96	gal/EDU		
Total EDU Capacity:	1070	EDUs	1338	EDUs on whole system
Current EDUs on Low Zone:	930	EDUs	2017	
Annual Growth Rate:	1.5%			
Height Avail. For FSS:	22	feet		
Volume:	323,113	gallons		
Lower Zone Fire Flow:	3200	gpm		
FF Duration:	180	min		
FF from FSS:	1795	gpm		
FF needed from Pumps:	1,405	gpm		
per IDAPA, pumps have to provide fire flow plus MDD with largest pump down				
Finished Water Pump Capacity:	2100	gpm		
MDD:	834	gpd/EDU		
MDD:	775	gpm		
Pump Capacity Avail. For FF:	1325	gpm		
Pump Capacity Surplus:	-80	gpm		

Lower Zone EDU:	1006		
SB:	96,616	gal	
OS:	14,687	gal	
Whole System EDUs:	1258		1283.920728 gpm PHD
MDD:	729	gpm	
FSS Avail:	329,305	gal	
FF from FSS:	1829	gpm	
FF avail from pumps:	1371	gpm	
FF Surplus:	0	gpm	

Back Into 440k Gallons, WTP Generator:

Total "Fundable" Volume:	440000	gallons	
Diameter:	50	feet	
Total Height:	30	feet	
Volume:	440,608	gallons	
OS:	1	foot	assumed
PHD/EDU:	1.0	gpm	
Source Cap. With Lg. Down:	2100	gpm	
EDUs before ES Triggered:	2057		
Year ES Triggered:	2056		
SB:	0	gallons	assuming generator at WTP
Height Avail. For FSS before ES Trigger:	29	feet	
Volume:	425,921	gallons	
FF Duration:	180	min	
FF from FSS:	2366	gpm	
FF Required:	3200	gpm	
Amount needed from pumps:	834	gpm	
MDD:	1192	gpm	
Pump Capacity Avail. For FF:	908	gpm	
Surplus:	74	gpm	
ES per EDU:	153	gal/EDU	

Existing Site:			WTP Site:	
Lower Zone EDUs:	1686			
Whole System EDUs:	2108		2057	can't have ES because no gravity storage
SB:	0	gal	0	
OS:	14,687	gal	14,687	
EDUs with ES:	51		0	
ES per EDU:	153	gal	153	
ES:	7,808	gal	0	
MDD:	1222	gpm	1192	
FSS Avail:	418,114	gal	425,921	
FF from FSS:	2323	gpm	2366	
FF avail from pumps:	878	gpm	908	
FF Surplus:	1	gpm	74	

APPENDIX H:

BACKWASH BASIN (CAS AND NOI)

WELCH-COMER
ENGINEERS | SURVEYORS

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

RECEIVED MAR 18 2020

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502
www.deq.idaho.gov

Governor Brad Little
Director John H. Tippets

March 9, 2020

The Honorable James Martin
Mayor of City of Priest River
552 High Street
P.O. Box 415
Priest River, ID 83856

Subject: Fully Executed Compliance Agreement Schedule for the City of Priest River Drinking Water Facility

Mayor Martin,

Enclosed for your file is a copy of the fully executed Compliance Agreement Schedule (CAS) regarding the actions the City of Priest River (City) must take to resolve the unpermitted discharge from the City's drinking water facility. Please bear in mind that this is a legal agreement between the Department of Environmental Quality (DEQ) and the City. If difficulties arise such that a required item in the CAS cannot be met by the stipulated date, please contact DEQ as soon as possible. If you have any questions, please contact Dan Redline at 208-666-4621 or at the following address:

Dan Redline
Idaho Department of Environmental Quality
2110 Ironwood Pkwy
Coeur d'Alene, ID 83814

Thank you for your continued cooperation in this matter. DEQ is confident that we can work cooperatively to resolve these issues.

Sincerely,

Mary Anne Nelson, PhD
Surface and Wastewater Division Administrator

MAN:BL:lf

Enclosure: Fully Executed Compliance Agreement Schedule (2019FAV64)

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

RECEIVED
MAR 06 2020
DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE WATER QUALITY PROGRAMS

IN THE MATTER OF

City of Priest River Drinking Water Facility 547 Montgomery Street Priest River, ID 83856	))))	**COMPLIANCE AGREEMENT SCHEDULE** Idaho Code § 39-116A

FINDINGS AND CONCLUSIONS

1. Pursuant to the Idaho Environmental Protection and Health Act (EPHA), Idaho Code § 39-116A, the Department of Environmental Quality (Department) enters into this Compliance Agreement Schedule (CAS) with the City of Priest River Drinking Water Facility, (Respondent) Public Water System number ID1090107, located in Priest River, Bonner County, Idaho.

   The City of Priest River owns and operates a drinking water facility in Priest River, Idaho, and currently, does not have an Idaho Pollutant Discharge Elimination System (IPDES) Permit for the drinking water facility's discharge of wastewater from their filter backwash operations. The Respondent is governed under IDAPA 58.01.25, "Rules Regulating the Idaho Pollutant Discharge Elimination System Program" due to the confirmed discharge in Paragraphs 3 and 4.

2. The Department conducted a reconnaissance inspection on September 4, 2019. The following was determined and documented in a subsequent report:

   - On average, the Respondent initiates a backwash cycle every 80 hours.
   - Each backwash cycle discharges approximately 40,000 gallons for treatment.
   - Daily operational system start-up discharges 2,000 gallons for treatment.

   The discharged effluent flows through a pipe and into a concrete splitter box. At this point, the effluent has reached the surface of the ground and flows into both infiltration basins. Most of the standpipes in both infiltration basins are damaged and disconnected. This has created a short circuiting in which wastewater flows directly from the two infiltration basins to the dry well pond. The bottom of the dry well pond has been sealed over time due to alum coagulant accumulation. Due to this failure and the dike on the outlet side of the pond being eroded away, effluent discharges into an adjacent wetland area. By walking the adjacent property, the inspector verified that effluent flows through the wetland, under the railroad tracks and road, into a subterranean wood conduit, and appears to discharge to the Pend Oreille River.

   An additional issue is the existence of an emergency overflow pipe that has the potential to discharge to the adjacent wetland and eventually to the Pend Oreille River. This issue is addressed in Paragraph 11.

3. The earliest confirmed discharge from the Respondent's facility to the Pend Oreille River was March 28, 2013 during a Department drinking water sanitary survey. The discharge was confirmed again on October 16, 2015 during a Panhandle Health District site investigation that was ultimately referred to the Department.

Due to the continued discharges occurring at approximately 80-hour intervals from the Respondent without an IPDES permit, the Department has determined the issuance of a CAS is necessary while the Respondent formalizes how they intend to comply with IDAPA 58.01.25, "Rules Regulating the Idaho Pollutant Discharge Elimination System Program."

4. On October 17, 2019 designated representatives of the Respondent held a compliance conference with the Department. The Respondent responded to the alleged violation cited in the October 10, 2019 Notice of Intent to Enforce from the Department, and presented actions taken or proposed to achieve compliance.

5. The Department has evaluated the factors in Idaho Code § 39-116A(4) and finds that a CAS is an appropriate mechanism to bring the Respondent into compliance and will be protective of human health and the environment, taking into account the resources of the Respondent to achieve compliance.

6. In order to resolve this matter without litigation or further controversy, the Respondent agrees to the provisions of this CAS and the following terms and actions:

AGREEMENT SCHEDULE

7. Within 60 calendar days from the effective date of this CAS, the Respondent will complete the following:

   a. Prepare a plan to cease discharge to waters of the United States and dispose of filter backwash in accordance with IDAPA 58.01.08 and paragraphs 11 and 12 of this CAS, or;
   b. Prepare and implement a plan to discharge treated wastewater designed to meet water quality conditions located in Table 1 and paragraphs 8-12 of this CAS.

8. Sampling Plan. Within 60 calendar days of the effective date of this CAS the Respondent must submit a sampling plan to the Department, as specified in Paragraph 14, detailing how the facility will comply with the requirements detailed in paragraph 9 and Table 1 of this CAS. The sampling plan, at minimum, must identify the following:

   a. Who will collect the samples;
   b. The lab contracted to analyze the samples;
   c. Sampling locations; and
   d. Methods and procedures for collecting, preserving, transporting, and analyzing the samples. All sampling procedures and analysis must meet the guidelines established at 40 CFR Part 136 *Guidelines Establishing Test Procedures for the Analysis of Pollutants*.

   The Department will review for approval the sampling plan in the manner specified in Paragraph 16.

9. Discharge Reports. Within 30 calendar days of the Department approving the sampling plan, the Respondent must begin submitting monthly discharge reports to the Department, as specified in Paragraph 14. Monthly discharge reports are due by the 20th day of the following month. If a discharge occurs, the monthly report must contain the dates of discharge, approximate volume discharged in gallons per day (GPD), and effluent monitoring data contained in Table 1. If no discharge occurs in a calendar month, the monthly report submitted must state "No discharge."

Table 1. Effluent Limitations and Monitoring Requirements.

Parameter	Units	Effluent Limitations		Monitoring Requirements[1]	
		Average Monthly	Maximum Daily	Sample Frequency	Sample Type
Total Suspended Solids (TSS)	mg/L	30	45	1/Month	Grab
Total Residual Chlorine[2]	mg/L	0.01	0.02	1/Week	Grab
pH	standard units	Within range of 6.5 to 9.0		1/Week	Grab
Flow[3]	Gpd	--	--	Continuous[9]	Continuous[9]
Hardness[4]	mg/L as CaCo	--	--	1/Month	Grab
Aluminum[5]	µg/L	--	--	1/Year	Grab
Metals[6]	µg/L	--	--	1/Year	Grab
Temperature[7]	° C	--	--	Continuous[9]	Continuous[9]
Total Trihalomethanes[8](TTHMs)	µg/L	--	--	1/Quarter	Grab
Turbidity	NTUs	--	--	1/Month	Grab
Narrative Conditions[10]	The respondent must not discharge floating, suspended or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair the beneficial uses of the receiving water.				

[1]For all effluent monitoring, the Respondent must use a sufficiently sensitive analytical method.
[2]Total Residual Chlorine Minimum Level (ML) is µg/L 50.0 unless specified.
[3]Flow estimate based on facility operations (i.e. backwash volume, startup volume, frequency, etc.). Report average monthly and maximum daily gpd.
[4]Hardness must be sampled at the same time metal samples are collected.
[5]Monitoring is only required where alum is used in the drinking water treatment process.
[6]Metals include: antimony, arsenic, beryllium, cadmium, total chromium, copper, lead, nickel, selenium, silver, thallium, and zinc.
These parameters must be measured and reported as total recoverable.
[7]The Respondent must report average monthly and maximum daily temperature data based on a minimum of once a week, grab
measurements of the temperature of the effluent.
[8]For TTHMs—Quarterly monitoring, with a minimum of 10 samples is required within 5 years. Analyses for chloroform,
chlorodibromomethane, dichlorobromomethane, and bromoform. Quarters are defined as: January to March; April to June; July to

September; and, October to December.
[9, 10]All conditions within Table 1, except footnotes 9 and 10, are derived directly from Table 8 *Effluent Limitations and Monitoring Requirements for a new facility without a mixing zone* of *EPA's NPDES Drinking Water Treatment Facilities for Idaho.* Sample type and frequency for temperature and flow have been changed to continuous monitoring from estimate or grab. Narrative conditions were not a part of Table 8, but have been added here.

10. Notice of Intent. Within 60 calendar days from the effective date of this CAS, the Respondent must submit a notice of intent (NOI) to the Environmental Protection Agency (EPA) for coverage under the NPDES Wastewater Discharges from Idaho Drinking Water Treatment Facilities General Permit.

    If the submitted NOI is not approved and the Respondent is denied coverage under the NPDES Wastewater Discharges from Idaho Drinking Water Treatment Facilities General Permit, the Respondent must submit an application for an IPDES individual permit within 30 days through the IPDES E-Permitting System.

11. Facility Upgrade. Within 180 calendar days of the effective date of this CAS, the Respondent must develop and submit a completed Preliminary Engineering Report to the Department's Coeur d'Alene Regional Office, as specified in Paragraph 14, prepared by a professional engineer licensed in the state of Idaho. The Preliminary Engineering Report must include sufficient detail to support design and construction of the alternative selected in Section 7 of this CAS, meet the requirements of IDAPA 58.01.08.503 and include, but not limited to:

    a. An evaluation of the need for a dechlorination process must be included.
    b. Include a project implementation schedule and completion dates for:

        i. Plans and Specifications
        ii. System Construction
        iii. Operations and Maintenance Manual, and
        iv. Record Drawings

    The implementation schedule to complete these activities must identify a construction completion date not to exceed December 31, 2021 for all identified improvements. The Department will review and/or approve the Preliminary Engineering Report in the manner specified in Paragraph 16. Please ensure all submittals are provided to the Department taking into account the potential review timeline and the deadline for a completed facility upgrade.

12. Annual Report. Beginning on July 1, 2020 the Respondent must submit an annual report to the Department, and annually on that date thereafter, addressing the progress of items 7-11 of the Agreement Schedule to the office specified in Paragraph 14. This requirement is not subject to the review and/or approval process specified in Paragraph 16.

INSPECTION

13. Pursuant to Idaho Code § 39-108 and this CAS, the Department may conduct inspections or site visits that the Department determines necessary to verify compliance with all applicable Sections and requirements appearing in this CAS.

CORRESPONDENCE

14. All communications, notices, reports, and submittals required of the Respondent, by this CAS, shall be addressed to:

    Water Quality Engineering Manager
    Idaho Department of Environmental Quality
    Coeur d'Alene Regional Office
    2110 Ironwood Parkway
    Coeur d'Alene, ID 83814

15. All correspondence sent by the Department to the Respondent regarding this CAS should be addressed to:

    The Honorable James Martin, Mayor
    City of Priest River
    PO Box 415
    Priest River, ID 83856

16. Unless otherwise specified, the following document submittal and review process (Submittal Review Process) will be followed regarding submittals required of this CAS. This process must be followed until the Department approves the document or the document review time frame expires, whichever comes first.
    a. After receipt of a submittal from the Respondent, the Department will: 1) notify the Respondent in writing that the document is approved or 2) notify the Respondent in writing of any deficiencies in the document.
    b. If the Department notifies Respondent of deficiencies in the document, the Respondent must submit a revised document to resolve those deficiencies within thirty (30) calendar days of receipt of the Department's notice.
    c. The Submittal Review Process may be repeated until the Department notifies the Respondent the document is approved. However, the submittal must receive the Department's approval within one hundred eighty (180) days from the due date for the first submittal of the document, unless the Department provides the Respondent with a written extension of the one hundred eighty (180) day time frame. The failure of the Respondent to obtain the Department approval of a submittal within such time frames will constitute a violation of this CAS.
    d. If the date on which a submittal or other communication is due falls on a Saturday, Sunday, or federal holiday, the deadline for such submission will be the next business day.
    e. Each document approved by the Department under the Submittal Review Process is incorporated into and enforceable as a part of this CAS.

STANDARD PROVISIONS

17. This CAS does not relieve the Respondent from its obligation to comply with any of the provisions of EPHA, IDAPA 58.01.25, any provision of an NPDES or IPDES permit issued by EPA or the Department to the Respondent, or other applicable local, state, or federal laws and regulations.

18. This CAS binds the Respondent, its successors, and assigns until such time as the terms of the CAS are met to the satisfaction of the Department and the Department terminates the CAS in writing.

19. The Respondent agrees that failure to comply with the terms of this CAS may result in a district court action for specific performance of the CAS, civil penalties, assessment of costs, restraining orders, injunctions, and other relief available under law and equity, as authorized by Idaho Code §§ 39-107, 108, and 116A.

20. If any event occurs that causes, or may cause, delay in the achievement of any requirement of this CAS, the Respondent must notify the Department in writing within ten (10) calendar days of the date Respondent knew, or should have known, of the delay.
    a. Any notice under this paragraph will describe in detail the cause of the delay, the anticipated length of the delay, all anticipated consequences of the delay, measures taken by Respondent to prevent or minimize the delay, and a timetable by which those measures will be implemented.
    b. The Respondent must utilize all reasonable measures to avoid or minimize any such delay. If the Department determines that the delay or anticipated delay in achieving any requirements of this CAS has been or will be caused by circumstances beyond the reasonable control of the Respondent, the Department may grant an extension for a period equal to the length of the delay.
    c. The burden of proving that any delay is caused by circumstances beyond the reasonable control of the Respondent rests wholly with the Respondent.

21. If the Respondent wishes to seek an extension of any deadline contained in this CAS, it must make a written request to the Department at least thirty (30) days prior to the deadline. The written extension request must explain the reasoning for the request and state the length of extension requested. The original deadline will remain operative while DEQ evaluates the request. A request for deadline extension does not alleviate the Respondent's original deadlines until approval is received from the Department. Any extension approval provided by the Department will be in writing, in response to the request.

22. In the event the Respondent violates this CAS, the Department will provide written notice that the Department believes a violation has occurred. The Respondent will have an opportunity to reply and explain the violation and when it will be rectified.

23. A waiver or failure to enforce by the Department of any provision, term, condition, or requirement of this CAS does not constitute a waiver of any other provision, term, condition, or requirement.

24. The Department and the Respondent represent and warrant that each has the authority to enter into this CAS and to take all actions or authorize all actions provided for herein.

25. In case any provision or authority of this CAS or the application of this CAS to any party or circumstances is held by any judicial or administrative authority to be invalid, the application of such provisions to other parties or circumstances and the remainder of the CAS will remain in force and will not be affected.

26. If the Respondent sells or offers the Site Property (or any portion thereof) for sale prior to completion of the requirements of the CAS and termination thereof, the Respondent must notify any prospective purchaser of the terms and conditions of this CAS and the current

status of completion of the requirements of this CAS. The Respondent must also provide notice to the Department of the offer for sale upon listing, and the identity of the purchaser prior to closing of any sale of the Site Property or any portion thereof.

27. Sale or transfer of the Site Property or any portion thereof by the Respondent does not relieve the Respondent of its obligation to complete the terms and conditions of this CAS unless appropriate arrangements are made with the purchaser or receiver of the Site Property for assignment of the obligations of this CAS and the Department consents in writing to the assignment of the obligations of this CAS to the new purchaser.

28. This CAS sets forth the entire agreement of the parties related to the subject matter of this CAS and may not be modified without written consent of both parties.

EFFECTIVE DATE AND TERMINATION

29. The effective date of this CAS is the date of the signature by the Department Director.

30. Upon request by the Respondent, this CAS may be terminated if the Department determines that all CAS requirements are complete.

DATED THIS 2 day of March, 2020

JAMES MARTIN
Mayor, Authorized Representative of the City of Priest River

DATED THIS 13th day of March, 2020

JOHN H. TIPPETS
Director, Idaho Department of Environmental Quality

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Memorandum

TO: **MATT PLAISTED, P.E.**

FROM: **NECIA MAIANI, P.E. AND STEVE CORDES, P.E.**

PRJ. #: **14778.20.0**

SUBJECT: **PRIEST RIVER WATER SYSTEM BACKWASH DISCHARGE IMPLEMENTATION PLAN IN RESPONSE TO COMPLIANCE AGREEMENT DATED FEBRARY 20, 2020.**

DATE: **MAY 5, 2020**

CC: **MAYOR JIM MARTIN, LAUREL THOMAS, CORY COLEMAN**

The purpose of this memorandum is to outline the plan developed by the City of Priest River in order to discharge effluent from the backwash of filters used to treat water from the Pend Oreille river. The City will follow the following steps as outlined in the Compliance Agreement Schedule received from the Idaho Department of Environmental Quality (DEQ).

1. The City will implement the Sampling Plan as shown in Appendix A.

2. The City will provide monthly discharge reports to DEQ starting no later than 30 days following approval of the sampling plan identified in Step 1. The discharge report will be based primarily on the data collected as part of the sampling plan and provide additional narrative as needed. A sample data collection table can be found in Appendix B.

3. The City will submit a Notice of Intent (NOI) to the Environmental Protection Agency (EPA) for coverage under the Wastewater Discharges from Idaho Drinking Water Treatment Facilities General Permit no later than May 12, 2020. See the attached NOI in Appendix C, which has been submitted for approval under the Idaho Drinking Water Treatment Facilities General Permit. If this application is denied, the City will submit an individual permit application for approval from the IPDES to allow discharge of the backwash discharge water.

4. Withing 180 days of the effective CAS (by September 9, 2020) the City will submit a Preliminary Engineering Report stamped by a licensed engineer discussing the preferred design alternative to mitigate the discharge of pollutants in excess of those presented in the CAS. The report will evaluate the need for dechlorination and mitigation necessary to reduce additional pollutants identified in sampling, if any. A schedule will be provided outlining when plans and specifications will be ready along with a preliminary construction schedule, operation and maintenance manual, and timeframe for completion of record drawings. Construction completion for this project is expected before December 31, 2021.

5. In addition to the monthly discharge reports, the City will submit an annual progress report starting July 1, 2020. This report will update the DEQ on the progress of the project.

Appendix A
Sampling Plan

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The purpose of this memorandum is to outline the sampling plan for the Priest River Water Treatment Facility backwash. Cory Coleman (operator) will be responsible for sampling unless otherwise approved by the Priest River Public Works Director. The City has contracted with Accurate Testing Labs to perform analysis of samples. Accurate Testing follows the procedures listed in Appendix A-1 for analysis of samples. The City currently meters the flow of backwash water at the treatment facility. Table 1 shows other samples that will be gathered. These samples will be collected at the outlet structure as shown in Figure 1. Appendix B-1 contains the procedures used to collect, preserve, and transport samples to the lab.

