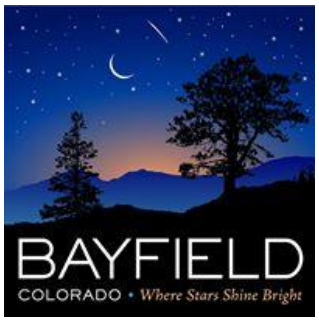

Wastewater Master Plan Update

MASTER PLAN

February 2020
Project #: 4123-010-01

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TABLE OF ACRONYMS

ACRONYM	DESCRIPTION
AAF	Average Annual Flow
BOD	Biochemical Oxygen Demand
BNR	Biological Nutrient Removal
CDPS	Colorado Discharge Permit System
CDPHE	Colorado Department of Public Health & Environment
CIP	Capital Improvement Program
COD	Chemical Oxygen Demand
CT	Contact Time
cfs	Cubic Feet Per Second
EU	Equivalent Unit
FOG	Fats, Oils, and Grease
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
gpm	Gallons per Minute
HRT	Hydraulic Retention Time
HVAC	Heating, Ventilation, and Air Conditioning
MMF	Maximum Month Flow
MG	Million Gallons
MGD	Million Gallons Per Day
mg/L	Milligrams per Liter
SCADA	Supervisory Control And Data Acquisition
SDS	Safety Data Sheet
ND	Not Detected
NR	Not Requested
O&M	Operations and Maintenance
PHF	Peak Hourly Flow
TIN	Total Inorganic Nitrogen

ACRONYM	DESCRIPTION
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
WQCD	Water Quality Control Division
WUSA	Wastewater Utility Service Area
WWTF	Wastewater Treatment Facility
YR	Year

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1. EXECUTIVE SUMMARY

This Master Plan Update has been prepared for the Town of Bayfield (Town) to assist in evaluating the existing wastewater treatment and collection infrastructure, the capacity of this infrastructure to serve a growing population, and the ability to meet current and anticipated future regulations associated with the sanitary sewer system.

Wastewater collection and treatment systems play a critical role in protecting the environment and maintaining the quality of life for the whole community. Use of individual (septic) treatment systems consumes significant land space and can lead to contamination of ground and surface water. Allowing the sewage to run into rivers untreated has historically caused regional pollution, algal blooms, and has led to the loss of aquatic life. The existing collection system and treatment plant help prevent these issues and protect the environmental resources of the Bayfield community and the Los Pinos River.

The report includes a review of existing and known future regulatory requirements; a comprehensive assessment of the existing facilities and their respective abilities to meet those regulations; review of anticipated growth rates and locations, as well as, the potential impact of growth on existing infrastructure; and the development and prioritization of planned capital improvement projects. Population growth and system needs have been evaluated for the 20-year planning period.

The existing collection facilities are adequately sized for current and future service needs. The existing lift stations are predicted to be capable of conveying expected sewer flow rates throughout the planning period and beyond. There are some areas of older vitrified clay piping that may eventually be targeted for replacement due to age; however, the major maintenance need for the collection system is to reduce inflow and infiltration. Sewer tap repairs are considered as a potential way to reduce the infiltration of groundwater to the sewer system. Cost estimates and suggestions for how to approach these needs are included in the report.

The current wastewater treatment plant has been in operation since 2009 and continues to perform as designed. All major units of the treatment process have been maintained in accordance with the manufacturer's recommendations. Several upgrades are evaluated in this Plan to help the plant meet new nutrient removal requirements that the state has implemented since the time of the plant design; the potential nutrient removal upgrades include a new controller, chemical dosing, as well as, additional process sensors and mixers.

A potential expansion to the treatment plant capacity is also considered. State regulations require that design of a facility expansion begins once the average flow exceeds 80 percent of the permitted capacity. Population growth is predicted to create the need to expand the plant capacity at the end of the planning period (close to 2039). However, the current rates of inflow and infiltration could lead to a requirement to expand the plant much sooner.