Table 1: Example Mothly Collection Form

	TSS (mg/L)	Total Chlorine Residual (mg/L)	Ph	Temperature (°C)	Flow (gpd)	Hardness (mg/L as CACO)	Aluminum (µg/L)	Metals (µg/L)	TTHM (µg/L)	Turbidity (NTUs)
Sample Type	Grab	Grab	Grab	Grab	Continuous	Grab	Grab	Grab	Grab	Grab
4/1/2020					1608					
4/2/2020					1492					
4/3/2020	22	0.03	7.12	12	1496					
4/4/2020					1564					
4/5/2020					1512					
4/6/2020					1556					
4/7/2020					45268					
4/8/2020					1552					
4/9/2020					1572					
4/10/2020		0.08	6.98	11	1500					
4/11/2020					1520					
4/12/2020					1620					
4/13/2020					1432					
4/14/2020					1512					2.81
4/15/2020					43796					
4/16/2020					1796					
4/17/2020		0.04	6.88	11	6821					
4/18/2020					1115					
4/19/2020					3504					
4/20/2020					1428	80.0 mg/L				
4/21/2020					1156					
4/22/2020					1172					
4/23/2020					1488					
4/24/2020		0.11	7.24	13	45428					
4/25/2020					1620					
4/26/2020					1432					
4/27/2020					1512					
4/28/2020					1608					
4/29/2020					1492					
4/30/2020					1496					

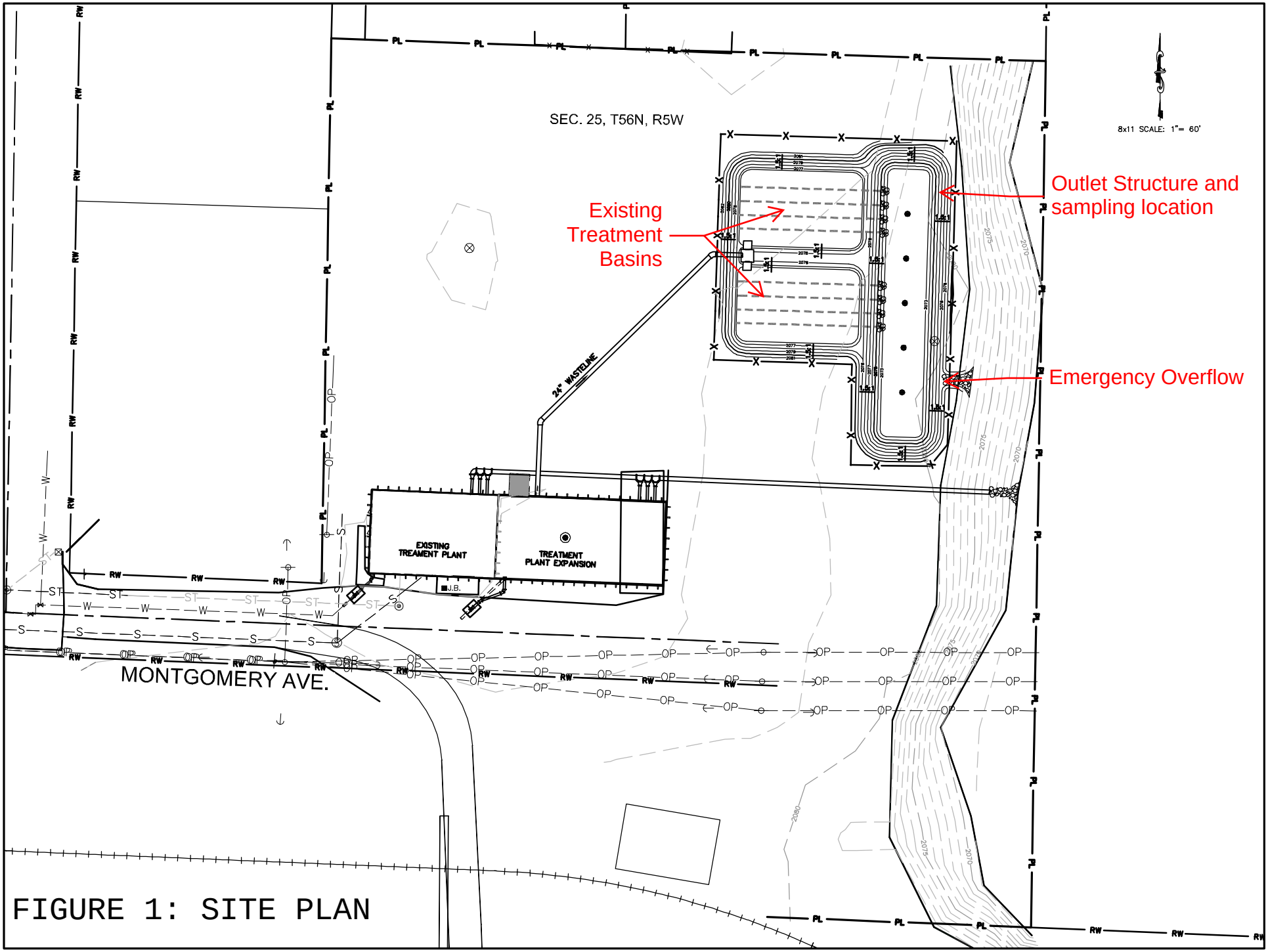

FIGURE 1: SITE PLAN

Appendix A-1
Testing QA/QC Plan

Accurate Testing Labs, LLC
7950 Meadowlark Way
Coeur d'Alene, ID 83815
208-762-8378

Quality Assurance Manual

SOP Code: QA MANUAL

Revision: 21

Date: 11/29/2019

Author: _____

Laboratory Director	Walter Mueller	Date

Approved: _____

Drinking Water	Rhena Cooper Microbiology Consultant	Date

The following have read this Standard Operating Procedure and understand the requirements set forth in it. By signing this document, these people acknowledge their responsibility to follow the procedures outlined:

SOP Code: QA MANUAL
SOP Name: Quality Assurance Manual
Revision: 20

Name: (Please Print)	Signature:	Date

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Appendix A *Laboratory Instrumentation*

Figure 4-1

Appendix B *Forms and Log Sheets*

1.0 INTRODUCTION

1.1 Purpose

1.1.1 This manual describes the quality assurance system employed at ATL. This is in compliance with the intent of thegeneral quality system requirements of the following organizations: Environmental Protection Agency (EPA), Idaho Department of Health and Welfare (DOH), Department of Environmental Quality (DEQ), American Society for Testing and Materials (ASTM), and other accrediting organizations. The policy of ATL is to apply the system to all testing and analytical activities undertaken on behalf of the customers in order to meet their requirements for quality assurance and quality control.

1.1.2 Quality Control is defined as routine, daily activities, which ensure that data generated meets acceptable levels of quality. These are generally physical activities or activities where data is compared to established norms with decisions made based on that comparison. Items such as performing matrix spikes, comparing standard responses to established limits, repeating samples when concentrations are above calibration ranges, etc. are "quality control" activities.

1.1.3 This manual provides personnel and customers of ATL with a description of company policy for maintaining an effective quality assurance program developed in conjunction with other management planning functions. It also describes the general quality assurance and quality control program. The specific procedures are addressed in the Standard Operating Procedures (SOP) Manual.

1.2 Proclamation

1.2.1 The Quality Assurance Program described in this Quality Assurance Manual has the absolute and unqualified support of the management of ATL. These procedures are binding on all personnel of the laboratory and shall be adhered to, implicitly.

1.2.2 Our established goal; deliverance of highest quality service at a reasonable price; is the same today as when the laboratorywas founded in 1995.

1.2.3 Our testing and analytical services, the care with which they are conducted, and their customer acceptance, are the means by which ATL has gained an enviable reputation and has become a leader in the industry. Being a leader in quality analytical testing is our number one priority and every member of the laboratory staff shares the responsibility of maintaining our present and future status.

1.2.4 All ATL personnel are expected to use this manual as a guide to the continued maintenance and improvement of the quality of our laboratory services.

2.0 GOALS AND OBJECTIVES

2.1 Purpose and Scope

2.1.1 The purpose of this section is to outline the Quality Objectives of Accurate Testing Labs, LLC.

2.1.2 The objective of the Laboratory Quality Assurance Program is to assure accuracy and precision, as well as reliability, of laboratory results produced for our customers, or at the request of regulatory or accrediting bodies. The QA/QC purposes are:

2.1.2.1 To maintain the physical sample's integrity and the data results validity and usability.

2.1.2.2 Ensure the analytical measurement systems are maintained in an acceptable state of stability and reproducibility.

2.1.2.3 Detect problems through data assessment and establish corrective action procedures, which keep the analytical process reliable.

2.1.2.4 Document all aspects of the measurement and reporting process in order to provide data, which is technically sound and legally defensible.

2.2 Specific Objectives

2.2.1 The initial data quality objective for each method is to achieve precision and accuracy levels that are cited in Standard Methods. Once control charts have been established for each analytical parameter, the statistics used for the chart, i.e., the mean and standard deviation, become the Data Quality Objectives (DQO's) for these tests.

2.2.2 Establish and update on a regular basis, the quality assurance and quality control program, which includes this manual.

2.2.3 Put into service, methods capable of meeting the user's needs for precision, accuracy, sensitivity, and specificity.

2.2.4 Ensure that all staff members receive training in basic quality technology; in sufficient depth to enable them to carry out the provisions of this manual.

2.2.5 Establish the level of quality of the laboratory's routine performance as a baseline against which to measure the effectiveness of quality improvement efforts.

2.2.6 Improve and validate laboratory methodologies by participation in method validation studies.

3.0 QUALITY POLICIES

3.1 Purpose and Scope

3.1.1 This section lists policies to be implemented by the laboratory in order to achieve the objectives set forth in section 2 and in the furtherance of the overall quality control program.

3.1.2 This section sets forth only the outlines of management's policies with regard to Quality Assurance. Details for carrying out these policies appear in later sections of the manual.

3.2 Laboratory Quality Policy

3.2.1 Quality activities shall emphasize the prevention of quality problems rather than detection and correction of problems after they occur.

3.2.2 The laboratory shall use published analytical and test methodologies whenever possible.

3.2.3 The laboratory shall retain copies of all test and analytical reports for a period specified by regulatory or accrediting bodies.

3.2.4 The laboratory shall use appropriate reagents and chemicals, certified when necessary, and appropriate calibrated glassware.

4.0 THE QA/QC MANAGEMENT ORGANIZATION

4.1 Purpose and Scope

4.1.1 This section describes the QA/QC organization of ATL. All analytical chemistry responsibilities fall under the control of the Laboratory Director. The QA/QC Coordinator supervises the responsibilities for the overall QA/QC program. The Lab Director and individual analysts assume additional responsibilities.

4.1.2 The management of a Quality Control Program as described in this manual requires the services of a Quality Control Coordinator within the laboratory to carry out the monitoring, record-keeping, statistical techniques, calibration, and other functions required by the system.

4.1.3 The Organization Chart of ATL illustrating the placement of the quality function within the organization is shown in *Figure 4-1* on page 36 of this manual.

4.2 Quality Control Coordinator-Job Description

4.2.1 Basic Function: The Quality Control Coordinator is responsible for the implementation of the Quality Control Program and for taking or recommending measures to ensure continuing accuracy and precision of data produced.

4.2.2 Responsibilities and Authority: The Quality Control Coordinator performs the following tasks:

4.2.2.1 Develops and carries out quality control programs, including statistical procedures and techniques, which will enable the laboratory to meet desired quality standards at minimum cost; and advises and assists management in the installation, staffing, and supervision of such programs.

4.2.2.2 Monitors quality control activities of the laboratory to determine compliance with authorized policies and procedures. Makes appropriate recommendations for correction and improvement as necessary. Maintains files of non-conformance records.

4.2.2.3 Reviews all client reports to ensure all QA/QC requirements have been met. QA/QC requirements include: in-house requirements, regulatory requirements, project-specific requirements, and client-requested requirements.

4.2.2.4 Seeks out and evaluates new ideas and current developments in the field of quality control and recommends means for their application wherever advisable.

4.2.2.5 Reviews new technology, methods, equipment, and advises management as to such use, with respect to quality aspects.

4.2.2.6 Advises the Purchasing Component with regard to the quality of purchased equipment, materials, reagents, and chemicals.

4.2.2.7 Recommends packaging materials and procedures as well as necessary changes.

4.2.2.8 Coordinates the review of QA Manuals.

4.2.2.9 Coordinates all chemical and administrative audits and certification programs.

4.2.2.10 Maintains the QA/QC file.

4.2.2.11 Insures the SOP Manuals are current.

4.2.2.12 Ensures that all individual analysts comply with QC requirements as outlined in the Standard Operating Procedures.

4.2.2.13 Performs other related duties as may be assigned.

4.3 Analysts, and Data Management

4.3.1 In addition to the Lab Director and Quality Assurance Coordinator, quality responsibilities fall upon various other individuals.

4.3.2 Analysts are responsible for ensuring that the instruments, reagents, experiments, etc. meet the criteria for acceptability as outlined in the Standard Operating Procedures, which they follow. They generate initial client data, monitor all QC facets of the analyses, and alert the Lab Director to any abnormalities.

4.3.4 The quality assurance coordinator is responsible for accurately converting raw data into client-ready reports, and for auditing the final reports. They are responsible for maintaining all client files, auditing data for gross errors, and proper archiving of all laboratory data, reports, electronic media, and methodologies.

5.0 MANAGEMENT OF QUALITY ASSURANCE MANUALS

5.1 Purpose and Scope

5.1.1 The purpose of this section is to define the tasks and responsibilities relating to the preparation, review, and maintenance of the Quality Assurance Manual.

5.2 Maintenance of the Manual

5.2.1 The Quality Control Coordinator bears the primary responsibility for the preparation, review, and upkeep of the Laboratory Quality Assurance Manual.

5.2.2 Copies of the manual may be distributed, from time-to-time to individuals or organizations outside the laboratory.

5.2.3 The Quality Control Coordinator is responsible for the timely, periodic review of the content of the manual to ensure that its requirements reflect current operating conditions.

6.0 SAMPLE CONTROL, HANDLING, STORAGE, AND SHIPPING

6.1 Purpose and Scope

6.1.1 The purpose of this section is to describe the duties and responsibilities of the Sample Custodian and Quality Control Coordinator with respect to shipping, packaging, handling, and storage of samples.

6.1.2 This section provides guidance in making decisions pertinent to the validity and acceptability of samples submitted for testing or analysis. While it is particularly pertinent to samples submitted to the laboratory for environmental analysis, its principles apply broadly to all types of samples, the goal being the preservation of the integrity of the sample.

6.2 Physical Condition of the Sample Container

6.2.1 Physical damage to the sample container received from commercial clients or others may be the fault of the carrier due to abusive handling or faulty packaging. If damage to the container is evident, the condition of the container shall be noted on the chain of custody. The package will be carefully opened and its contents inspected. In the event of damage to the sample, the sender will be

notified. The client shall make a decision concerning the disposition of the sample as to whether or not analytical testing is to be conducted, the sample to be returned, or if it is to be discarded.

6.3 Sample Integrity

6.3.1 Sample integrity refers to the cumulative end result of those factors, which contribute to the overall validity of a sample. Sample integrity is promoted and preserved by adhering to adequate custodial handling and identification procedures by those individuals collecting samples, up to the point of receipt of the samples by the laboratory.

6.3.2 ATL shall have available proper sample containers for sample collection and transportation to the lab. The lab maintains a current inventory of EPA, DOH, and DEQ approved containers and literature outlining their use.

6.3.3 When the samples are received for testing or analysis they are checked for:

6.3.3.1 Physical damage due to inadequate packing and protection.

6.3.3.2 That samples were collected in the proper container and sufficient amount was collected to perform all analyses including duplicates, retesting, QA/QC matrix spikes, etc.

6.3.3.3 Loss of sample because of inadequate or improper sealing.

6.3.3.4 Cross-contamination of samples due to inadequate separation of sample types.

6.4 Sample Identification

6.4.1 A basic requirement of sample control is accurate sample identification. Samples that cannot be related to specific sample identification information on the associated sample chain of custody because of inadequate, ambiguous, or non-existent labeling will be quarantined until the client is able to provide specific identification.

6.4.2 Upon receipt at the laboratory, each independent sample shall be given a unique ATL identification number and labeled accordingly. The number shall also be written on the Chain of Custody along with date and time of receipt.

6.4.3 All drinking water samples that require metal analysis (excluding method EPA 200.5 or if the samples are acid digested) are recorded in the Log-in book noting the date and time preserved. This log is in accordance with EPA regulations pertaining to methods for the analysis and determination of metals in drinking water.

6.4.4 An internal tracking system is in place within the lab as tests are performed on samples. Each sample is recorded in the Sample Tracking log; noting the date, time, sample number, tests to be done, the storage place, when the sample is logged out for testing, and when disposal of the sample occurs. Each incident that involves the movement of the sample in the lab has a date, time, and the initials of the individual involved noted in the log.

6.5 Sample Storage

6.5.1 After the log-in procedure is complete, the samples are stored according to the procedures set forth in the appropriate EPA, ASTM, or other methodology. Generally, samples are stored in ascending identification number order at 1-5°C and protected from cross-contamination. Some samples, such as solids may be stored at ambient room temperature as refrigeration is not required. *Samples are not to be stored with standard reference materials.*

7.0 CHAIN-OF-CUSTODY PROCEDURES

7.1 Purpose and Scope

7.1.1 This section describes the procedures to be followed when strict Chain-of-Custody (COC) protocols for samples received must be followed.

7.1.2 A detailed SOP describing the tracking of every sample that enters the ATL facility is located in the SOP manual. It is available to employees from the Quality Control Coordinator.

7.1.3 This laboratory follows strict Chain-of-Custody procedures in handling all environmental samples received for testing or analysis. Additionally, these procedures are followed for all other samples where it is so requested by the client. Usually, chain-of-custody documentation is necessary when laboratory results are to be used as evidence in legal proceedings. This documentation is prepared in addition to the normal sample processing paperwork.

7.2 Chain-of-Custody Documentation Form

7.2.1 The Chain-of-Custody Form will be used as the Chain-of-Custody record. One of these forms will be completed for each sample batch.

7.3 Procedure

7.3.1 All shipping containers sent to clients are to have one or more Chain-of-Custody Forms present. The form is to be filled out by the sampling personnel and is to accompany the samples at all times.

7.3.2 Upon receipt at the laboratory, if requested by a customer, the sample temperature is recorded. The samples identification numbers, matrices, and containers are checked against the information on the form, discrepancies noted, and ATL identification numbers are written on form and sample containers. The form is signed, dated, and then a copy is given to the client upon request. The original is placed in the active client file upon completion of all tests.

7.3.3 The original Chain-of-Custody is to always accompany the sample. If a sample is split, such as for sub-contracting analyses, a separate COC shall be filled out and follow the sample as above.

7.3.4 After being logged in, samples are then placed in the appropriate area until analyses are performed.

7.3.5 In addition to the Chain-of-Custody Form, a variety of laboratory sample tracking documentation is maintained such as sample log-in/log-out from the Sample Control area, instrument bench sheets noting when samples were prepped/analyzed, laboratory notebooks, etc. Disposal of samples after completion of testing is documented.

8.0 LABORATORY METHODOLOGY, VALIDATION, AND ANALYSIS CONTROL

8.1 Purpose and Scope

8.1.1 This section deals with the methods used at Accurate Testing and how the lab maintains a specified level of quality control associated with the experimental method. Methods, validation information, and analysis control information shall be kept on record in the QA/QC file under the control of the QA Coordinator.

8.2 Methods

8.2.1 Accurate Testing uses only established methods for routine analytical testing. These methods are found in seven basic references. They are:

8.2.1.1 "Standard Methods for the Examination of Water and Waste Water," 22nd edition 2012, American Public Health Association, et. al., Washington D.C.

8.2.1.2 "Standard Methods for the Examination of Water and Waste Water," 19th edition 1995, American Public Health Association, et. al., Washington D.C.

8.2.1.3 "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020 March 1983 US EPA EMSL, Cincinnati, Ohio.

8.2.1.4 "Methods for the Determination of Metals in Environmental Samples," EPA-600/4-91-010 June 1991 US EPA, Washington, D.C.

8.2.1.5 "Methods for the Determination of Metals in Environmental Samples Supplement I," EPA-600/R-94-111 May 1994 US EPA, Washington, D.C.

8.2.1.6 "Test Methods for Evaluating Solid Waste," SW-846, Third Edition, US EPA, Washington, D.C.

8.2.1.7 Soil, Plant and Water Reference Methods for the Western Region, 2005 3rd Edition.

8.2.2 The QA Coordinator is responsible for ensuring that the most current revisions of the methods are present in the lab. Outdated copies are removed from the lab and archived.

8.2.3 Non-routine methods are obtained from in-house development or through scientific literature or other sources and can be found in the Methods Manual.

8.3 Standard Operating Procedures

8.3.1 In addition to the methods listed in the reference materials, the laboratory maintains a complete set of SOPs, which describe specifically how the EPA, ASTM, etc. method is performed at this laboratory. Specific instrumentation is listed, QA/QC information, reporting limits, deviations from the original method, function and control checks.

8.3.2 The format of the ATL SOP for methods is exactly that as listed in the original method. Specifics are given under each section heading.

1. Scope and Application
2. Definitions
3. Summary Method
4. Safety
5. Sample Rejection and Interferences
6. Handling and Preservation
7. Equipment and Supplies
8. Quality Control
9. Procedure
10. Interpretation
11. Data and Reporting
12. Waste Management
13. References
14. Distribution
15. Changes from previous Revision
16. Forms

8.4 Method Validation

8.4.1 The production of data, which is legally defensible, may require seven aspects of the method areas to be evaluated.

1. Accuracy - how close the data result is to the true value.
The main components are precision (affected by random error) and bias (systematic error). Accuracy is achieved by the proper use and maintenance of the instruments, obtaining quality reference materials, proper standard and sample prep, etc. ATL evaluates the accuracy of the method by analyzing samples of known concentration such as Performance Evaluation (PE) check samples. Comparison of single point daily calibrations to extensive multi-point calibrations may also be performed. Results of matrix spike analyses are also used.

2. Bias - a measure of systematic error. It has two components: method and the laboratories use of the method. *Method bias* is the difference between the grand average and the known value. The *laboratory bias* is the difference between the laboratory average recovery and the true value.

3. Precision - how reproducible one result is to a repeat analysis. ATL routinely performs analyses on duplicate prepared samples to determine precision. Most ATL Non-chromatographic methods vary as to the frequency of duplicate analysis. Refer to the specific method SOP.

4. Linearity - achieving a one to one ratio of instrument response to increasing sample concentration. Specifically, the instrument

manufacturer or the original method often dictates the linearity ranges. When not given, a working range for a routine experiment type will be determined and documented.

5. Selectivity - the ability to differentiate one compound or analyte from another. Analytical methods used are generally very selective in nature. For example, atomic absorption experiments require lamps, which are specific to the analysis of only certain elements. Selectivity is further addressed in each SOP.

6. Stability - this refers to the chemical steadiness of the instrument, standards, and samples over time. Instrument stability is often addressed in the original method with requirements such as recalibration every 12 hours automatically or recalibration when the operator notices drift. Data may be discarded and samples repeated if the system became unstable or severe drift was noted during an automated run. Of other concerns are the stability of standards and samples. All SOPs will have complete storage statements regarding these items. Holding times, temperature requirements, and the need for preservatives are listed.

7. Detection Limits - There are several types of detection limits; method detection limits, instrument detection limits, practical quantitation limits. All ATL methods shall have specific reporting limits given, which are based on the method detection limits. These are based on a statistical evaluation of spiked samples which have been carried through the entire experimental procedure.

8.5 Function and Control Checks

8.5.1 Checks will be made to determine the day-to-day instrument performance, variances in analyst's techniques, and effects due to sample matrices. A Sample Prep Log is maintained for each sample; recording spike, QC, matrix, and reagent information. A copy of this log can be found in *Appendix B, Forms and Log Sheets* on page 40 of this manual.

8.5.2 *Function checks* refer to hardware related items such as background contamination, mechanical instrument performance; which influence calibrations, and accuracy.

8.5.3 *Control checks* are those which involve statistical evaluations of data on a long-term basis.

8.5.4 Checks are performed through a variety of techniques, which include:

8.5.4.1 Check Standards - used to monitor the precision and accuracy of laboratory performance, irrespective of sample matrix effects. A solution of known concentration is used to check the precision of analyses (and bias due to calibration).

8.5.4.2 Blanks - Instrument blanks used to determine background contamination due to the analytical hardware.

8.5.4.3 Method blanks - used to indicate interferences or contamination due to the preparation of samples or to the laboratory environment.

8.5.4.4 Trip blanks - used to determine if samples are contaminated prior to receipt at the laboratory.

8.5.4.5 Duplicates and Matrix Spikes - used to determine the recovery of analytes of interest for each matrix, the accuracy of the method, and the reproducibility (precision) of the technique. Depending on the method, samples may be run in duplicate and/or be spiked in duplicate to determine precision.

8.5.4.6 Standard Responses - comparison of a daily standard to previous standards in order to determine the stability of stock standards and instrument drift.

8.5.4.7 Instrument or Signal Intensities - used to determine variances in lamp intensities and mirror alignments.

8.6 Control Charts

8.6.1 ATL utilizes six types of control charts: PBLK, PQL, LFB, QC Standard, Duplicate, and MS.

1. PBLK (Prepared Blank)- Analyzed with each batch of samples and plotted to assess contamination levels in the laboratory. Predetermined guidelines are used for accepting or rejecting data based on the level of blank determination.

2. PQL (Practical Quantitation Level) - MDL x 2.2, analyzed with each batch of samples, the recovery is calculated to determine if the reporting limit is viable. Results are plotted on control chart with upper and lower control limits to assess if sensitivity is changing.

3. LFB (Lab Fortified Blank) - to detect the presence of bias in analyses. Results are plotted on control chart with upper and lower control limits.

4. QC Standard (Quality Control Standard) - A solution (from a different source than the analytical standard) of known concentration is used to check the precision of analyses. Standard solutions are repetitively analyzed to enable calculation of the mean and standard deviation for the series of determinations. Results are plotted on control chart with upper and lower control limits to facilitate detection of a systematic error or that precision has worsened.

5. Duplicate - The relative % difference between the two results are plotted on a control chart with zero as the expected result.

6. MS (Matrix Spike) - Intended to detect the presence of bias in the sample matrix. Results are plotted on control chart with upper and lower control limits.

8.6.2 It is the responsibility of the QA Coordinator to establish and monitor appropriate items for methods which require a high level of quality control. This is to determine if a system is out of control, to aid in determining which aspect of a system is at fault, and to provide an indication of the results of corrective action. Each SOP will state which parameter must be monitored. Periodically, the QA Coordinator will coordinate the revision of control limits based on statistical evaluations of data supplied by and collated by the analysts.

9.0 FACILITIES, EQUIPMENT, AND PREVENTIVE MAINTENANCE

9.1 Purpose and Scope

9.1.1 This section describes briefly the facilities, which comprise ATL, and the equipment used to analyze samples. General guidelines for conducting preventative maintenance are also given. This section of the manual applies to all equipment used to generate client data, which includes refrigerators for sample storage, instruments used to calibrate or standardize others, and the individual measurement devices.

9.2 Facilities

9.2.1 ATL is a secure facility encompassing 3,200 square feet. The facility is maintained at 72-74 degrees by means of standard heating and ventilation equipment. Normal business hours are 7:30 AM to 4:30 PM Monday through Friday.

9.2.2 Security:

9.2.2.1 Overall security is maintained by the controlled distribution of perimeter door keys. Off-site monitored electronic

security system is in place. Visitors are not allowed in the laboratory unless accompanied by ATL personnel.

9.2.2.2 A current signature list is maintained including printed signature and initials, signed signature and initials, date of employment, and date of termination. This document identifies all individuals at ATL that handle and process samples and documents.

9.2.3 Sample and Standard Storage:

9.2.3.1 Refrigerators are used for sample storage if necessary. Additional information on this subject can be found in section 6 of this manual. Standards are kept separately in department refrigerator units and maintained at 4°C. All refrigerator temperatures are monitored electronically. Records of temperature are maintained in the QA/QC file.

9.2.3.2 Samples are maintained at the appropriately controlled temperature until their analysis is completed. After that point, they are moved to the sample storage, which is not temperature controlled.

9.2.4 Hoods:

9.2.4.1 The facility maintains several fume hoods for the safety of its employees and in accordance with various methodologies. Hoods are monitored monthly as part of the routine safety inspection and must maintain a hood velocity required by the testing performed. Hood velocities will be maintained at 50 or 360 FPM as needed.

9.2.5 Chemical and Reagent Storage:

9.2.5.1 The facility has a variety of storage rooms and cabinets and proper storage of reagents and chemicals.

9.2.5.2 All pertinent information relating to each chemical placed into stock is noted.

9.3 Instrumentation

9.3.1 The lab maintains a full complement of analytical instrumentation employed in all stages of sample processing. A list of major components and their applications can be found in *Appendix* A.

9.3.2 ATL uses a variety of computers and LIMS systems for general data handling, sample control, and report generation.

9.3.3 Maintenance and Preventive Maintenance

9.3.3.1 Laboratory equipment is used and maintained in accordance with the manufacturer's recommendations. Several of the instruments are under manufacturer's warranties and service contracts with the manufacturer to provide routine maintenance and emergency services if needed.

9.3.3.2 The laboratory also conducts an orderly program of positive actions (equipment cleaning, lubricating, reconditioning, adjusting, and/or testing) to prevent instruments or equipment from failure during use. The purpose of this preventive maintenance program is to increase measurement system reliability, reduce downtime, reduce costs, and improve data validity.

9.3.3.3 The physical location of instruments will also be taken into account. Proximity to temperature extremes, vibration, sources of cross-contamination, etc. will be evaluated prior to installation of any measurement device or when additional procedures or instruments are added to a room currently operating such device.

9.3.3.4 In addition to the physical integrity of parts and equipment, the proper operation of the equipment has a significant effect on its performance. The QA Coordinator will determine the training requirements of analysts necessary for the proper operation of all equipment.

9.3.3.5 Since instrument calibration is commonly the responsibility of the operator in addition to preventive maintenance tasks, a combined preventive maintenance-calibration schedule will be used in those cases.

10.0 REFERENCE STANDARDS

10.1 Purpose and Scope

10.1.1 This section discusses the use of Standard Reference materials available from the National Institute of Science and Technology, SPEX, or other reliable sources.

10.2 Policies

10.2.1 ATL will use reference standards of known purity at all times and will take measures to ensure the stability of those materials. Additional control measures are present to determine if standard materials have degraded during use.

10.3 Purchase and Receipt

10.3.1 Standards are to be obtained from reputable sources such as major manufacturers, NIST, SPEX, APG, ERA, EM Science, etc. The purity as a percent value or the known concentration of diluted standards must be given. All standards are to be 96% pure or greater. In the event that purity is below 96%, corrections must be made for the listed purity.

10.3.2 In some instances, standards are obtained from local suppliers and are assumed 100% pure, unless in-house testing of the standard indicates otherwise. Documentation of where, when, by whom, and what type of standard was obtained is to be kept on file.

10.3.3 Upon receipt at the lab, each standard is marked with the date received, assigned a lot number, if not given by the manufacturer, and stored according to the manufacturer's specifications.

10.3.4 Certificates of analysis (or other paperwork listing purity) will be kept on file in the QA/QC file for all reference materials used in the calibration and standardization of equipment and methodologies.

10.3.5 In the absence of manufacturer's recommendation, the following maximum holding times are assigned:

Inorganic solids - 3 years
Inorganic solutions - 2 years
Buffer solutions - 12 months

10.3.6 Standards are stored at ambient room temperature, 4°C (refrigerator), or -10 to -20°C (freezer). In general, inorganics are stored at ambient room temperature or the refrigerator, and diluted organic solutions stored in either the refrigerator or freezer depending on volatility.

10.4 Daily Use

10.4.1 Documentation of standard prep is discussed in the standard operating procedure for each method. Standard prep log sheets are maintained and contain information such as a compound, manufacturer, lot, purity/initial concentration, aliquot volume, final volume, solvent, and final concentration. Each in-house prepared standard will be assigned a

reference number and storage/holding time condition. Each prepared standard will be labeled with type, concentration, preparer, reference number, and date.

10.4.2 The suitability of standards received from vendors and standards prepared in the lab is to be evaluated routinely as part of the experimental process. Deviation in standard response, such as lower area/signal counts, increases in impurity peaks, etc. may indicate degradation of the standard. Standards will be either discarded or may under certain circumstances be reassigned a new purity value and holding time after scientific evaluation by the group leader.

10.4.5 Refer to the non-conformance section of this manual for more information concerning deviations of standards.

11.0 LABORATORY DOCUMENTATION

11.1 Purpose and Scope

11.1.1 The purpose of this section is to describe briefly some of the aspects of the documentation process, which is associated with the generation of client data. The documentation process applies to all areas of the laboratory and ensures the validity of data from initial receipt of samples to archiving of files.

11.1.2 All records are confidential and may not be copied without permission of the laboratory director. All entries are made with indelible ink and corrections are to be a single line crossed out, initialed, and dated. All documentation is kept for ten years.

11.2 Client Files

11.2.1 Upon receipt of samples, a work order file is created by Sample Log-in. The file maintains a complete written record of all information concerning a particular project. The following information is contained in the files:

Chain-of-Custody forms
Lab Sample Identification Numbers
Copy of the complete final report sent to the client.

11.2.2 After the log-in, an invoice is generated. When the work order is completed the final report and invoice is mailed to the client, a copy of the analytical results page(s) are made and placed with the original client file in chronological order by lab number.

11.3 Sample Tracking

11.3.1 Ensuring that data generated is properly attributed to specific samples requires documentation of sample tracking. Upon receipt of samples, a record is generated in the "Sample Receipt Tracking Preservation" log sheet. Samples are tracked within the Laboratory such as specific location (Lab, Refrigerator, Storage, etc.) if samples are preserved (HNO_3, H_2SO_4, HCl, NaOH), or an aliquot is taken from the original container. Changes are made by individual analysts handling the specific sample(s).

11.3.2 A copy of the Sample Tracking log can be found in *Appendix B, Forms and Log Sheets.*

11.3.3 During the analysis of samples, a variety of worksheets, sample prep sheets, instrument bench sheets, and Lab Information Management System (LIMS) are used to track the sample's data. Bench sheets are generally specific to certain laboratory groups or specific instruments.

11.4 Standard preparation information sheets

11.4.1 Complete information concerning the preparation of standards is kept on file specific to a certain group of tests. Standard prep sheets contain information such as the compound name, manufacturer, lot number, aliquot volumes, and preparer's initials.

11.5 Instrument and Maintenance Logbooks

11.5.1 Information concerning the routine and non-routine maintenance/repair, calibration, and use of instruments are kept with the instrument.

11.6 Electronic Data and Programs

11.6.1 A variety of instruments used at Accurate Testing Labs employ sophisticated data acquisition, retrieval, and manipulation programs. Both raw data and final client-ready results may be present on electronic storage media. Copies of all procedures, programs, raw data, integration files, calibration files, and analytical results will be kept on file.

11.7 Hard Copy Data

11.7.1 Chromatograms, integration results, and other data printed or drawn onto paper will be stored with the first sample of the batch. Raw paper data is kept for ten years.

11.8 Data handling

11.8.1 ATL uses a local network computer system for data handling. A laboratory information management system (LIMS, Visual LabPro.Net®) is integrated with all of our laboratory's sample control, quality control, raw data storage, and report generation.

11.8.2 Most of our equipment uses the network computer system or a serial port data transfer (TALTech, WinWedge) to download data directly into the LIMS.

11.8.3 Chain of Custodies and the bench sheets generated by the analyst (s) are scanned into .pdf files and linked to the appropriate samples in the LIMS system for easy retrieval.

11.8.4 All paperwork generated during receiving, testing, and the final report of a sample is stored in a file cabinet or file storage boxes for retrieval.

11.8.5 A hardcopy of the invoiced report is mailed and also emailed to the customer as soon as the work order is completed and approved.

11.9 Other

11.9.1 Other documentation is also present in the lab. Quality control information such as surrogate recovery control charts, tabulations of samples which indicate when duplicates or matrix spikes are required (every 10 or 15th sample), etc. are also present.

12.0 DATA VALIDATION

12.1 Purpose and Scope

12.1.1 This section explains the need for data validation and the methods of data validation, which will be employed by this laboratory. Data validation can be accomplished by several methods and can be manual or computerized.

12.1.2 Data validation is the process in which data is checked, accepted, or rejected based on a set of criteria. Validation is performed to ensure that the data generated accurately reflects the true values and to isolate spurious values, which may not have been automatically rejected.

12.2 General

12.2.1 Validation of data involves many aspects of the data generation process. It requires review by all individuals involved with a particular sample, instrument, or QA/QC program. Data validation involves the following:

12.2.1.1 Sample collection, receipt, and in-lab sample control: Samples must have been collected and delivered to the facility in the appropriate containers, with appropriate preservative, and within prescribed holding times.

12.2.1.2 Analytical methodologies and analysts: Methods and procedures are validated and the results of the validation process kept on file in the QA/QC Coordinator's file. The methodology was discussed earlier in this manual. The individual analyst plays an important role in determining the validity of data as it is generated. Instrument performance, QC criteria, standard responses, reagent blank analysis, matrix spikes, and duplicates all influence the determination that client data is valid. Each method SOP has specified criteria for determining the validity of the experiment. Data values, which appear to be above or below normal values expected for the sample matrix or project, will be investigated.

12.2.1.3 Lab Directors function is to audit the documentation created/maintained by the individual analysts concerning instruments, methods, finished data reported to clients, specific project requirements, and all QC results.

12.2.1.4 QA Coordinator: The QA Coordinator establishes and revises those conditions by which the validity of the data is judged. These include; determining warning and control limits for matrix spike recoveries, surrogate recoveries, and Relative Percent Deviation (RPD). The QA Coordinator ensures current test methods and SOPs are being employed and that analysts are properly trained to perform assigned tasks. The QA Coordinator also reviews data management procedures implemented to assure accuracy in client report transcriptions.

12.2.1.5 Administrative personnel: Administrative personnel is responsible for maintaining data validity through control measures designed to eliminate all typing or transcription errors, to provide reports which contain all required information in a clear and concise

manner, and to provide reports which meet all the validity requirements of the client's project and of the lab.

13.0 NON-CONFORMANCE, CUSTOMER CONCERNS, MCL VIOLATIONS, AND AUDITS

13.1 Purpose and Scope

13.1.1 This section sets forth the procedures and responsibilities for handling experiments in which QC indicates deviations from established norms, customer concerns/complaints, MCLvilolation, and negative audit results. This section applies to all technical complaints regardless of the source.

13.2 Experimental Non-conformance

13.2.1 Due to the complex nature of many of the experiments and the high level of quality being carried out, deviations from established norms may occur. Deviations may be due to gradual changes in the hardware from the initial conditions. There may be deviations due to changes in standard solutions or matrix effects of samples, which may also influence surrogate recoveries, etc.

13.2.2 When deviations occur, the analysts evaluate the system and the data to warrant continuing the experiment and using data generated.

13.3 Customer Concerns and Complaints

13.3.1 All technical complaints and negative comments or suggestions from customers, government agencies, or other sources outside the laboratory will be turned over to the Quality Control Coordinator for review, handling, and reply. In each case, he will advise the individuals concerned as to the nature of the complaint. Additionally, he will initiate corrective action and the finding of a solution to the problem, the Quality Control Coordinator will advise the customer accordingly.

13.4 MCL Violations

13.4.1 Notification of High Contaminant Levels. The chemistry supervisor or designee must notify the appropriate regulatory agency or drinking water coordinator by phone as soon as feasible of any nitrate and nitrite level exceeding the current MCL including subcontracted samples. Notification must also be made when any other regulated chemical or radiological contaminant exceeds four (4) times the MCL.

13.4.2 Notification of Positive Microbiological Results. The microbiological supervisor or designee is responsible for an immediate telephone notification to the appropriate regulatory agency in the case of a positive result for a microbiological test. If the RA or DWC is not available, the results must be given to the person designated by the RA or DWC to take the information.

13.5 Negative Audit Reports

13.5.1 In the case of corrective action taken to satisfy the comments or suggestions of outside auditors from accrediting organizations, an in-depth investigation of the problem area will be undertaken. Evaluations of the equipment, standard/sample prep, analyst training, etc. will be documented. A detailed explanation will be given of measures taken to prevent recurrence of problems causing the negative comments. These reports will be filed in the QA/QC file.

14.0 SUBCONTRACTING

14.1 Purpose and Scope

14.1.1 This section applies to outside laboratories doing analytical or testing work on a contract basis.

14.2 Quality Assurance in Contract Laboratories

14.2.1 Each contract laboratory, which this laboratory employs for providing testing services, chemical analyses, or calibration services, will maintain its own internal quality assurance system.

15.0 PERSONNEL QUALIFICATIONS AND TRAINING

15.1 Purpose and Scope

15.1.1 The purpose of this section is to set forth the training methods, evaluation, and qualification procedure used in the laboratory. All personnel involved in any function affecting data quality (sample receipt, analysis, testing, data reduction, and quality control and assurance) will have sufficient training and technical expertise to generate complete high-quality data.

15.1.2 The Quality Control Coordinator is responsible for seeing that the required training is made available to this personnel.

15.2 Qualifications

15.2.1 The laboratory evaluates all prospective job applicants for scientific knowledge and professionalism. Minimum scientific requirements for specific job categories are given in the standard operating procedure manual. These follow the guidelines given for skill ratings and requirements in the "Handbook of Analytical Quality Control in Water and Wastewater Laboratories" published by the EPA (document EPA-600/4-79-019, Chapter 9) and the EPA Contract Laboratory Program (CLP) Statement of Work (document OLM01.0, section III).

15.3 Continuing Education Opportunities

15.3.1 In addition to prior work and educational experience, ATL actively encourages its employees to expand and refine their job skills and knowledge.

15.4 In-House Training

15.4.1 ATL conducts in-house training on chemistry, analytical methods/techniques, QA/QC principles, etc. These add to the general and specific knowledge and skill of its employees.

15.5 In-House Training Methods

15.5.1 On the job an experienced analyst provides training to a new analyst. The analyst will be given sufficient time during the training process to interact extensively with the experienced trainer in order to understand the theoretical principles of the procedure and to observe the actual work being conducted in an unhurried, controlled manner.

15.5.2 Next, the analyst will perform the operation under the direct supervision of the experienced analyst. The analyst then performs the experiment independently with limited supervision.

15.6 Training Evaluation

15.6.1 Training will be evaluated in terms of (1) level of knowledge and skill achieved by the operator from the training, and (2) the overall effectiveness of the training including determination of the training areas, which need improvement.

16.0 QUALITY CONTROL PROTOCOL

16.1 Purpose and scope

16.1.1 The minimum requirements of this program consist of an initial demonstration of laboratory capability, and the periodic analysis of laboratory reagent blanks, fortified blanks, and other laboratory solutions as a continuing check on performance. The laboratory will maintain performance records that define the quality of the data that are generated.

16.2 Initial Demonstration of Performance

16.2.1 The initial demonstration of performance is used to characterize instrument performance (determination of LCRs and analysis of QCS) and laboratory performance (determination of MDLs) prior to performing analyses by various methods.