2. INTRODUCTION AND OBJECTIVES

This update to the Town's Wastewater Master Plan has been prepared to assess the existing collection and wastewater treatment systems owned and operated by the Town, and to prepare for future growth. All existing components of the system have been reviewed for their respective abilities to meet current and future (20-year) operating conditions. The development of this report includes an assessment of the collection system gravity piping and pumping systems, as well as, evaluation of the individual unit processes at the treatment plant. The Town's SewerGEMS hydraulic model has been updated and calibrated to match existing conditions. A model of the anticipated future service area has also been prepared to help review future collection system needs. All the Town's sewer collection and treatment systems were reviewed and are discussed in the following sections. Recommended future upgrades and capital improvement projects are included following the system analysis.

2.1. APPROACH

The methodology used to develop the required information for this Master Plan includes the following:

1) Review of the Town's historic and projected population data to estimate wastewater loading for the Town's current and predicted future service area.
2) Review of current and upcoming potential regulatory requirements.
3) Update of the Town's hydraulic model to simulate the existing conditions.
4) Development of a hydraulic model to simulate the system using the projected population in 2039, and review of infrastructure needed to support potential expansion areas consistent with future growth projections.
5) Assessment of treatment plant improvements that may be needed to support upcoming regulations and future growth.
6) Identification of proposed system improvements for use in a capital improvements plan.

Section 3 presents a summary of existing wastewater collection and treatment facilities. Section 4 discusses existing and anticipated regulatory requirements that impact the Town operations. Section 5 evaluates the current and estimated future wastewater flow rates. Section 6 presents a review of the hydraulic model of the collection system. In Section 7, the major components of the collection system and treatment facility are evaluated for current performance and ability to meet future needs of the system. Recommended, and potentially required, capital improvement projects are presented in Section 8.

3. DESCRIPTION OF EXISTING WASTEWATER SYSTEM

3.1. SERVICE AREA

The sanitary sewer service area covers the incorporated limits of the Town, as well as, the neighboring Gem Village community and several residences along Bayfield Parkway to the west of the Town limits. There currently are approximately 1,700 residential and commercial billed users within the Town's sewer system. Growth during the planning period is anticipated to be concentrated to the east of the existing service area, with some infilling of the area between Gem Village and the Town service areas. Figure 1 (below) depicts the current and predicted future service area boundaries.

SEE FIGURE 1 – SERVICE AREA MAP REFERENCED ON NEXT PAGE.

Figure 1. Service Area Map

Figure 2. Existing Facilities Map

3.2. COLLECTION FACILITIES

The sanitary sewer collection system provides for the conveyance of sewer flows from all (connected) Town businesses and residences to a central treatment facility. This arrangement helps to maintain a clean environment by preventing sanitary waste from contaminating private and public property, including waterways, and prevents over concentration of residential septic systems.

3.2.1. GRAVITY PIPING AND MANHOLES

There are approximately 21.6 miles of gravity pipe in the existing collection system. The majority is constructed of polyvinyl chloride (PVC) piping with some older areas of vitrified clay pipe (VCP). The oldest portions of the collection system remaining in service date back to the 1960s. There are a combined total of 500 manholes and 4 lift stations that convey sanitary sewer flows within the existing collection system. Historically, the Gem Village area operated a separate collection and treatment system but the older WWTP was decommissioned and a lift station installed to convey sewer flows to the Town treatment facility in 2007.

The Gem Village collection area is depicted in Figure 2 (above). This area is built with approximately 19,670 feet of 8-inch PVC piping, and a 70-foot section of 10-inch piping that connects the last manhole to the Gem Village Lift Station. There are 80 manholes and 2 lift stations within the Gem Village collection area.

The Town collection area is larger and more varied in size and material types than the Gem Village area. There are approximately 85,610 feet of 8-inch, 210 feet of 10-inch, 5,220 feet of 12-inch, and 3,310 feet of 15-inch gravity piping within the Town collection area. This mostly consists of PVC piping, but also includes approximately 15,220 feet of VCP, 3,550 feet of which has been lined with PVC during previous maintenance projects. There are approximately 420 manholes and 2 lift stations that connect the Town collection area and convey flows to the Town WWTP.