16.3 Linear Calibration Range (LCR)

16.3.1 *This applies only if a single standard is used for calibration.* The LCR will be determined initially and verified every 6 months or whenever a significant change in instrument response is observed or expected. The initial demonstration of linearity will use sufficient standards to ensure that the resulting curve is linear. The verification of linearity uses a minimum of a blank and three standards. If any verification data exceeds the initial values by ±10%, Linearity will be re-established. If any portion of the range is shown to be nonlinear, sufficient standards will be used to clearly define the nonlinear portion.

16.4 Quality Control Standard (QC) Prepared or purchased from a secondary source (different than the primary source used for calibration).

16.4.1 A Quality Control Standard is analyzed with each batch to meet data-quality needs. If the determined concentrations are not within ±10% of the stated values, the performance of the determinative step of the method is unacceptable. The source of the problem will be identified and corrected before continuing with on-going analyses.

16.5 Method Detection Limit (MDL)

16.5.1 MDLs are established for all analytes, using reagent water (blank) fortified at a concentration of two to five times the estimated instrument detection limit (IDL). To determine MDL values, analyze seven replicate aliquots on three nonconsecutive days of the fortified reagent water and processed through the entire analytical method. All calculations defined in the method are performed and the concentration values in the appropriate units are reported. MDLs are calculated as follows: MDL = (t) x (S) where t = Student's t value for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom [t=3.14 for seven replicates]; and S = standard deviation of the replicate analyses.

16.5.2 Ongoing Annual Verification Ensure that at least seven spiked samples and seven method blanks are completed for the annual verification. If only one instrument is in use, a minimum of seven spikes are still required, but they may be drawn from the last two years of data collection.

16.6 Laboratory Reagent Blank (PBLK)

16.6.1 The laboratory analyzes at least one PBLK with each batch of samples. The LRB is analyzed exactly like a sample. Data produced is used to assess contamination in the laboratory environment. Values that exceed the MDL; laboratory or reagent contamination should be suspected and corrective actions are taken before continuing the analysis.

16.7 Laboratory Fortified Blank (LFB)

16.7.1 The laboratory analyzes at least one LFB with each batch of samples. The LFB is analyzed exactly like a sample. Accuracy is calculated as percent recovery. If the recovery of any analyte falls outside the required control limits of 90-110%, that analyte is judged out of control, and the source of the problem should be identified and resolved before continuing analyses.

16.7.2 The laboratory uses LFB analyses data to assess laboratory performance against the required control limits of 90-110%. When sufficient internal performance data become available (usually a minimum of 20-30 analyses), optional control limits are developed from the percent mean recovery (x) and the standard deviation (S) of the mean recovery. This data is used to establish the upper and lower control limits as follows:

Upper control limit = x + 3S
Lower control limit = x - 3S

16.7.3 The optional control limits must be equal to or better than the required control limits of 90-110%. After each five to ten new recovery measurements, new control limits can be calculated using only the most recent 20-30 data points. Also, the standard deviation (S) data is used to establish an ongoing precision statement for the level of concentrations included in the LFB. This data will be kept on file and be available for review.

16.11 Instrument Performance Check Solution (IPC)

16.11.1 For all determinations, the laboratory will analyze the IPC (a mid-range check standard) and a calibration blank immediately

following daily calibration, after every tenth sample (or more frequently, if required), and at the end of the sample run. Analysis of the IPC solution and calibration blank immediately following calibration must verify that the instrument is within ±5% of calibration. Subsequent analyses of the IPC solution must verify the calibration is still within ±10%. If the calibration cannot be verified within the specified limits, the IPC solution is re-analyzed. If the second analysis of the IPC solution confirms calibration to be outside the limits, sample analysis is discontinued; the cause determined and/or in the case of drift, the instrument recalibrated. All samples following the last acceptable IPC solution must be re-analyzed. The analysis data of the calibration blank and IPC solution must be kept on file with the sample analyses data.

16.12 Laboratory Fortified Sample Matrix (MS)

16.12.1 The laboratory adds a known amount of analyte to a minimum of 10% of the routine samples. In each case, the MS aliquot must be a duplicate of the aliquot used for sample analysis. The analyte concentration must be high enough to be detected above the original sample and should not be less than four times the MDL. The added analyte concentration should be the same as that used in the laboratory-fortified blank.

16.12.2 If the concentration of fortification is less than 25% of the background concentration of the matrix, the matrix recovery should not be recalculated.

16.12.3 The percent recovery for each analyte is calculated, corrected for concentrations measured in the unfortified sample, and these values are compared to the designated MS recovery range 90-110%. Percent recovery is calculated using the following equation:

R=Cs-C/Sx100 where R=percent recovery, Cs=fortified sample concentration, C=sample background concentration, S=concentration equivalent of analyte added to sample.

16.12.4 As sufficient data becomes available (usually a minimum of 20-30 analyses), laboratory performance is assessed against recovery limits of 80-120%. When sufficient internal performance data becomes available to control limits are developed from percent mean recovery and the standard deviation of the mean recovery.

16.12.5 If the recovery of any analyte falls outside the designated MS recovery range and the laboratory performance for that analyte is shown to be in control, the recovery problem encountered with the MS is judged to be either matrix or solution related, not system related.

16.12.6 Where reference materials are available, they are analyzed to provide additional performance data. The analysis of reference samples is a valuable tool for demonstrating the ability to perform the method acceptably.

16.12.7 In recognition of rapid advances occurring in analyses, the analyst is permitted certain options, such as the use of different columns and/or eluents, etc., to improve the separations or lower the cost of measurements. Each time such modifications to the method are made, the analyst is required to repeat the Initial Demonstration of Performance.

16.12.8 The laboratory adopts additional quality assurance practices for use with these methods. The specific practices that are most productive depend upon the needs of the laboratory and the nature of the samples. Field duplicates may be analyzed to monitor the precision of the sampling technique. When doubt exists over the identification of a peak, confirmatory techniques such as sample dilution and fortification must be used. Whenever possible the laboratory should perform an analysis of quality control check samples and participate in relevant performance evaluation sample studies.

16.13 Instrument Detection Limit (IDL)

16.13.1 The IDL is the concentration equivalent to a signal, for the analyte of interest, which is the smallest signal that can be distinguished from background noise by a particular instrument.

16.13.2 Using reagent water (blank) to determine IDL values, analyze ten replicate aliquots processed through the entire analytical method.

16.13.3 IDLs are calculated as follows: IDL = Three times the Standard deviation (S) with ten replicate readings.

16.14 Mathematical Equations used to calculate each type of acceptance criteria.

All QA/QC data, limits and control charts, (UCL/LCL and UWL/LWL) are calculated and stored in the LIMS system under the QA/QC Test results file in a batch format.

16.14.1 % Recovery = analytical result *100 / spiked concentration.
16.14.2 Relative % difference = 100*ABS(analytical result - duplicate result) / ((analytical result + duplicate result) / 2).

17.0 DEFINITIONS.

17.1 Calibration Blank
- A volume of reagent water acidified with the same acid matrix as in the calibration standards. The calibration blank is a zero standard and is used to auto-zero the instrument.

17.2 Calibration Standard (CAL)
- A solution prepared from the dilution of stock standard solutions. The CAL solutions are used to calibrate the instrument response with respect to analyte concentration.

17.3 Dissolved Analyte
- The concentration of an analyte in an aqueous sample that will pass through a 0.45 µm membrane filter assembly prior to sample acidification.

17.4 Field Reagent Blank (FRB)
- An aliquot of reagent water or other blank matrices that is placed in a sample container in the laboratory and treated as a sample in all respects, including shipment to the sampling site, exposure to the sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the FRB is to determine if method analytes or other interferences are present in the field environment.

17.5 Instrument Detection Limit (IDL)
- The concentration equivalent to the analyte the signal which is equal to three times the standard deviation of a series of ten replicate measurements of the calibration blank.

17.6 Instrument Performance Check (IPC) Solution
- A solution of method analytes used to evaluate the performance of the instrument system with respect to a defined set of method criteria.

17.7 Laboratory Duplicates (DUP)
- Two aliquots of the same sample taken in the laboratory and analyzed separately with identical procedures. Analyses of the sample and the DUP indicates precision associated with laboratory procedures, but not with sample collection, preservation, or stored procedures.

17.8 Laboratory Fortified Blank (LFB)
- An aliquot of PBLK to which known quantities of the method, analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements.

17.9 Laboratory Fortified Sample Matrix (MS)

- An aliquot of an environmental sample to which known quantities of the method analytes are added in the laboratory. The MS is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations.

17.10 Laboratory Reagent Blank (PBLK)
- An aliquot of reagent water or other blank matrices that are treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents, and internal standards that are used with other samples. The PBLK is used to determine if method analytes or other interferences are present in the laboratory environment, reagents, or apparatus.

17.11 Linear Dynamic Range (LDR)
- The concentration range over which the instrument response to an analyte is linear.

17.12 Matrix Modifier
- A substance added to the graphite furnace along with the sample in order to minimize the interference effects by selective volatilization of either analyte or matrix components.

17.13 Method Detection Limit (MDL)
- The minimum concentration of an analyte that can be identified, measured, and reported with 99% confidence that the analyte concentration is greater than zero.

17.14 Quality Control Sample (QC)
- A solution of method analytes of known concentrations which are used to fortify an aliquot of PBLK or sample matrix. The QC is obtained from a source external to the laboratory and different from the source of calibration standards. It is used to check either laboratory or instrument performance.

17.15 Solid Sample
- For the purpose of this method, a sample taken from material classified as either soil, sediment or sludge.

17.16 Standard Addition
- The addition of a known amount of analyte to the sample in order to determine the relative response of the detector to an analyte within the sample matrix. The relative response is then used to assess either an operative matrix effect or the sample analyte concentration.

17.17 Stock Standard Solution

- A concentrated solution containing one or more method analytes prepared in the laboratory using assayed reference materials or purchased from a reputable commercial source.

17.18 Total Recoverable Analyte
- The concentration of analyte determined to be in either a solid sample or an unfiltered aqueous sample following treatment by refluxing with hot dilute mineral acid (s) as specified in the method.

17.19 Water Sample
- For the purpose of this method, a sample taken from one of the following sources: drinking, surface, ground, storm runoff, industrial or domestic wastewater.

18.0 CHANGES MADE FROM PREVIOUS REVISION.

Revision	Date	Responsible Person	Description of Change
17	March 2015	April Capello	Layout change in compliance with EPA guidance.
18	Jan. 2016	April Capello	Corrected typographical and spacing errors.
19	Feb. 2017	April Capello	Corrected typographical errors. Change in staff.
20	Nov. 2018	Walter Mueller	Corrections and additions from findings of the inorganic audit Nov. 14, 2018

Appendix A

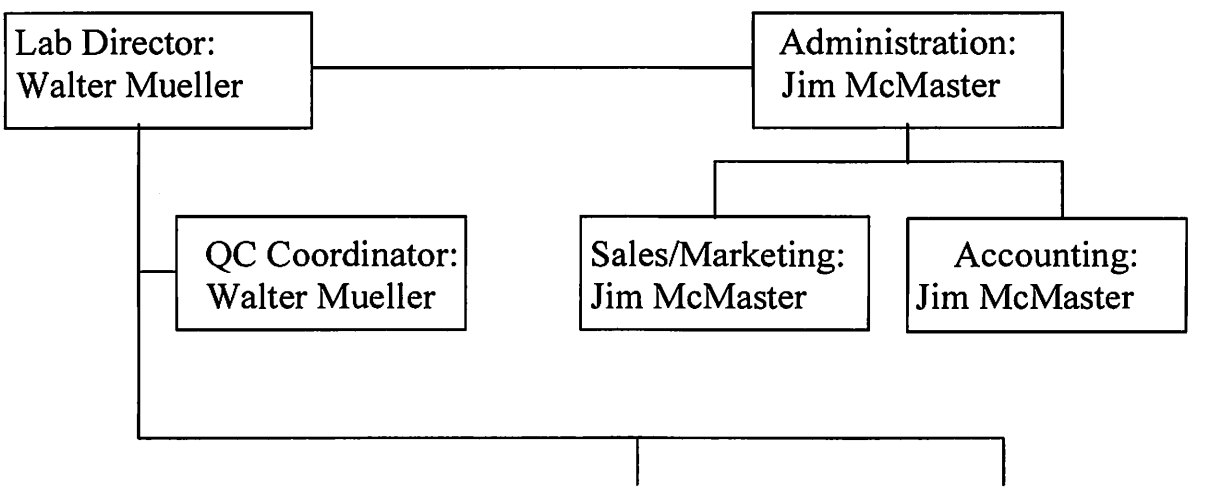
LABORATORY INSTRUMENTATION

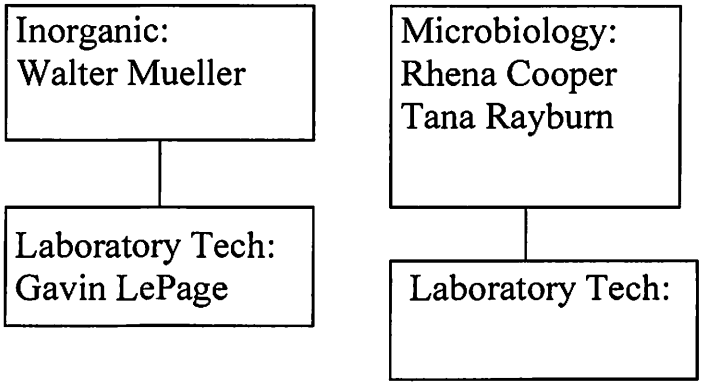
AGILENT 240Z AA Spectrometer
BARNSTEAD/THERMOLYNE Cimarec, Heated magnetic stirrer
BINDER Model 720BF Incubator
BRAND TECH, Accu-jet, Pipette controller
BRAND TECH, Dispensette III, the Bottle-top dispenser
BRAND TECH, Seripettor, Bottle-top dispenser
BRAND TECH, Titrette 25 ml, Burette
BRAND TECH, Transferpette 10-100 µl, 10-200 µl, 10 – 1000 µl, 100 µl, 1000 µl
BÜCHI Heating Block Digester K-437 for TKN
BÜCHI K-350, steam distillation for Ammonia and TKN
CETAC Mercury Analyzer Model 7500
E-control systems, temperature monitoring, remote access, and alert system
ELGA Purelab FLEX 2 with UV, Ultra Pure (Type 1) Water Polishing unit
ELGA Purelab R-7, Water Purification System, RO, UV, 75 L Reservoir
FISHER ISO-Temp incubators
FISHER Scientific Accumet 50 meter with Conductivity/pH/Ion Electrode
HACH 2100P Turbidimeter
HACH DR 5000 Spectrophotometer
HACH DR/700 Colorimeter

HACH Reactor Block 200
HAMILTON ML530b diluter/dispenser
HEPA filtered enclosure for Hot Block
HORIZON Oil and Grease, automated extraction instrument
HORIZON Speed Vap III, a solvent evaporator for Oil and Grease
HOT BLOCK 36 well for 50 ml samples, the Temperature range is ambient to 180°C
HOT BLOCK 54 well for 50 ml samples, the Temperature range is ambient to 180°C
IKA HS260, Horizontal shaker
IKA Topolino, Magnetic stirrer
IKA Tube Mill for impact milling or cutting milling
METROHM Ion Chromatograph 761 analyzer
METTLER Toledo FiveEasy pH meter
METTLER Toledo MS802S Balance
METTLER Toledo XS204 Balance
MIELE G 7883, Professional Laboratory Glassware Dishwasher
NAPCO Model 9000-D Autoclave
NATIONAL 9000-D Autoclave
OMEGA OSXL650 Infrared Thermometer
OVENS, distillation units, refrigerators, and other general chemistry equipment.
PANASONIC LabAlert electronic temperature probes (Incubators Water bath and Refrigerators)
PRECISION circulating water bath, large and small
REICHERT Quebec Colony Counter
YSI 5100 Dissolved Oxygen Meter
SEAL Flow Injection Analysis System AA3
THERMO SCIENTIFIC Electrothermal, Heating mantel, and glassware for cyanide distillation
TRITECH RESEARCH PourBoy 4, Variable Speed Sterile Media Dispenser
TUTTNAUER 2540EPK Autoclave
VARIAN ICP 720-ES Axial, Analysis System
VELP SMS scrubber for BÜCHI Heating Block Digester K-437

ACCURATE TESTING LABS, LLC

Organizational Chart
Figure 4-1





Appendix B

FORMS AND LOG SHEETS

Chemical Receipt Log

Date of rec'd/Initials	Chemical	Vendor	Lot #	Quantity	Exp. Date

Sample Receipt/Tracking/Preservation

LAB #	MATRIX	TEST	Location	Location 1	Location 2	Location 3	Location 4	Location5	DISPOSAL
	☐DW ☐ WW ☐Soil ☐ Non-Potable ☐OTHER		☐ Laboratory ☐ Fridge ☐ Storage ☐ Aliquot ☐ Preservation	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL
	☐DW ☐ WW ☐Soil ☐ Non-Potable ☐OTHER		☐ Laboratory ☐ Fridge ☐ Storage ☐ Aliquot ☐ Preservation	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL
	☐DW ☐ WW ☐Soil ☐ Non-Potable ☐OTHER		☐ Laboratory ☐ Fridge ☐ Storage ☐ Aliquot ☐ Preservation	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL
	☐DW ☐ WW ☐Soil ☐ Non-Potable ☐OTHER		☐ Laboratory ☐ Fridge ☐ Storage ☐ Aliquot ☐ Preservation	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL
	☐DW ☐ WW ☐Soil ☐ Non-Potable ☐OTHER		☐ Laboratory ☐ Fridge ☐ Storage ☐ Aliquot ☐ Preservation	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL	DATE TIME INITIAL

TURBIDITY LOG FOR DRINKING WATER PRESERVATION

SAMPLE	SAMPLE	RECEIVED	SAMPLE PRESERVED			TURBIDITY	
LAB #	DATE	TIME	DATE	TIME	READING	DATE	TI

Sample PREP/DIGESTION

Date: _____

LAB #	MATRIX	TEST(s)	Weight (g)/Vol (mL)	Final Vol (mL)	Acid (mL)	LFB, MS, MSD	Tech Initial
	☐ Liquid ☐ Solid ☐ Other		☐ g or ☐ mL		☐ HNO3 ☐ HCL ☐ H2O	ID Lot # Vol (*ul*)	
	☐ Liquid ☐ Solid ☐ Other		☐ g or ☐ mL		☐ HNO3 ☐ HCL ☐ H2O	ID Lot # Vol (*ul*)	
	☐ Liquid ☐ Solid ☐ Other		☐ g or ☐ mL		☐ HNO3 ☐ HCL ☐ H2O	ID Lot # Vol (*ul*)	
	☐ Liquid ☐ Solid ☐ Other		☐ g or ☐ mL		☐ HNO3 ☐ HCL ☐ H2O	ID Lot # Vol (*ul*)	
	☐ Liquid ☐ Solid ☐ Other		☐ g or ☐ mL		☐ HNO3 ☐ HCL ☐ H2O	ID Lot # Vol (*ul*)	
	☐ Liquid ☐ Solid ☐ Other		☐ g or ☐ mL		☐ HNO3 ☐ HCL ☐ H2O	ID Lot # Vol (*ul*)	
	☐ Liquid ☐ Solid ☐ Other		☐ g or ☐ mL		☐ HNO3 ☐ HCL ☐ H2O	ID Lot # Vol (*ul*)	

Chain of Custody

Accurate Testing Labs

7950 Meadowlark Way | Coeur d'Alene, ID 83815 | Phone: (208) 762-8378 | Fax: (208) 762-9082
E-mail: mueller@accuratetesting.com | Internet: http://www.accuratetesting.com

Results & Invoice to:

Name: _____
Address: _____
_____
Phone: _____ Fax: _____

Reporting Requirements:

Preliminary: FAX ☐ Verbal ☐ by: ___/___/___
Final Report: FAX ☐ Verbal ☐ by: ___/___/___
Rushes: 48 hrs.☐ Other:☐

Name of Sampler: _____

Project Information:

Project Name: _____
Project Number: _____
Purchase Order Number: _____

ANALYSIS REQUEST

Lab #	Sample ID	Date	Time	Matrix	NO. OF CONTAINERS													Remarks/Sample Conditions

Relinquished by:	Date Time	Received by:	Date Time	Chain of Custody Seals
				☐ Yes ☐ No ☐ N/A
				☐ UPS ☐ FedEx
				☐ Bus ☐ Hand

Appendix B-1
Sampling QA/QC Plan

Priest River Sampling Procedures

This document provides guidelines to be used by Priest River staff for collection of samples collection of chemistry samples for water analysis and is based primarily on guidelines used by the EPA Region 8 Laboratory staff. The sampler is urged to check with the laboratory performing the analysis to ensure that the bottles, preservatives, and holding times which are to be employed are compatible with the methods used by the laboratory.

SAMPLING FOR UNPRESERVED CLASSICAL CHEMISTRY CONSTITUENTS INCLUDING NUTRIENTS, ANIONS, AND OTHER ANALYTES AS LISTED (IOCs)

Acidity, Alkalinity, Biological Oxygen Demand, Bromate, Chloride, Chlorite, Color, Conductivity, Fluoride, Foaming Agents, Nitrate, Nitrite, Odor, o-Phosphate, Residues, Silica, Sulfate, Surfactants, Total Dissolved Solids, Total Suspended Solids, Turbidity

Bottles to Use

Or

Plastic or glass bottles may be used but plastic is preferred.

Preservative to Use Cool to ≤ 4 °C (≤ 39.2 °F)

Holding Times

Most of these analytes have short holding times. Deliver samples to the lab the same day if possible or ship via overnight delivery. Check with the lab regarding the holding times for the specific analytes of interest.

Acidity – 14 days
Total Suspended Solids – 7 Days
Turbidity – 48 Hours

Sampling Instructions

Check with the laboratory on the sample volume required for analysis. Wear gloves and eye protection when collecting samples. Rinse the bottle and cap three times with sample water and fill the bottle to within one to two inches from the top. Place the sample into a cooler with ice for immediate delivery or shipment to the laboratory.

SAMPLING AND COLORIMETRIC ANALYSIS FOR DISINFECTANT RESIDUALS

Free Chlorine, Combined Chlorine, Chloramines, Total Chlorine,

Bottles to Use

Glass test tubes are generally used.

Preservative to Use

None

Holding Times

Analyze Immediately On-Site

Sampling and Analysis Instructions for the DPD Colorimetric Methods

Several methods are approved for analysis of disinfectant residuals. A common method is the DPD Colorimetric Method (***Standard Methods***, 18th edition or later 4500-Cl G). Test kits for the DPD method are available commercially. The analyst should follow the specific directions provided with the test kit.

In general, the analyst will need to measure out a known volume of sample using a test tube or flask provided with the kit and will need to add the DPD reagents in the order described, wait a specific reaction time, and then measure the pink color that develops in the sample. The intensity of the pink color that develops after the addition of a reagent is measured using a spectrophotometer or a color comparator and relates directly to the amount of disinfection residual present in the sample.

Example Test Kits

SAMPLING FOR METALS (IOCs)

Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium (total), Hardness, Magnesium, Manganese, Mercury, Nickel, Selenium, Sodium, Silver, Thallium, Lead, Copper, Zinc, and other trace metals

Bottles to Use

Or

Or

*

Plastic or glass bottles may be used but plastic is preferred.

***Note:** 1000 mL wide-mouth bottles are recommended for collection of Lead and Copper Rule compliance samples

Preservative to Use

Nitric Acid (HNO_3) to pH < 2

Holding Times

28 days for mercury, 6 months for other metals

Sampling Instructions

Check with the laboratory on the sample volume required for analysis. Wear gloves and eye protection when handling acid and while collecting samples. If the bottle contains a preservative, do not rinse the bottle. If the preservatives are not included in the bottle, rinse the bottle and cap three times with sample water, fill the bottle, and then carefully add the preservatives following the instructions provided by the laboratory. The bottle should be filled to within one to two inches from the top. Deliver or ship the samples to the laboratory.

Lead and Copper Rule Compliance Samples: Refer to Item #9 in the General Sampling Instructions above. Do not remove aerators or rinse bottles. Use the bathroom tap if the kitchen tap has a water softener or point of use filter on it.

Note: If samples are not acid preserved, they must be received by the laboratory within 14 days of sampling.

SAMPLING FOR TOTAL TRIHALOMETHANES (TTHMs)

Bromodichloromethane, Dibromochloromethane, Tribromomethane (Bromoform), Trichloromethane (Chloroform)

Bottles to Use

Or

Clear or amber volatile organic analysis (VOA) glass bottles with Teflon septum-cap must be used.

Preservatives to Use

Check with the lab to verify the type of preservation required which depends on laboratory method in use. Generally, preservation includes the following…

Sodium Thiosulfate or Ascorbic Acid if sample chlorinated
and **Hydrochloric Acid (HCl) to pH < 2** and
Cool to ≤ 4 °C (≤ 39.2 °F) but do not freeze

Holding Time

14 days

Sampling Instructions

Check with the laboratory on the sample volume required for analysis. Typically duplicate samples must be collected (triplicate preferred) at each sampling location. Wear gloves and eye protection when handling acids and other preservatives and while collecting samples. Do not rinse the bottle as it should contain the preservatives before it is filled. Check to make sure this is the case and if not add the preservative. Slowly fill the bottle by allowing the sample to gently flow down the inside of the bottle. Create a meniscus of water at the mouth so that the bottle is actually overfilled. Cap the bottle so that no air bubbles are present in the bottle and the excess water spills down the sides of the bottle. Check to make sure that the bottle does not contain bubbles by inverting the bottle several times. Place the sample into a cooler with ice for delivery or shipment to the laboratory.

Appendix B
Sample Discharge Report Table

Table 1: Monthly Discharge Report Table										
	TSS (mg/L)	Total Chlorine Residual (mg/L)	Ph	Temperature (°C)	Flow (gpd)	Hardness (mg/L as CACO)	Aluminum (µg/L)	Metals (µg/L)	TTHM (µg/L)	Turbidity (NTUs)
Date	Grab	Grab	Grab	Grab	Continuous	Grab	Grab	Grab	Grab	Grab

Appendix C
Notice of Intent

NOTICE OF INTENT

City of Priest River

Owner Information

Mayor James Martin
City of Priest River
208-448-2123
jmartin@priestriver-id.gov
552 High Street
PO Box 415
Priest River, ID 83856

Operator Information

Cory Coleman
City of Priest River
208-448-2123
ccoleman@priestriver-id.gov
552 High Street
PO Box 415
Priest River, ID 83856

Facility Information

Facility Address:
City of Priest River Drinking Water Facility
547 Montgomery Street
Priest River, ID 83856

The Drinking Water Facility is not located on Indian Country and the facility name has not changed in the past five years.

Location map:
See Attachment 1 for location map.

Location information:
The Drinking Water Facility is located at 547 Montgomery Street in Priest River, ID. The location of the outfall is at 48.178945° latitude and -116.903077° longitude. The outfall location is noted on the location map.

Other Permits and Approvals:
The Facility submitted a Shallow Injection Well Inventory Form to IDWR in 2012. The permits are included in Attachment 3.

Operations and Production Information (Project Plan)

A drawing of the water flow through the facility with a water balance, showing operations contributing wastewater to the effluent and treatment units, or provide a pictorial description of the nature and amount of any sources of water and any collection and treatment measures if a water balance cannot be determined.

See Attachment 2 for drawings of the system water flow. The raw water intake pumps pump water from Pend Oreille River to the water treatment filters. The filters are then backwashed and piped through a 24" waste line to the backwash concrete splitter boxes. The solids settle in the splitter boxes and the treated water flows into the dry well pond. Once the filters have completed the backwash process, the filtered water runs through the filters to filter to waste pipes until the correct turbidity is reached.

Pollutant Characterization

Total suspended solids and chlorine residual are the pollutants that are present in the proposed effluent. Additionally, the City is testing for several other constituents. These are included in Attachment 4.

Description of Discharges

On average, the Facility initiates a backwash cycle every 80 hours and each backwash cycle discharges approximately 40,000 gallons for treatment. The Facility also discharges approximately 2,000 gallons upon daily operational system start-up.

Receiving Water Information

The discharge effluent from the filter backwash operations flows though the freshwater wetland, under the railroad tracks and road, and appears to finally discharge into the Pend Oreille River. Additionally, the emergency overflow also has the potential to discharge to the adjacent wetland and eventually discharge to the Pend Oreille River.

The designated beneficial use of Pend Oreille River is:

- Aquatic life – cold: water quality appropriate for protecting and maintaining a viable aquatic life community for cold-water species.
- Recreation – Primary contact recreation applies to waters where people engage in activities that involve immersion in, and likely ingestion of, water, such as swimming, wading, and infrequent swimming.

Below is the species list for Bonner County, Idaho found on the U.S. Fish & Wildlife Service website on 3/10/2020:

- Mammals
    - North American Wolverine (Proposed Threatened)
- Fishes

- Bull Trout (Threatened)

The minimum flow measured by USGS at Pend Oreille River is 4,050 cfs and the maximum annual measured flow is 133,000 cfs.

The surface water that the Facility discharges to has been included on the state's 303(d) list of impaired waterways. Pend Oreille River is listed for the following pollutants: Dissolved gas, supersaturation, and temperature. The proposed pollutants to be discharged are not anticipated to contribute to the impaired waterway pollutants.

Request for Mixing Zone

The Facility is not requesting the IDEQ consider a mixing zone for one or more pollutants required.

No Dilution Statement

The Facility will not use dilution as a form of treatment to comply with the effluent limits in the DWGP.

ATTACHMENT 1:

Location Map

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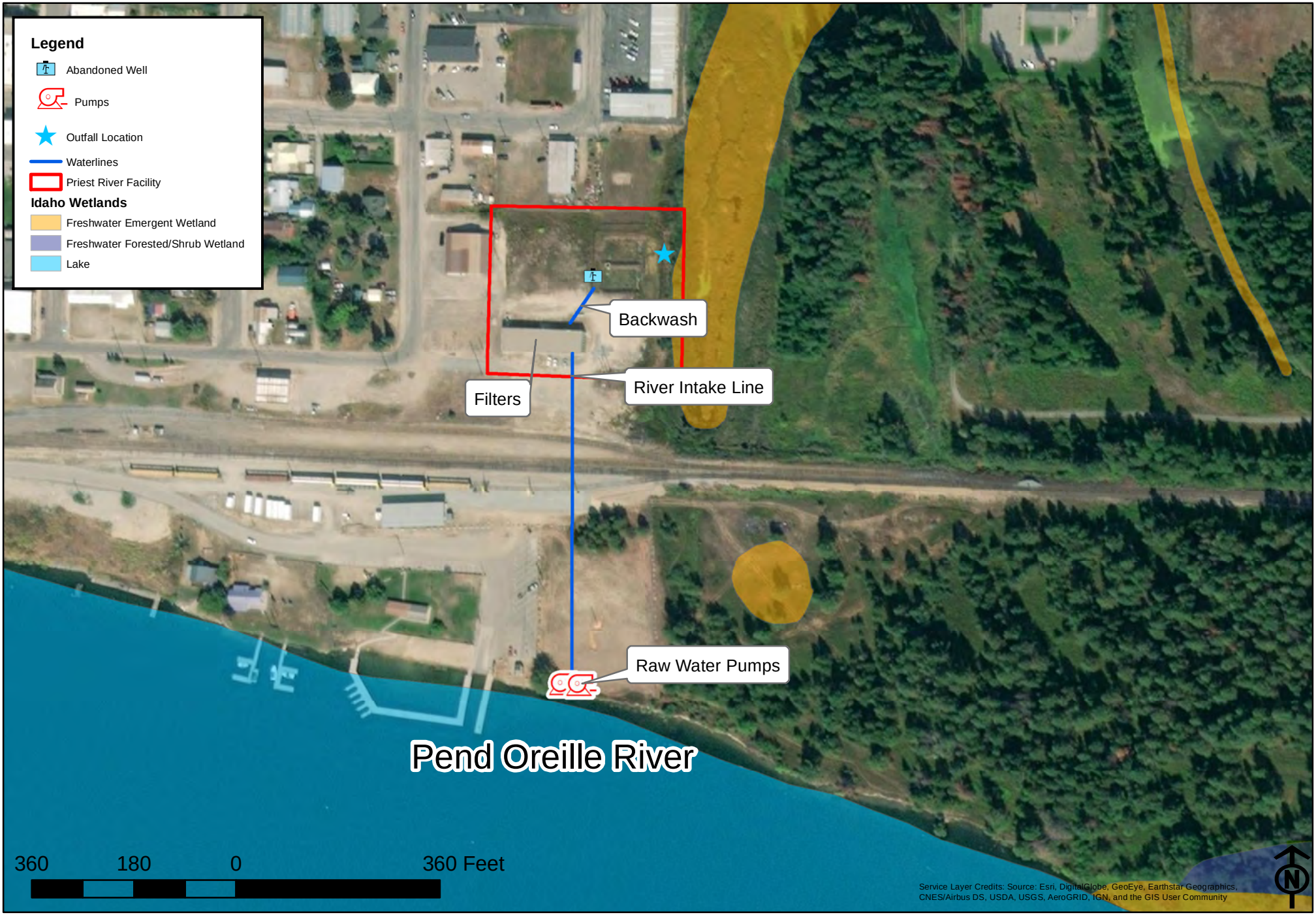
ENGINEERS | SURVEYORS



Sources:

WELCH-COMER
ENGINEERS | SURVEYORS
www.welchcomer.com 208-664-9382

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City of Priest River

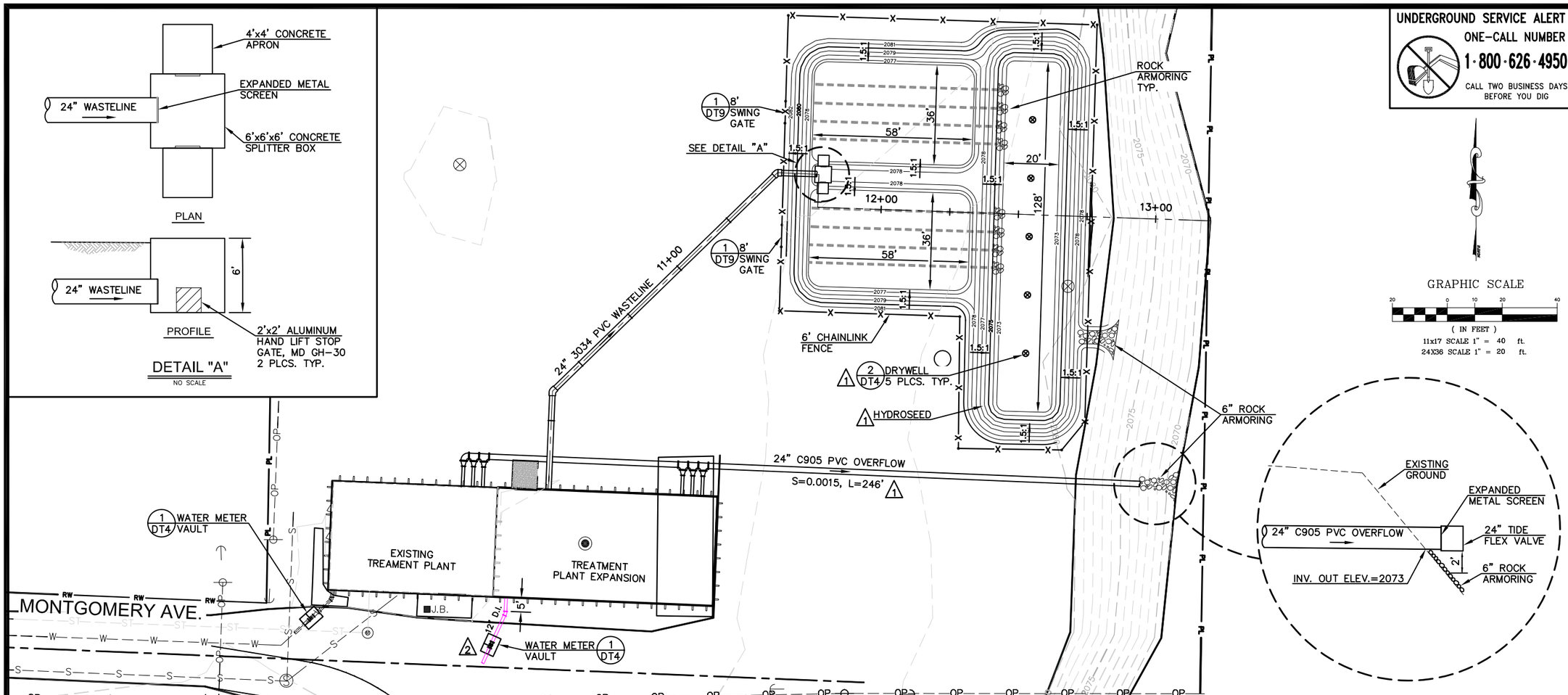
Location Map

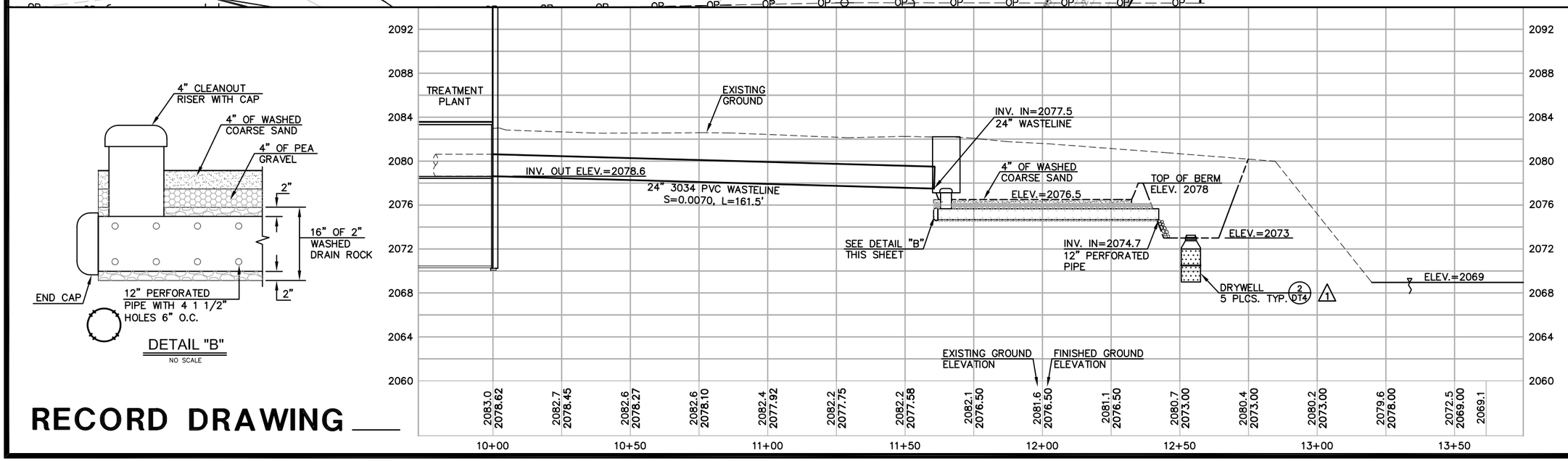
PROJECT NO.....14778
DRAWN BY.....LP
FILENAME.....NOILocationMap
DATE.....3/10/2020

ATTACHMENT 2:

Plans

WELCH-COMER
ENGINEERS | SURVEYORS





RECORD DRAWING

UNDERGROUND SERVICE ALERT
ONE-CALL NUMBER
1·800·626·4950
CALL TWO BUSINESS DAYS BEFORE YOU DIG

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PROFESSIONAL ENGINEER
REGISTERED
8276
STATE OF IDAHO
STEVEN B CORDES

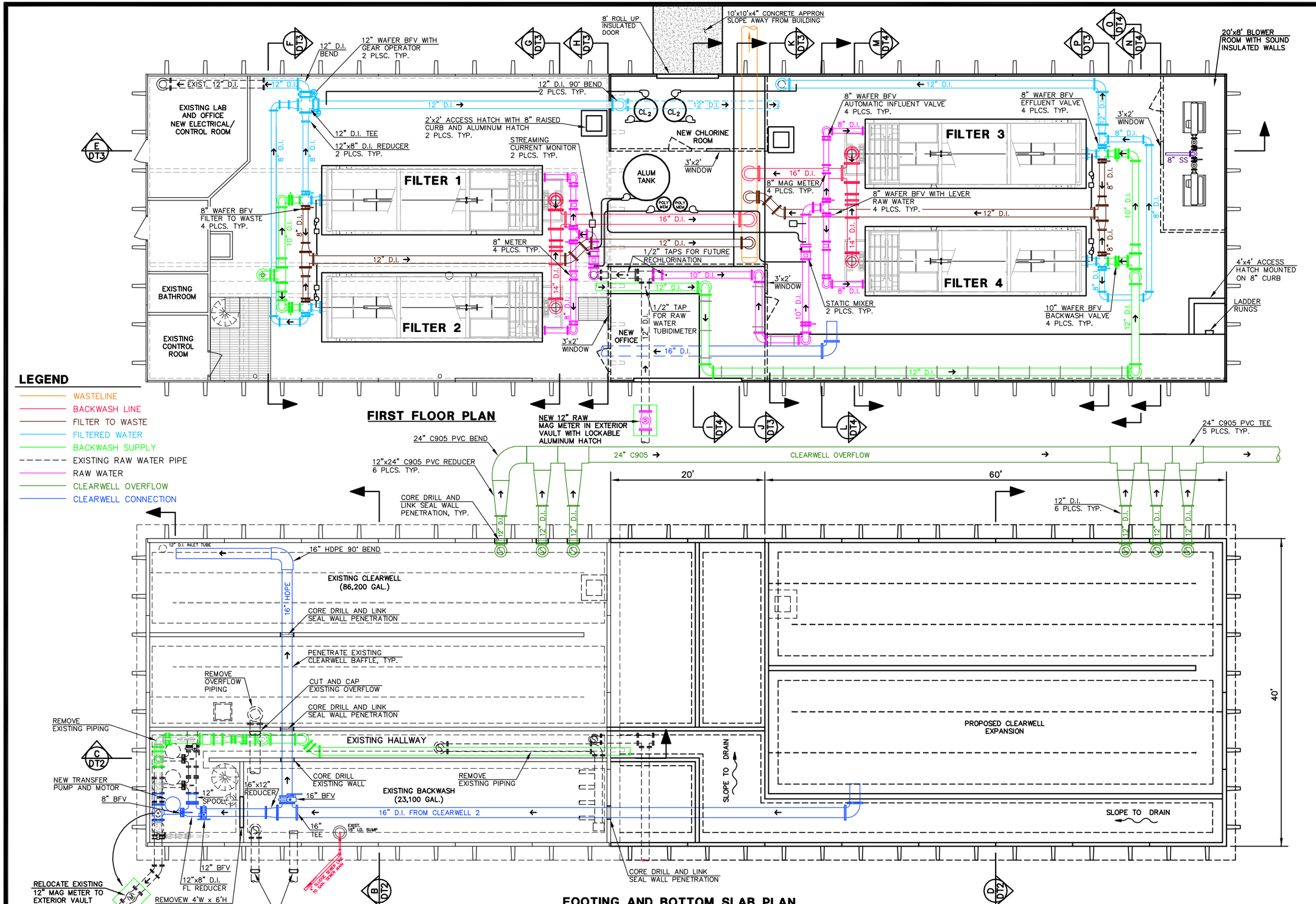
WELCH-COMER
ENGINEERS | SURVEYORS
www.welchcomer.com
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815
208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY
1.	08-03-11	ADDENDUM NO. 2	J.A.L.
2.	09-24-12	FIELD AS-BUILT INFORMATION	J.A.L.