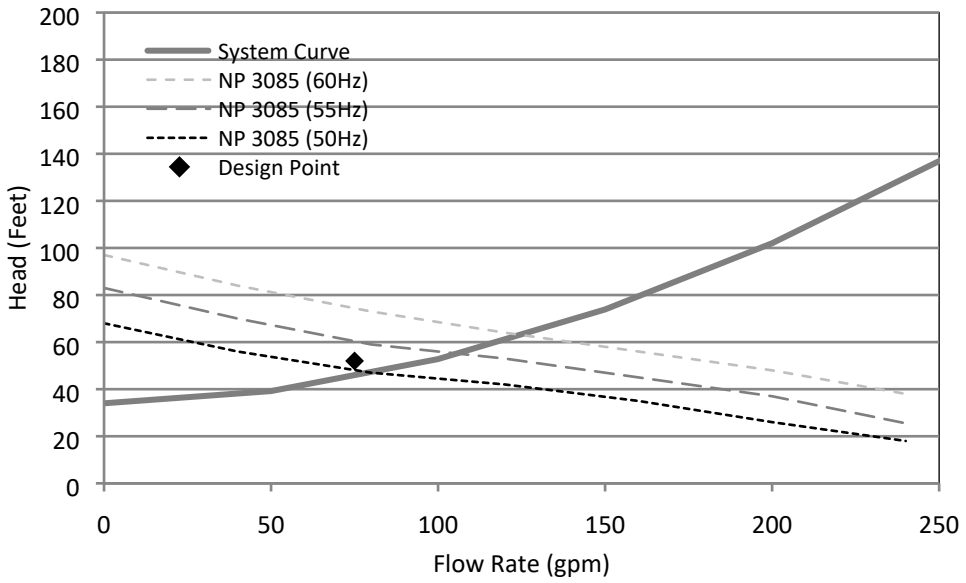
3.2.2. LIFT STATIONS

The Bayfield collection system includes 4 collection system lift stations; 2 of the stations use vacuum prime pump systems and 2 others have recently been rebuilt using submersible pump systems. Each station is a duplex installation; providing redundant pumping units that alternate duty to maintain even wear on the pumps. They are discussed individually in the sections below.

3.2.2.1. SUNRISE LIFT STATION

The Sunrise Lift Station was rebuilt in June 2019 with a new submersible pump system (Flygt model NP 3085); pump curves are included in the Figure 3. The rebuilt lift station retains the existing force main, which is constructed of approximately 1,610 feet of 4-inch PVC piping. The new pumps are predicted to run at a reduced motor frequency of approximately 50 Hz to achieve the design flow rate. The previous installation used a mechanical rotophase unit to convert single phase to 3-phase power to operate the pumps. The new installation uses a solid state (VFD) unit to create 3-phase power; this change has also improved the reliability of the lift station. This lift station averaged 5.4 hours of run time per day with the previous vacuum prime pump system and showed no seasonal change in operating times. The Operations team had struggled with occasional loss of prime in the vacuum system leading to erroneously high run times on the pump hour meter. The new submersible system has shown significantly reduced run time, averaging 1 hour per day.

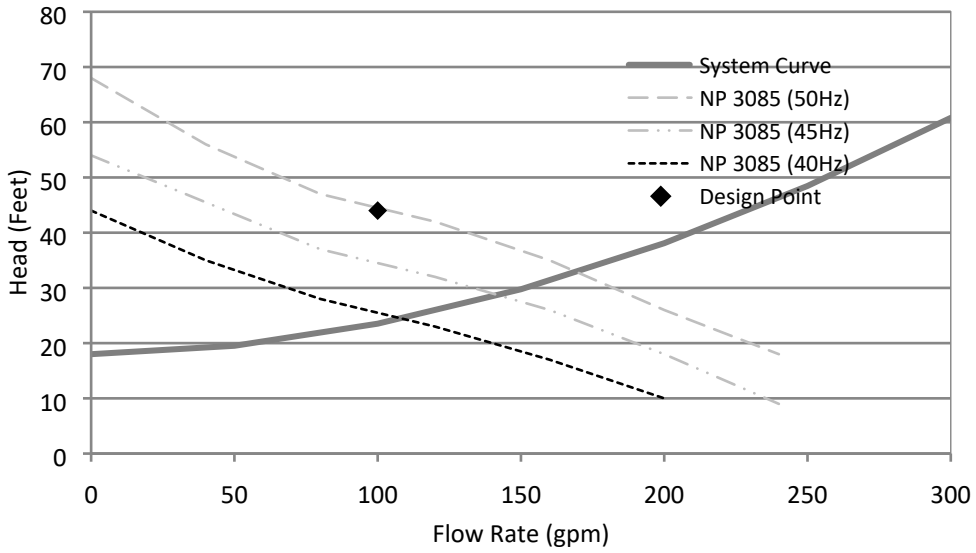
Figure 3. System and Pump Curves for Sunrise Lift Station



3.2.2.2. SHELL LIFT STATION

The Shell Lift Station was rebuilt in July 2019 using identical pumps and controls as the Sunrise Lift Station; pump curves are represented on Figure 4. The lift station designer appears to have planned for more head loss than the as-built conditions provide; hence, the duty point is significantly above the calculated system curve. This existing force main is built from approximately 450 feet of 4-inch PVC and the new pumps may be able to achieve the design flow at a reduced motor frequency of approximately 40 Hz. This lift station averaged 0.3 hours of run time per day with the vacuum prime system and showed no seasonal variation in run times; the new pump system has shown the same average daily run time.

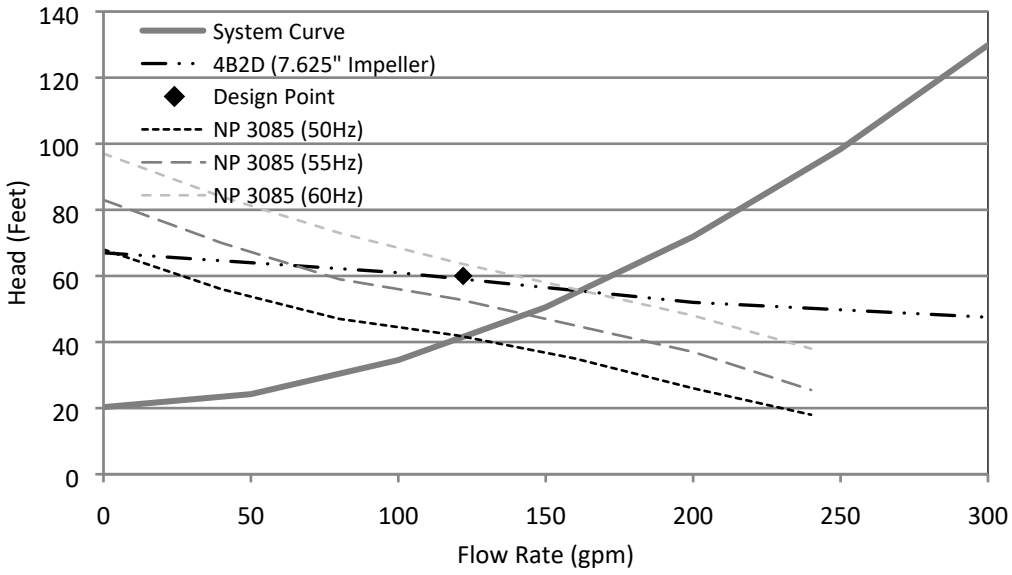
Figure 4. System and Pump Curves for Shell Lift Station