CITY OF PRIEST RIVER
WATER TREATMENT PLANT
EXPANSION IMPROVEMENTS

BACKWASH SWALE
PLAN PROFILE

PROJECT NO.:	44009
DESIGNED BY:	SBC
DRAWN BY:	JAL
CHECKED BY:	
DWG NAME:	44009PL01.DWG
DATE:	07-06-11
SHEET NO:	C1



PROPOSED WATER TREATMENT PLANT EXPANSION

11x17 SCALE: 1"=12'
22x34 SCALE: 1"=6'

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(toll free) 877–815–5672
(fax) 208–664–5946

NO.	DATE	REVISION DESCRIPTION	BY

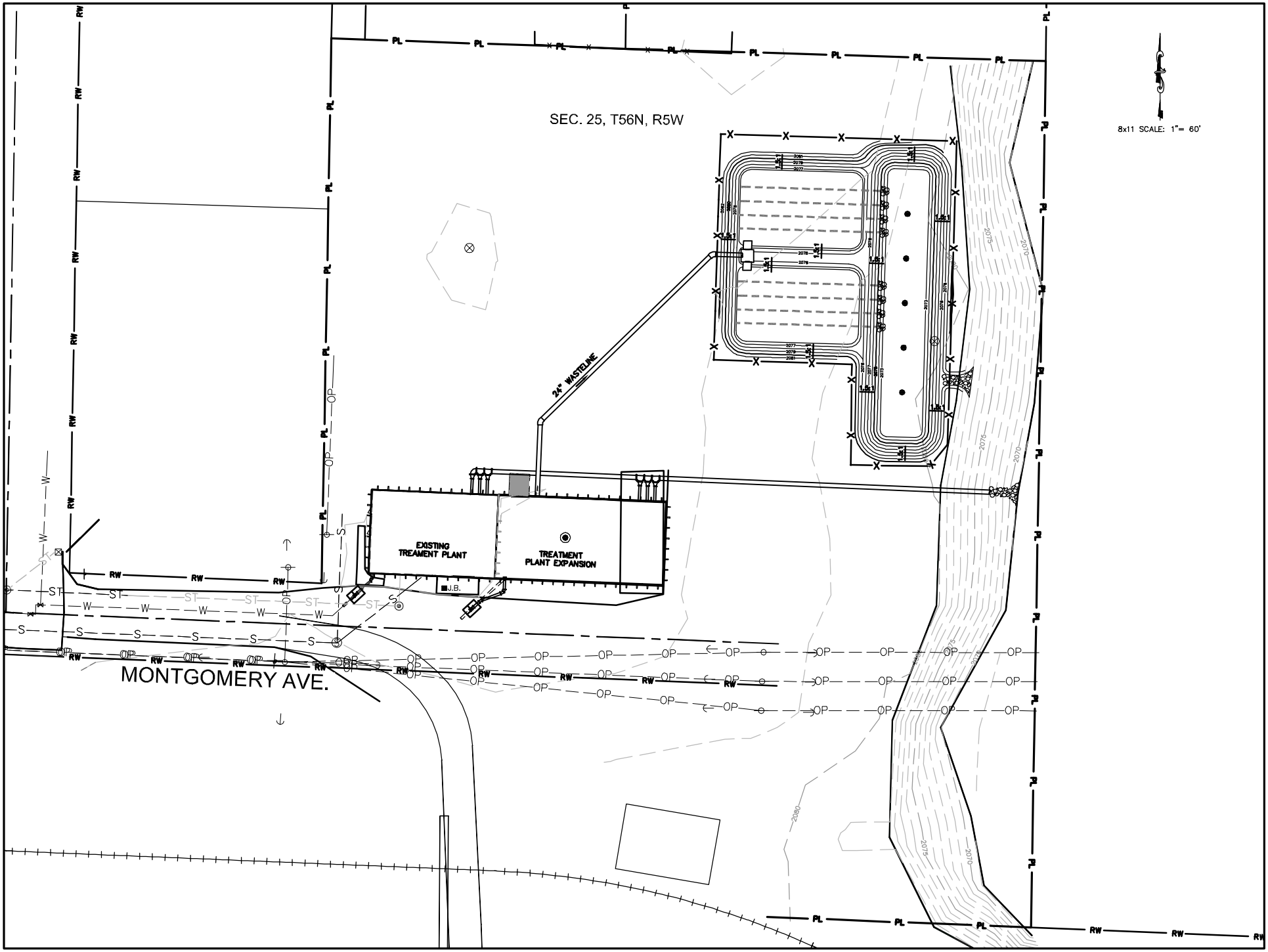
CITY OF PRIEST RIVER
WATER TREATMENT PLANT
EXPANSION IMPROVEMENTS

PROPOSED WATER TREATMENT PLANT EXPANSION PLAN VIEWS

PROJECT NO.:	44009
DESIGNED BY:	SBC
DRAWN BY:	JAL
CHECKED BY:	
DWG NAME:	44009DT01.DWG
DATE:	06–06–11
SHEET NO:	

DT1

\\Nas-01\CAD\CAD Projects\44009\dwg\44009DT01.dwg, 6/17/2011 8:43:19 AM, julie, 1:2


SEC. 25, T56N, R5W
8x11 SCALE: 1"= 60'
24" WASTELINE
EXISTING TREAMENT PLANT
TREATMENT PLANT EXPANSION
J.B.
MONTGOMERY AVE.
PL
RW
OP
ST
W
S
2080
2075
2070

ATTACHMENT 3:

Drywell Permit

WELCH-COMER
ENGINEERS | SURVEYORS

State of Idaho Department of Water Resources

Notice of Construction/Shallow Injection Well Inventory Form

Administered by

PANHANDLE HEALTH DISTRICT I

8500 N. Atlas Road ● Hayden, Idaho 83835 ● 208 / 415-5200

Under Provisions of Title 42 § Chapter 39 of the Idaho Code

Inventory No. _____

HD Number _____
Agency Use Only

I. GENERAL INFORMATION *(Required)* *See attachment for additional information*

Well / Project Name Priest River Water Treatment Plant Facility

Project Address 547 Montgomery Street

City Priest River County Bonner State Idaho Zip 83856

Name and Address of Legal Contact (Applicant): ☒ Owner ☐ Operator

Name City of Priest River

Street Address P.O. Box 415

City Priest River County Bonner State Idaho Zip 83856

Phone 208-448-2123 Alternate Phone _____

Well Class (see list below)	# of Wells
☐ 5D02 Storm Water Runoff	
☐ 5D04 Industrial Storm Runoff	
☐ 5A07 Closed Loop Heat Pump	
☐ 5W12 Water Treatment Plant Effluent	
☐ 5X28 Service Station Drainage	
☒ Other 5G30 Special Drainage Water **(See Section VI)**	5

If multiple wells with varying technical specifications are reported for inventory, please provide separate technical information. Use attachments if necessary.

$75.00 filing fee for each new shallow injection well

II. TECHNICAL DATA, SHALLOW INJECTION WELL (*Required)*

1. Type of Well Construction (See Attachment)

☐ a. Infiltration Gallery ☐ c. Pre_cast Open Bottom Dry Well ☐ e. Other _____ (attach drawing)

☐ b. French Drain ☒ d. Standard Shallow Injection Well

2. Injection Pre_treatment Facilities

☐ a. Sediment Basin ☐ c. Oil & Grease Trap ☐ e. Other _____

☒ b. Sand Filtration ☐ d. Vegetative Filter Strip or Swale

3. Anticipated Completion Date: May, 2012

4. Total square feet of area draining to the well: 3193 sq. ft (to all 5 wells)

5. Drinking water wells within 300 feet? ☐ Yes ☒ No

If yes, direction and distance _____

III. LOCATION INFORMATION (*As Required Below*)

Legal description information is required and must be completed entirely, unless highway information

Section 25, Township 56 ☒ N ☐ S, Range 5 ☐ E ☒ W
Parcel Number RPR00000250791A, RPR00000252833A
Subdivision Name N/A
Block N/A Lot N/A City Priest River County Bonner
The following pertains to state and local highway entities only. (*Optional if items above are used for location.)*
Feet N/A Direction N/A To: Milepost No. N/A Highway No. N/A
Is The Well Located on Indian Lands? ☐ Yes ☒ No

IV. ATTACHMENTS

Note: Attach additional sheets as needed.

☒ a. Site Maps Showing Well Locations

☒ b. Design Plans and Other Drawings or Schematics

☐ c. Copy of Reference from Technical Guidance Manual

☐ d. Name of Technical Guidance Manual and Agency Issuing Manual

☐ e. Other _____

☐ f. Name of Project Engineer Steven B. Cordes Phone 208-664-9382

I certify that the above information is true and correct to the best of my knowledge.

Signature, Title and Company Date

Print Signature and Title Steven B. Cordes, Principal Engineer

V. FOR AGENCY USE ONLY

Fee Paid $_____ Receipted by _____ Date_____ Receipt No. _____
Forwarded to IDWR_____ Date _____
Data Entry Date _____ By _____ Checked by _____
Field Checked Date_____ By _____ Findings _____
Size of Opening _____ Excavated Dimensions: Length Width _____ Depth _____

Remarks _____

VI. INJECTION WELL SUBCLASSES

Shallow Injection Well - Any excavation or artificial opening into the ground, less than 18 feet deep, which is bored, driven, drilled or dug for the purposes of temporarily or permanently storing fluids in the subsurface geologic formations.

5A07 Closed Loop Heat Pump Return
Reinject ground water used to heat or cool a building in a heat pump system.

5A19 Cooling Water Return
Used to inject water which was used in a cooling process, both open and closed loop processes.

5D02 Storm Water Runoff
Receive storm_water runoff from paved areas, including parking lots, streets, residential subdivisions, building roofs, highways, etc.

5D03 Improved Sinkholes
Receive storm_water runoff from developments located in a karst topographic area.

5D04 Industrial Storm Runoff
Wells located in industrial areas which primarily receive storm_water runoff but are susceptible to spills, leaks, or other chemical discharges.

5F01 Agricultural Runoff Waste
Receive irrigation tail waters, other field drainage, animal yard waste, feed lot, or dairy runoff, etc.

5G30 Special Drainage Water
Used for disposing of water from sources other than direct precipitation. Examples of this well type include: landslide control, drainage wells, swimming pool drainage wells, potable water tank, overflow drainage wells, and lake control drainage wells.

5R21 Aquifer Recharge
Used to recharge depleted aquifers and may inject fluids from a variety of sources such as lakes, streams, domestic wastewater treatment plants, other aquifers, etc.

5S23 Subsidence Control
Used to inject fluids into a non_oil or gas_producing zone to reduce or eliminate subsidence associated with overdraft of fresh water and or used for the purpose of oil or natural gas production.

5W12 Water Treatment Plant Effluent
Dispose of treated sewage or domestic effluent from small package plants up to large municipal treatment plants. (Secondary or further treatment.)

5X13 Mine Tailings Backfill
Used to inject a mixture of fluid and sand, mill tailings, and other solids into mined out portions of subsurface mines whether what is injected is a naturally occurring radioactive material or not. Also includes special wells used to control mine fires and acid mine drainage wells.

5W20 Industrial Process Water
Used to dispose of a wide variety of wastes and wastewaters from industrial, commercial, or utility processes. Industries include refineries, chemical plants, smelters, pharmaceutical plants, laundry mats and dry cleaners, tanneries, laboratories, petroleum storage facilities (storage tank condensation water), electric power generation plants (mixed waste stream of laboratory drainage, fireside water, and boiler blowdown), electroplating industries (spent solvent wastes), etc.

5X25 Experimental Technology
Wells used in experimental or unproven technologies such as pilot scale in situ solution mining wells in previously unmined areas.

5X26 Aquifer Remediation
Wells used to prevent, control, or remediate aquifer pollution, including, but not limited to Superfund sites.

5X27 Other Wells
Any other specified Class V wells. Well type / purpose and injected fluids must be specified.

5X28 Service Station Waste
Used to dispose of effluent from repair bay floor drains, body shop floor drains, and motor vehicle washing.

5X29 Abandoned Drinking Water Wells
Used for the disposal of wastes.

Panhandle Health District I Numbers

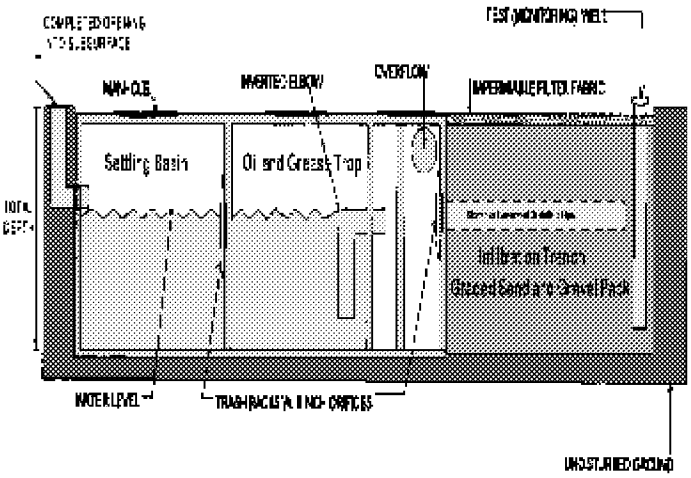
Kootenai, Benewah & Shoshone Counties: **VOICE:** 208/415-5200 ● **FAX**: 208/765-4309 ● **E-Mail:** phd1.Idaho.gov
Bonner & Boundary Counties: **VOICE:** 208/265-6384 ● **FAX:** 208/265-8550

IDWR Numbers

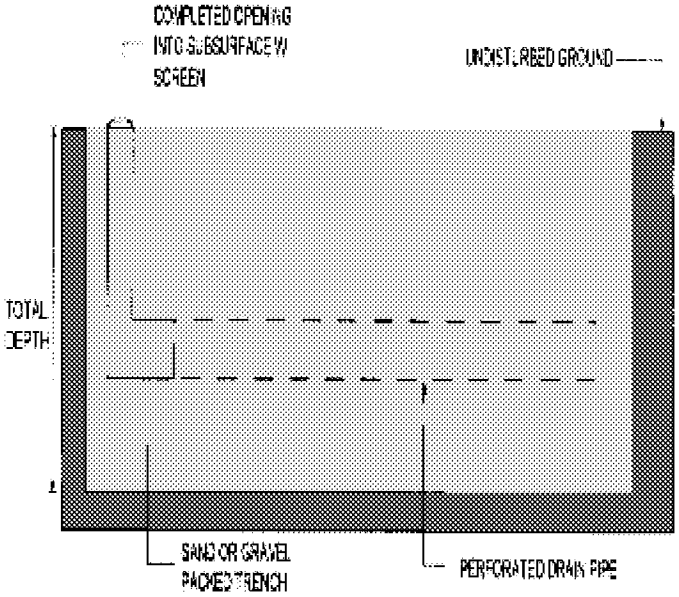
Coeur d'Alene Office: 208/769-1450 ● **Boise Office:** 208/327-7900

Shallow Injection Well - Generalized Construction Types

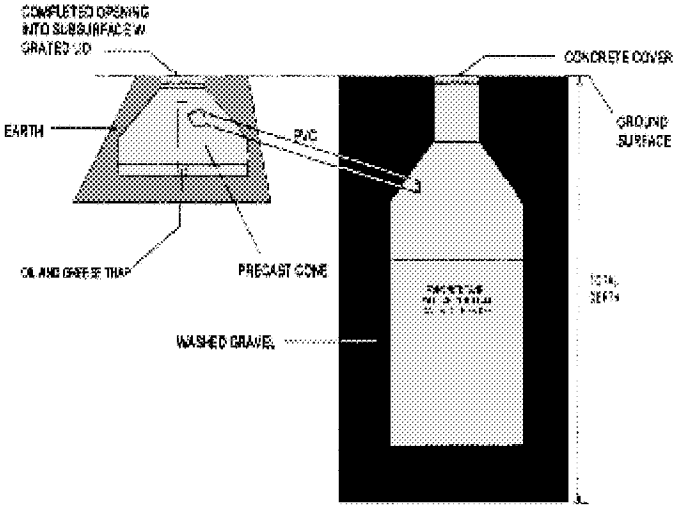
INFILTRATION GALLERY



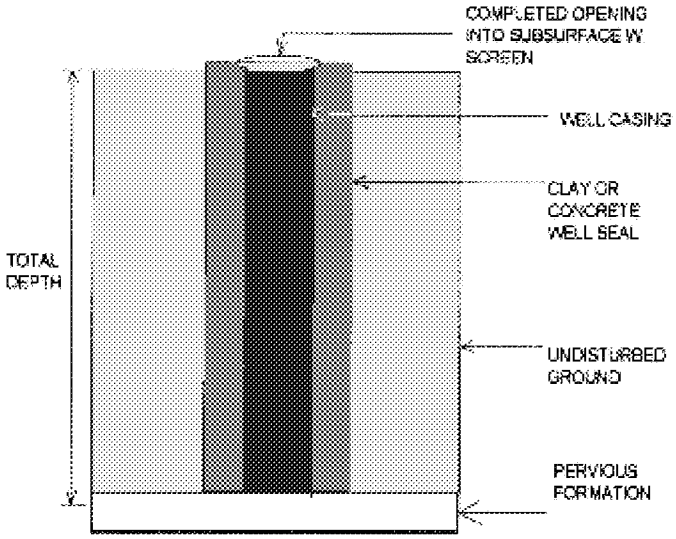
FRENCH DRAIN



PRECAST, OPEN BOTTOM DRY WELL



STANDARD SHALLOW INJECTION WELL



ATTACHMENT 4:
Pollutant Characterization

WELCH-COMER
ENGINEERS | SURVEYORS

Sampling Type and Schedule										
Sample Type	Continuous	Continuous	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Frequency	Continuous	Continuous	1/week	1/week	1/Month	1/Month	1/Month	1/Quarter	1/Year	1/Year
Sample Units	°C	gpd	mg/L		mg/L	mg/L as CACO	NTUs	µg/L	µg/L	µg/L
Effluent Limit[3]			0.01/0.02	6.5-9.0	30/45					
Date:	Temperature[2]	Flow[2]	Total Residual Chlorine[1]	Ph[2]	TSS[1]	Hardness[2]	Turbidity[2]	TTHM[2]	Aluminum[2]	Metals[2]

[1] Pollutants are identified due to the impaired satus of the receiving water body and the IDEQ

[2] Pollutants are measurements required by IDEQ

[3] Effluent limits are average monthly/maximum daily values

Instrument # 937079
Bonner County, Sandpoint, Idaho
04/12/2019 12:48:25 PM No. of Pages: 5
Recorded for CITY OF PRIEST RIVER
Michael W. Rosedale Fee: $0.00
Ex-Officio Recorder Deputy
Index to: EASEMENT

EASEMENT AGREEMENT

This Easement Agreement ("Easement Agreement") is made and entered into this 4th day of February, 2019 by and between Joslyn Manufacturing Company, LLC as successor in interest to Joslyn Mfg & Supply Co. ("Grantor") and the City of Priest River, an Idaho municipality, ("Grantee").

WHEREAS, Grantee desires to acquire an easement for the purpose of discharging water from the Grantee's potable drinking water treatment facility to the existing surface waters via Grantor's property more particularly described and depicted in **Exhibit A** ("Easement Property"), attached hereto and incorporated herein by this reference; and

WHEREAS, Grantor is willing to grant an easement for the aforesaid purposes on the terms and conditions set forth herein below.

NOW, THEREFORE, for good and valuable consideration by Grantee to Grantor, the covenants of Grantee herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor does hereby grant, and for and in consideration of the easement rights herein granted and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantee does hereby covenant and agree as follows:

1. Grant of Easement.

1.1 Grantor does hereby grant and convey unto Grantee, its successors, assigns, lessees, licensees and agents, an easement under and through the Easement Property, for the sole purpose of discharging water from the Grantee's potable drinking water treatment facility to the existing surface waters via the Easement Property described in **Exhibit A**.

1.2 Grantee shall also have the specific rights of ingress and egress, consistent with this Easement Agreement, for the construction, reconstruction, operation and maintenance of a drainage/discharge pipe and conveyance system, consistent with the easement provided herein. Subject to the other terms and conditions of this Easement Agreement, Grantee shall also have the right to remove impediments such as trees, asphalt and sidewalks as required for the use of the Easement Property for the purpose described above.

2. Operation and Maintenance.

2.1 Discharge water will consist of filter backwash water and waste water from the Grantee's potable drinking water treatment facility.

2.2 Water will be discharged by Grantee in compliance with all state and federal requirements.

2.3 Grantee will install and maintain a conveyance system to allow the water to be conveyed from the existing backwash basin to the surface waters. This conveyance system may take the form of a culvert, a rock lined open channel, or similar.

2.4 Water entering the Easement Property will not contain hazardous substances as defined in 42 U.S.C § 9600 et. seq. and will not contaminate Grantor's property.

2.5 Upon completion of any repair or maintenance work contemplated hereunder, Grantee agrees to promptly restore the above-described property owned by Grantor to a condition equal to that existing prior to exercising its rights under this Easement.

3. Grantor Defined. The word "Grantor" as used herein, whenever the context requires or permits, shall include the heirs, personal representatives, beneficiaries, successors, grantees and assigns of the owners of the land through which the easement runs, or the respective owners from time to time of portions thereof. The burdens and benefits of this Easement Agreement shall be deemed covenants running with said easements and said land.

4. Covenants of Grantee. Grantee hereby represents, covenants and warrants in favor of Grantor, and its successors and assigns, as follows:

4.1 Grantee shall protect the Easement Property, and the adjacent lands of Grantor over which Grantee has rights of ingress and egress, from damage caused, in whole or in part, by acts or omissions of Grantee, its employees, agents, contractors, subcontractors, assigns, lessees, licensees and agents.

4.2 Grantee further agrees to provide Grantor notice at least three (3) days prior to all construction, reconstruction, maintenance, removal and any other activities which disturb the Easement Property and to coordinate with Grantor so as to minimize any disruption to Grantor's property. Grantee hereby agrees to indemnify, defend, save and hold harmless the Grantor from any and all liability, loss or damage Grantor may suffer as a result of any and all actions, claims, damages, costs and expenses on account of, or in any way arising out of or from, this Agreement, including but not limited to indemnify and save and hold harmless Grantor from any and all losses, claims, actions or judgements for damages or injuries to person or property arising out of or from, or caused by, the construction, operation, maintenance and use of the Easement Property by Grantee or its agents. This indemnity shall continue so long as this Easement Agreement is in effect.

5. Retained Rights. Grantor shall have all rights to the Easement Property not granted hereby.

6. Miscellaneous.

6.1 Except as otherwise expressly provided herein, all provisions herein contained, including the benefits, burdens and covenants, are intended to run with the land and shall be binding upon and inure to the benefit of the respective successors and assigns of the parties hereto.

6.2 This easement constitutes all of the agreements, understandings and promises between the parties hereto, with respect to the subject matter hereof.

6.3 This easement shall be of no force and effect until this easement is duly and validly executed by all parties hereto.

6.4 The recitals set forth above are hereby incorporated by this reference.

7. Governing Law, Jurisdiction, and Venue. This Easement Agreement shall be construed and interpreted in accordance with the laws of the State of Idaho. The parties agree that the courts of Idaho shall have exclusive jurisdiction and agree that Bonner County is the proper venue.

GRANTOR:

Dated: April 10, 2019

Robert S. Lutz

ROBERT S. LUTZ

(Printed Name and Title) President

STATE OF _____)
) ss.
County of _____)

On this 10 day of April, 2019, before me Ivy Santomauro, personally appeared Robert Lutz known or identified to me to be the President of Joslyn Manufacturing Company LLC the corporation that executed the instrument or the person who executed the instrument on behalf of said corporation, and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

LANDRO SANTOMAURO NOTARY PUBLIC EXP. 3-14-22 DISTRICT OF COLUMBIA

NOTARY PUBLIC FOR Washington DC
Residing at _____
My Commission Expires March 14, 2022

Dated: 02/04/19

GRANTEE:

James L Martin, Mayor
City of Priest River, ID

ATTEST:

Laurel Thomas

Laurel Thomas, CMC, City Clerk
City of Priest River, ID

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ENGINEERS | SURVEYORS

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877-815-8872
208-664-5946
350 E. Kathleen Avenue
Coeur d'Alene, ID 83815

EASEMENT DESCRIPTION

That portion of of Government Lot 5 of Section 25, Township 56 North, Range 5 West, Boise Meridian, City of Priest River, Bonner County Idaho, described as follows:

Commencing at the Northeast corner of Warranty Deed recorded as Instrument Number 780412, records of Bonner County, thence along the East line of said Warranty Deed South 00°59'06" West a distance of 30.74 feet to the TRUE POINT OF BEGINNING:

Thence leaving said East line, South 78°08'40" East a distance of 32.21 feet;

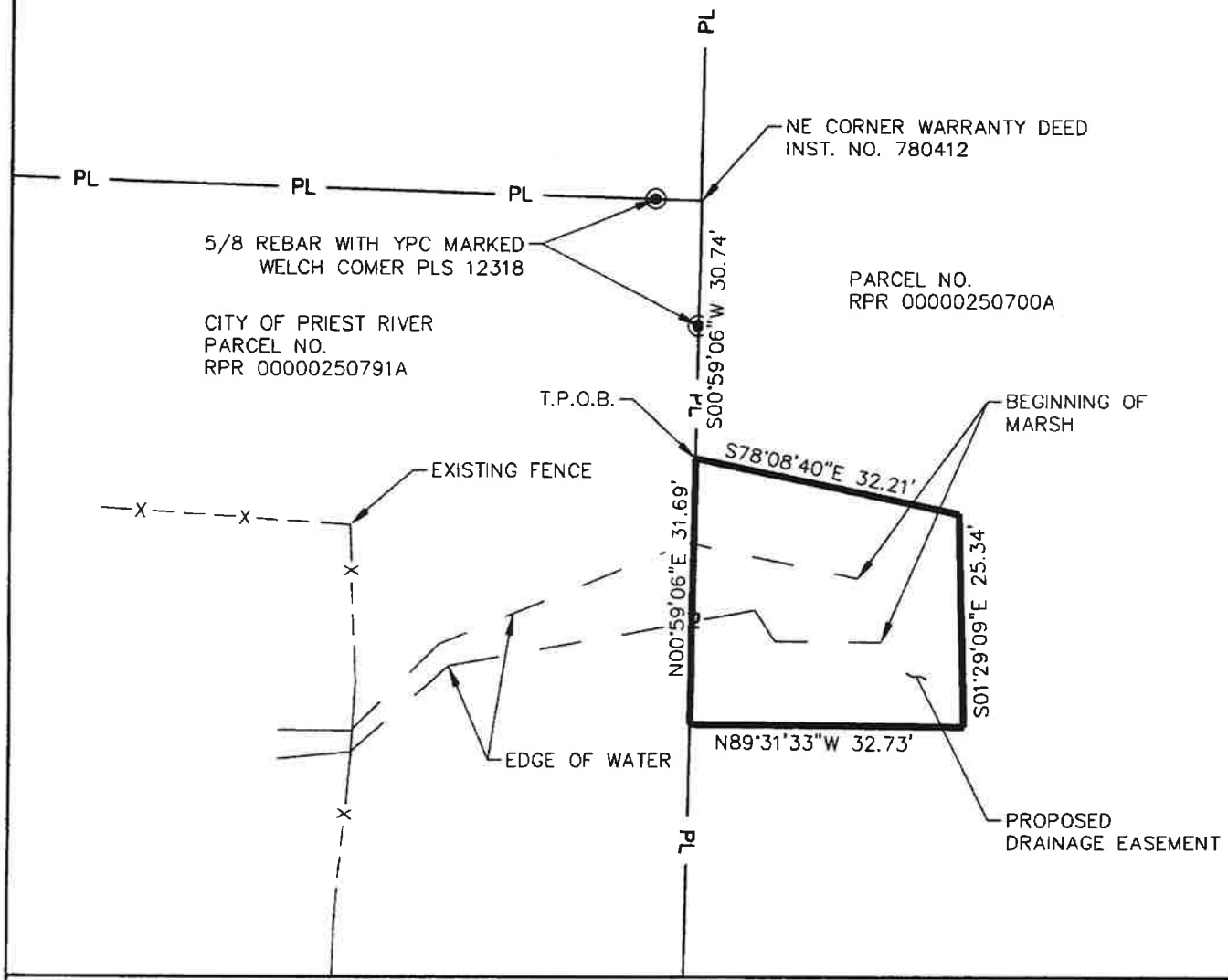
Thence South 01°29'09" East a distance of 25.34 feet;

Thence North 89°31'33" West a distance of 32.73 feet to said East line;

Thence along said East line North 00°59'06" East a distance of 31.69 feet to the **TRUE POINT OF BEGINNING.**

Containing 916 square feet or 0.021 acres more or less;

PROFESSIONAL LAND SURVEYOR
REGISTERED
12318
7-23-18
STATE OF IDAHO
MICHAEL LYNN HATHAWAY



SCALE: 1"=20'

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EXHIBIT A – PROPOSED DRAINAGE EASEMENT
PARCEL NO. RPR 00000250700A

SEC. 25, T.56N, R.5W, B.M., BONNER CO, ID.

PROJECT NO.:	14778.20.0
DESIGNED BY:	MLH
DRAWN BY:	GG
DWG NAME	14778.20EX01.DWG
DATE:	JULY, 2018
SHEET NO:	1 OF 1

APPENDIX I:

EXHIBITS 1-9

WELCH-COMER
ENGINEERS | SURVEYORS

Exhibit 1

Hour 0

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. No finished water pumps
3. Upper boosters on, fire pump off
4. 3,200 gpm fire flow at Beardmore Building
5. Both tanks start without OS and ES

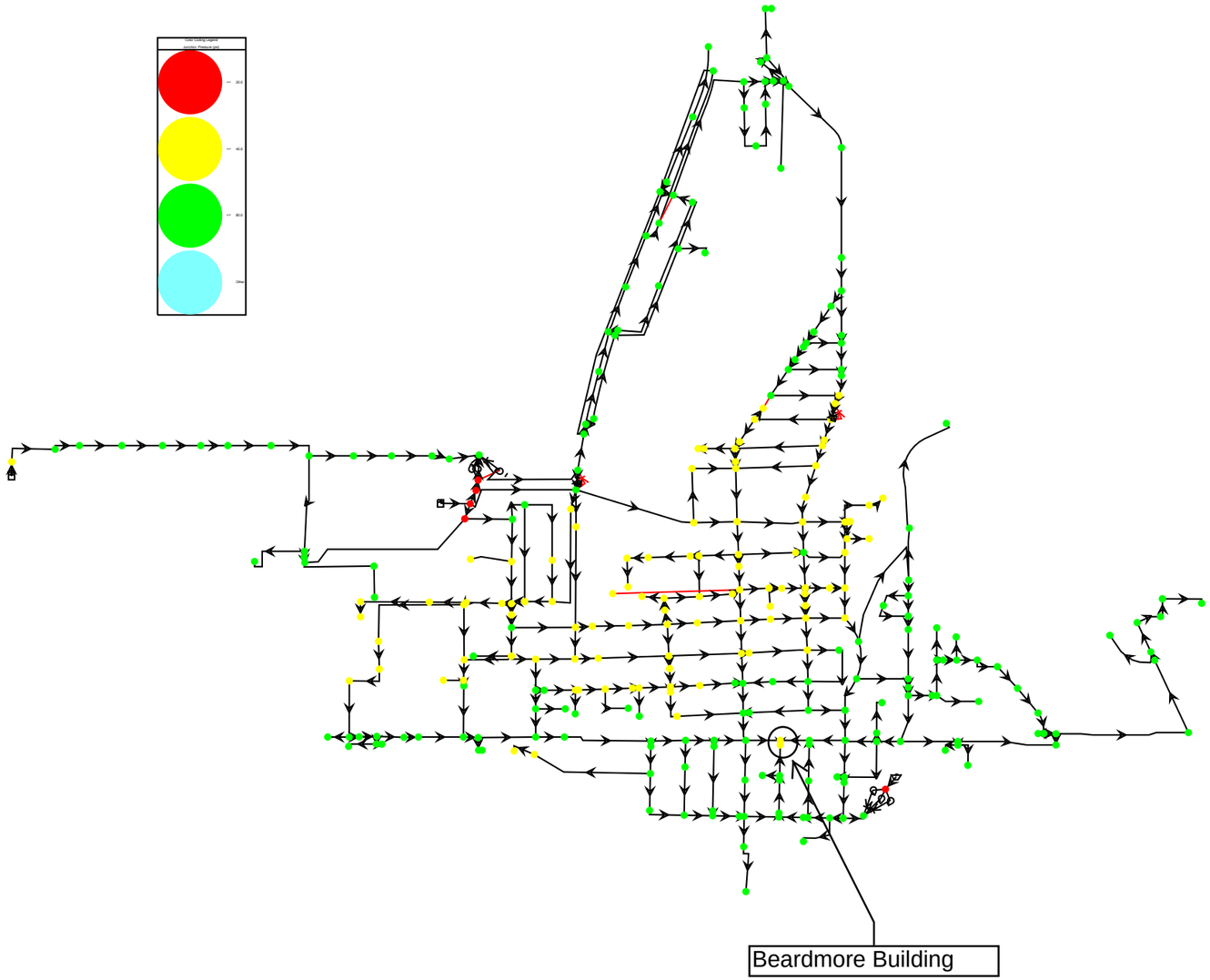


Exhibit 2

Hour 1.5

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. No finished water pumps
3. Upper boosters on, fire pump off
4. 3,200 gpm fire flow at Beardmore Building
5. Both tanks start without OS and ES

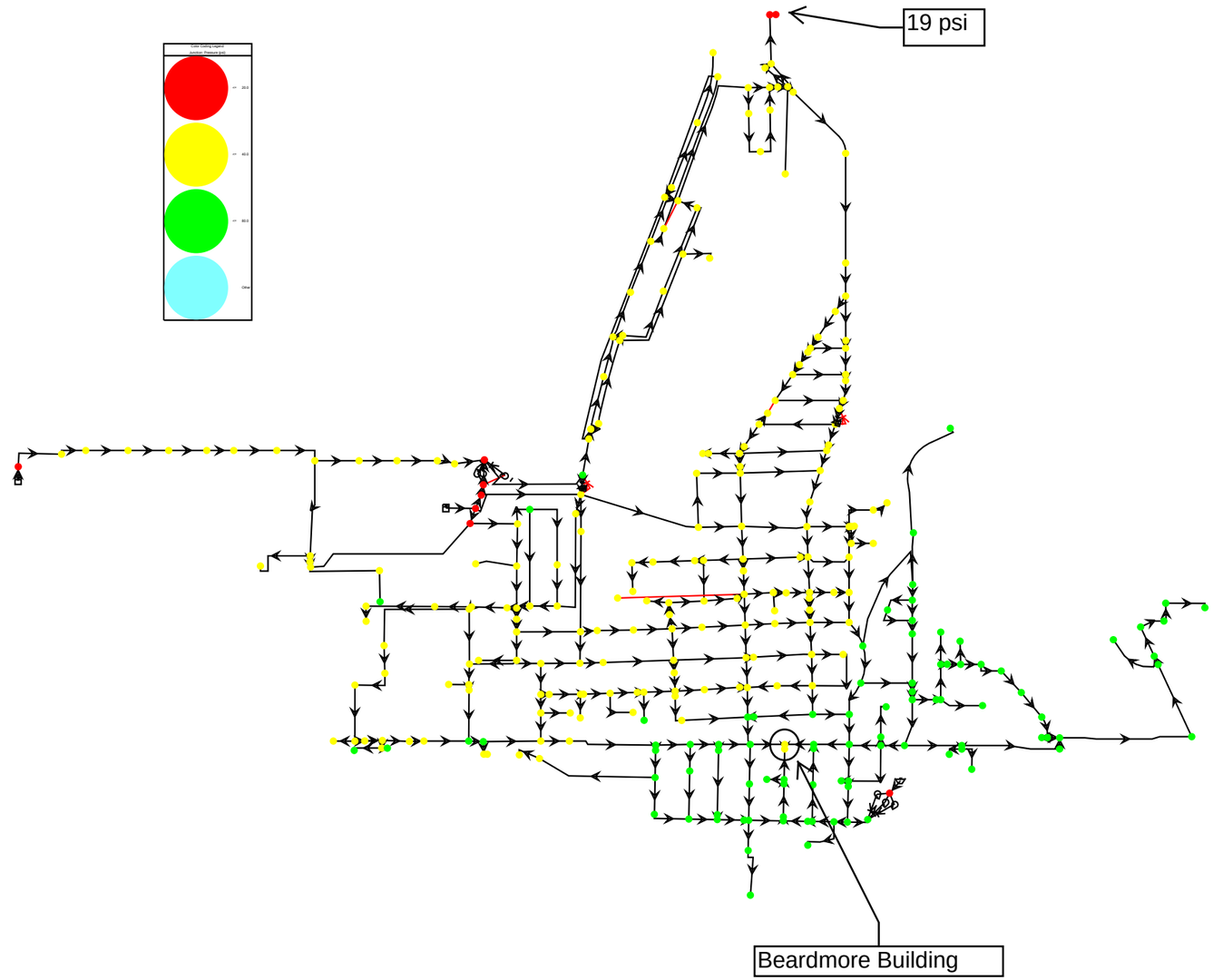


Exhibit 3

Hour 3

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. No finished water pumps
3. Upper boosters on, fire pump off
4. 3,200 gpm fire flow at Beardmore Building
5. Both tanks start without OS and ES

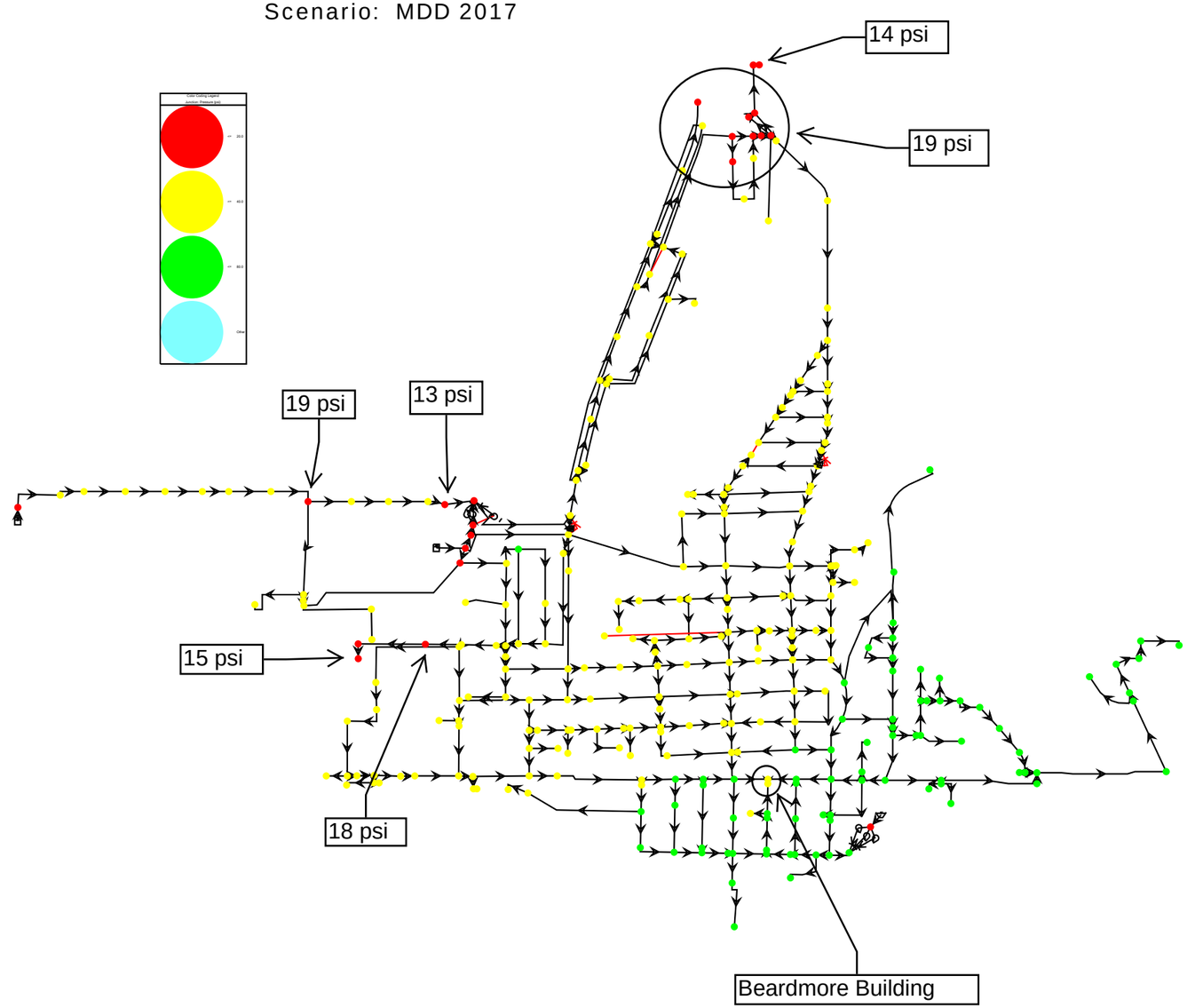


Exhibit 4

Hour 3

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. Finished water pump on
3. Upper boosters on, fire pump off
4. 3,200 gpm fire flow at Beardmore Building
5. Both tanks start without OS and ES

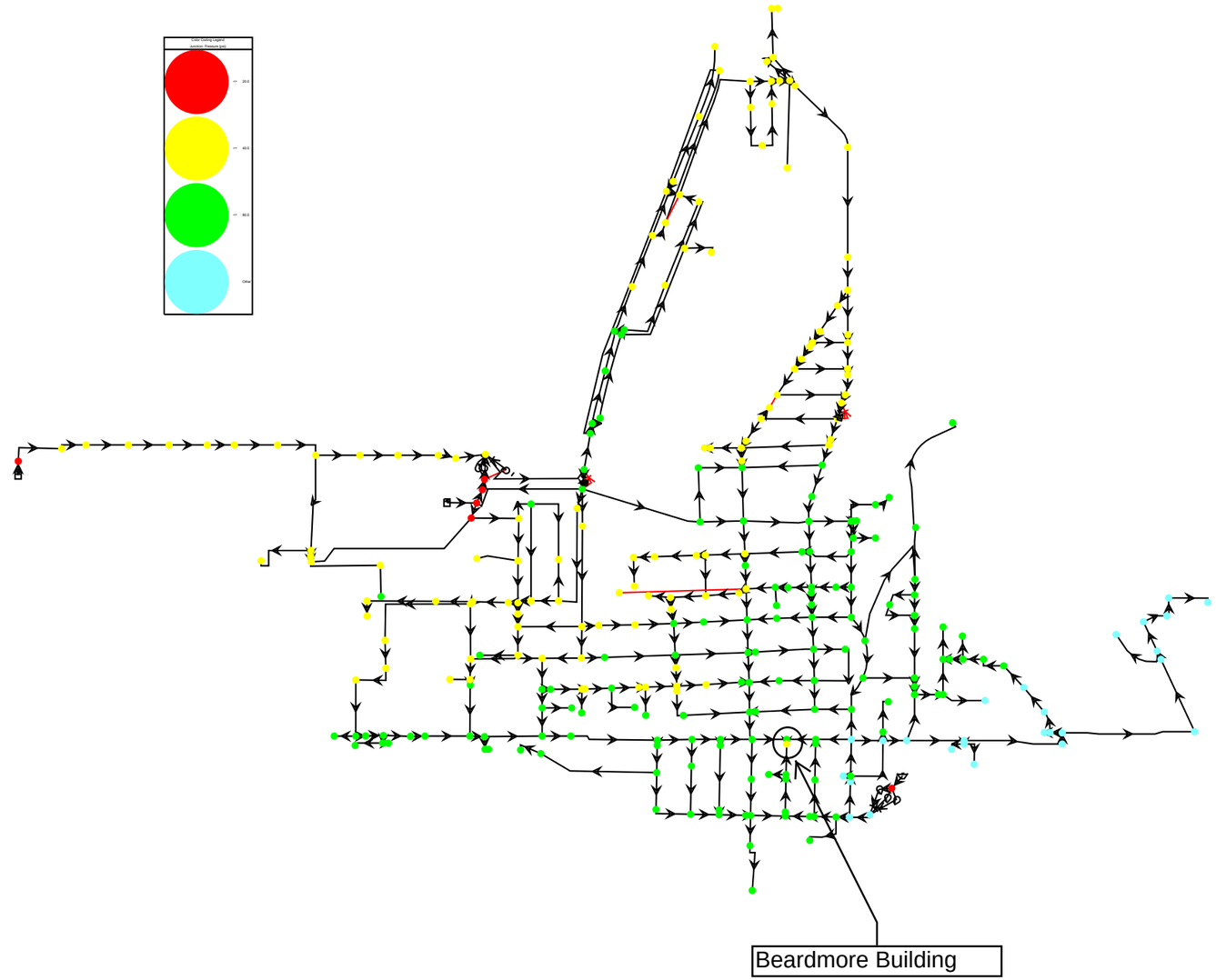


Exhibit 5

Hour 0

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. No finished water pumps
3. Upper boosters off, fire pump on
4. 3,500 gpm fire flow at Safety Line Building
5. Both tanks start without OS and ES

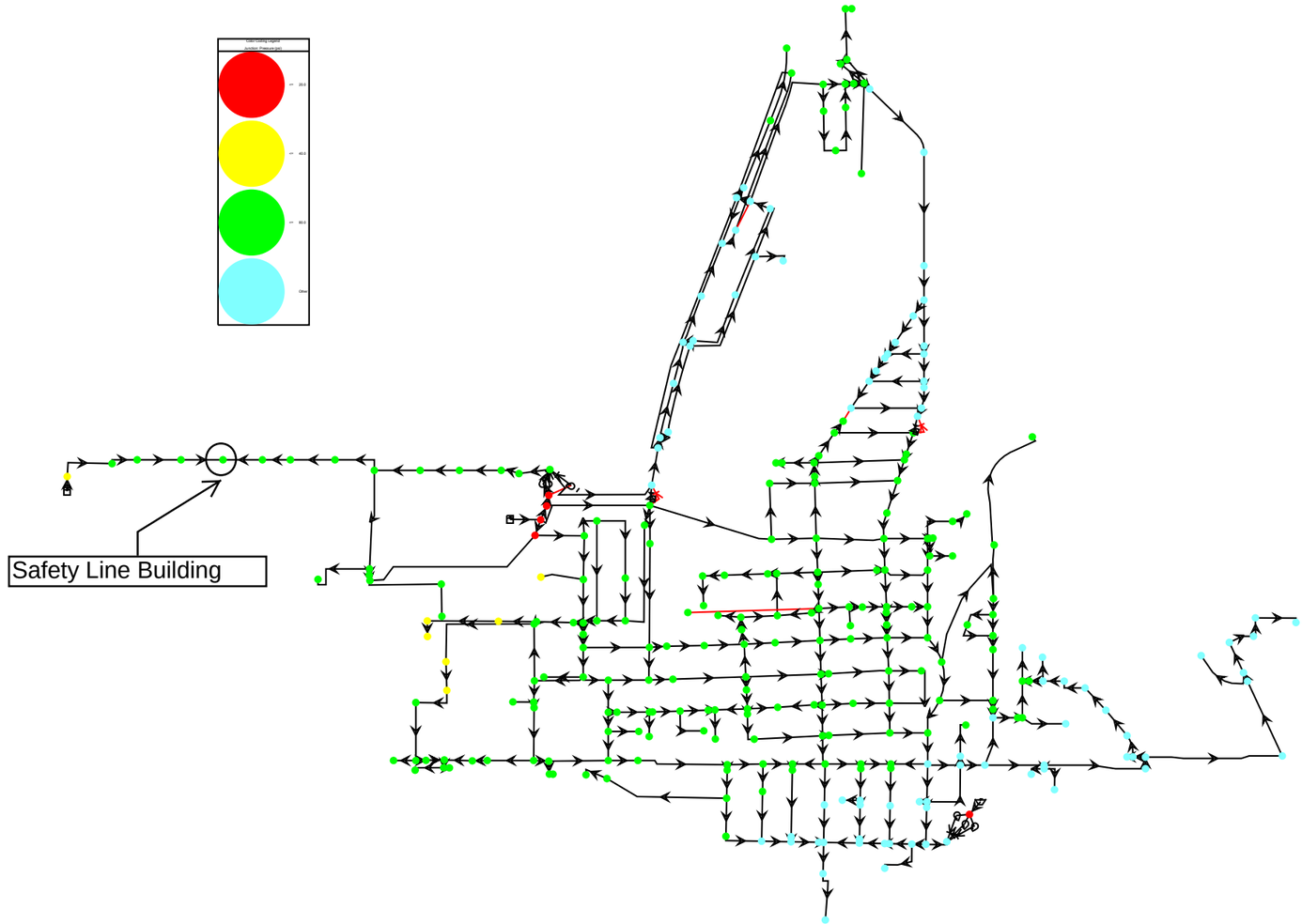


Exhibit 6

Hour 1.5

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. No finished water pumps
3. Upper boosters off, fire pump on
4. 3,500 gpm fire flow at Safety Line Building
5. Both tanks start without OS and ES

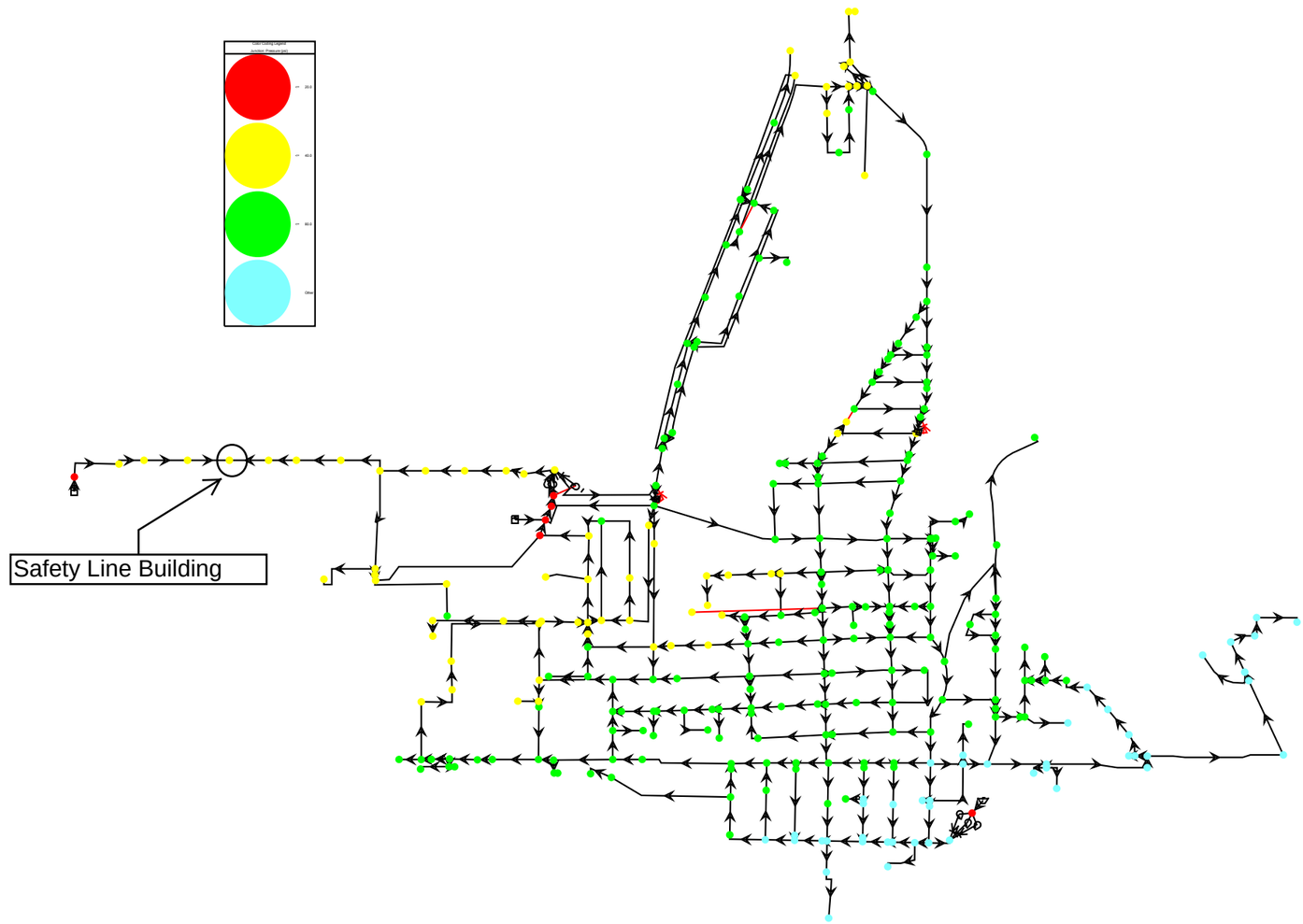


Exhibit 7

Hour 3

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. No finished water pumps
3. Upper boosters off, fire pump on
4. 3,500 gpm fire flow at Safety Line Building
5. Both tanks start without OS and ES

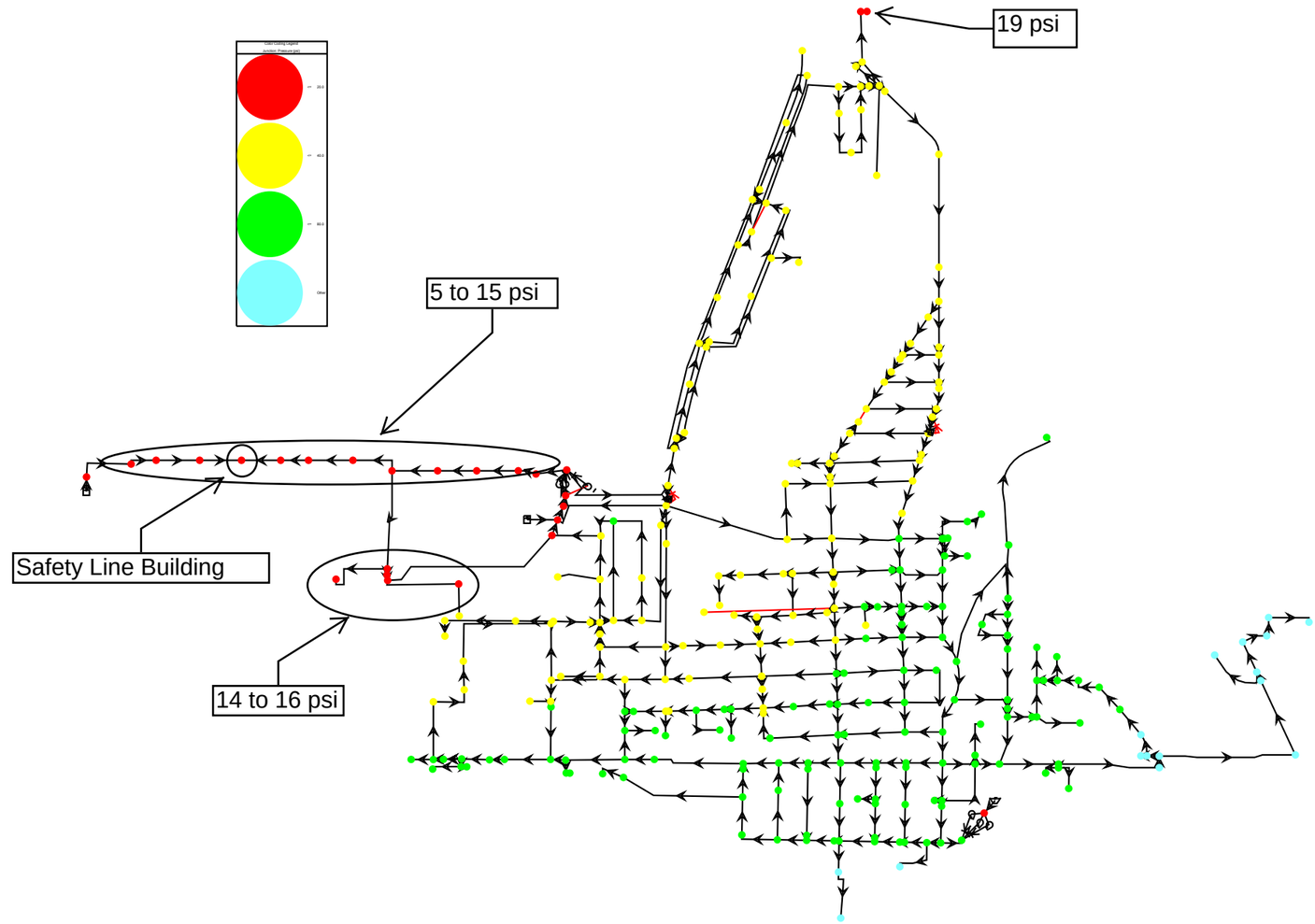


Exhibit 8

Hour 3

Scenario: MDD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. With finished water pumps
3. Upper boosters off, fire pump on
4. 3,500 gpm fire flow at Safety Line Building
5. Both tanks start without OS and ES

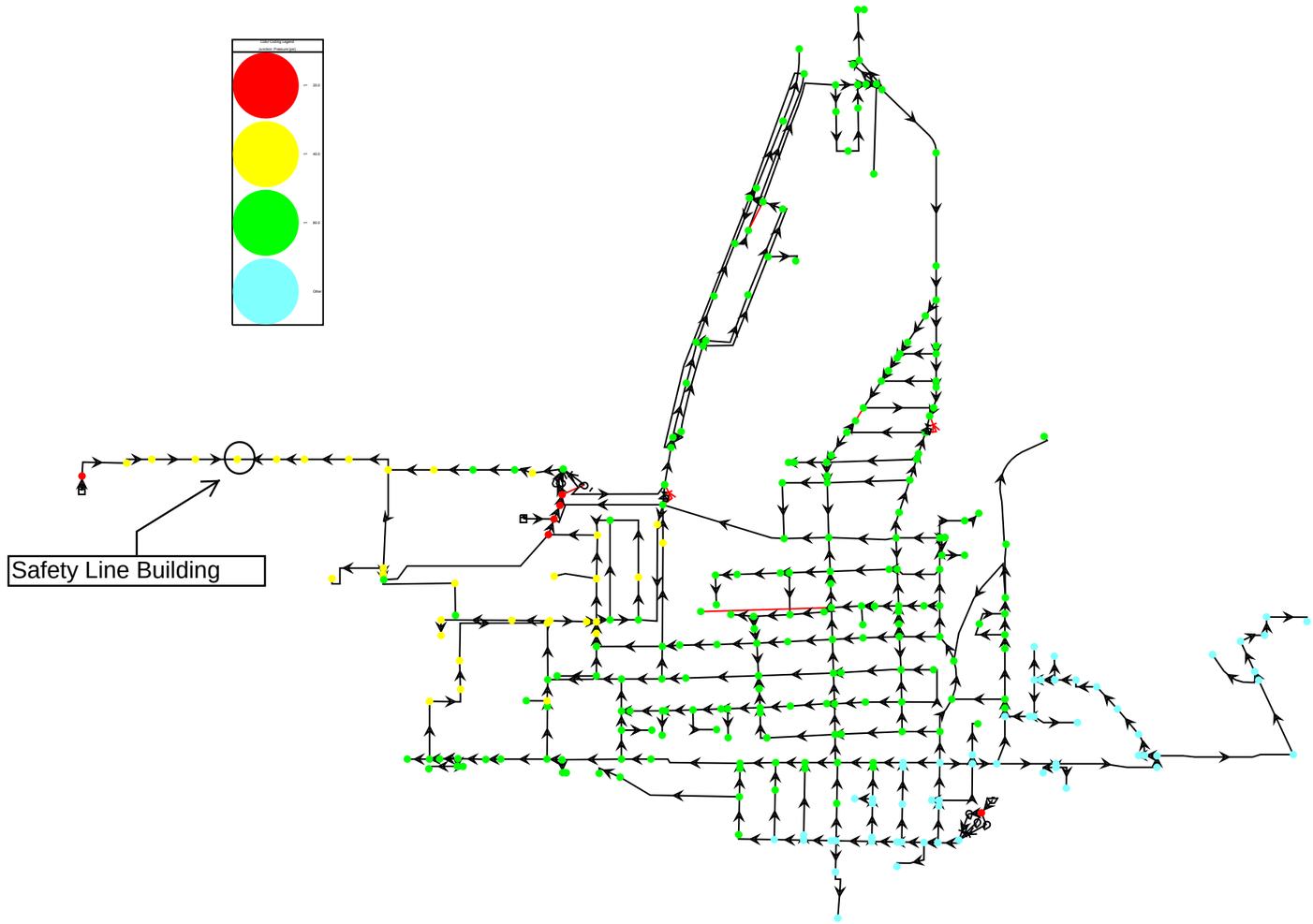
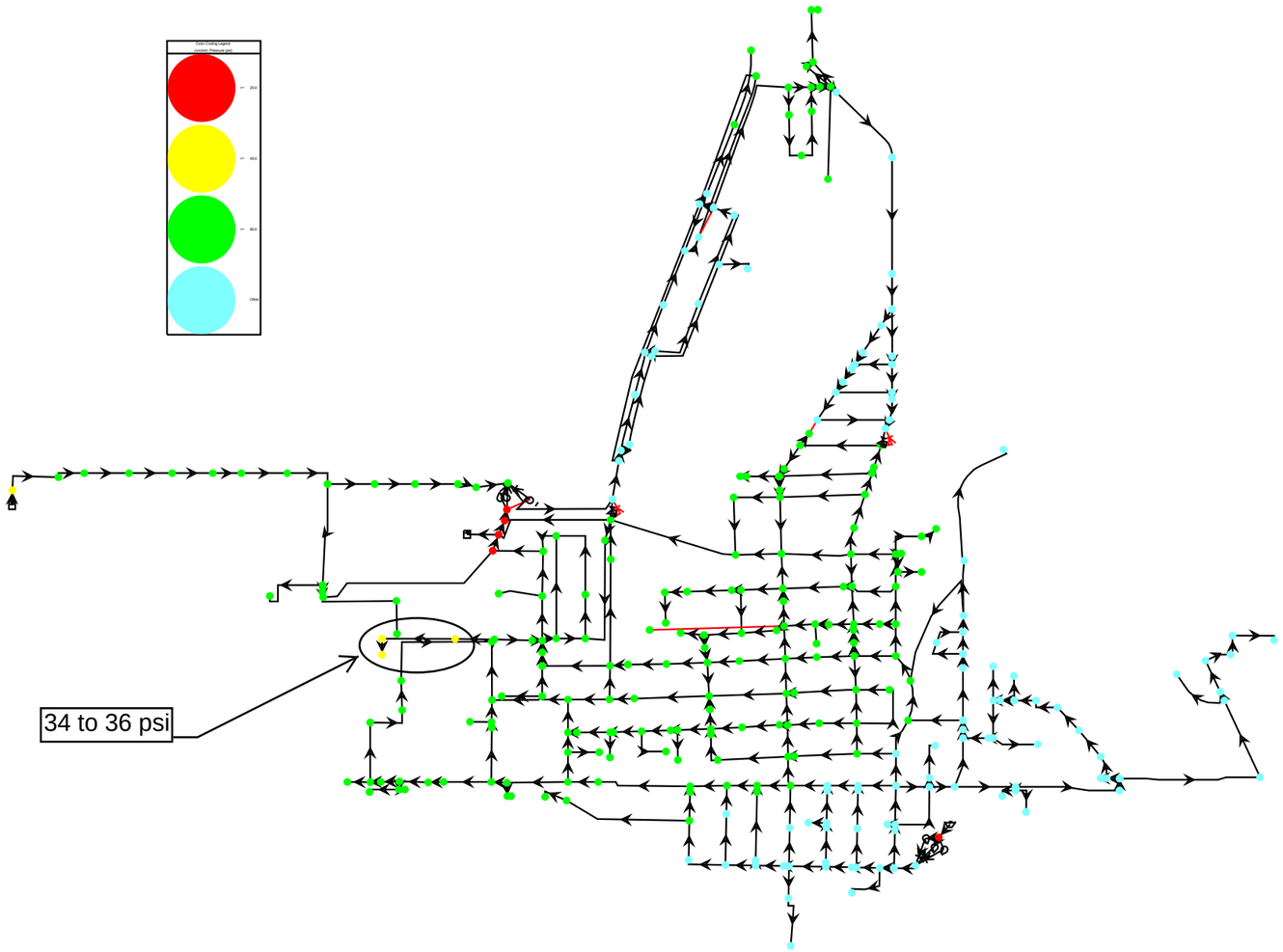


Exhibit 9

Scenario: PHD 2017

Notes:
1. New Tank at Existing Site: 440k gallons
2. Finished Water Pumps on
3. Upper boosters off, fire pump off
5. Both tanks start without OS and ES