3.2.2.3. HIGHWAY 160 LIFT STATION

The Highway 160 Lift Station uses a Smith & Loveless vacuum prime pump system that was installed in 2001, and it averages 0.3 hours per day of run time; represented on Figure 5. The station is being considered for a future upgrade to the same Flygt pumps installed in the Sunrise and Shell Lift Stations. This would allow the Town to maintain limited shelf spares that can be utilized at any of three lift stations. The existing force main is constructed of approximately 1,200 feet of 4-inch PVC piping, that crosses under Highway 160 near the east edge of Gem Village. The planned replacement pumps are predicted to run at a motor frequency of 50 Hz to maintain the design flow rate. This lift station operates for an average of 20 minutes per day and shows no seasonal variation in recorded run times.

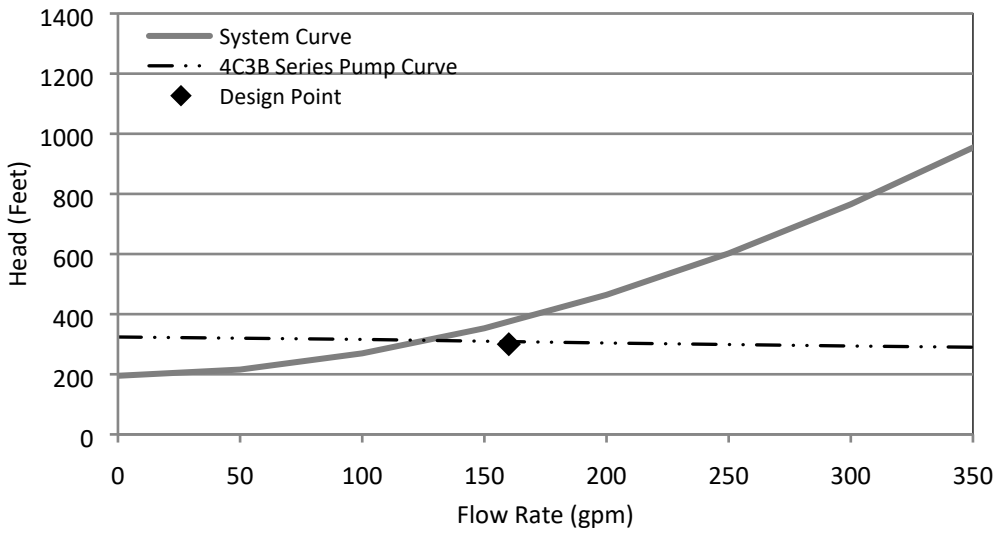
Figure 5. System and Pump Curves for Highway 160 Lift Station



3.2.2.4. GEM VILLAGE LIFT STATION

The Gem Village Lift Station conveys sanitary sewer flows from the Gem Village area into the central collection system; represented on Figure 6. It utilizes 2 pumps in series to achieve the needed pressure; the existing installation has been in operation since 2007. The Smith & Loveless pump system is vacuum primed and runs for an average of 2.1 hours per day. There is some seasonal variation with winter months showing a typical run time between 1-1/2 to 2 hours per day and summer months at closer to 3 hours per day. There are two existing force mains, each is approximately 6,590 feet long; a 4-inch diameter PVC pipe is in service and a 6-inch pipe was installed to allow for future growth of the system. The pumps operate near the minimum allowable flow for the design, and due to the series, installation pump seals have a shortened life expectancy. Similar to the previous installation at the Sunrise Lift Station, the Operations team has struggled with occasional loss of prime in the vacuum system leading to reports of erroneously high run times on the pump hour meter.

Figure 6. System and Pump Curves for Gem Village Lift Station



3.3. WASTEWATER TREATMENT PLANT

The current wastewater treatment plant is based around a Sanitaire Sequencing Batch Reactor (SBR) design and has been in operation since August 2009. Previously the Town operated a three-cell lagoon treatment system. The WWTP process flow diagram is included as Figure A in Appendix A. The SBR WWTP includes 2 treatment trains that both operate simultaneously, but on alternating cycles so only one will discharge at a given time. The SBR plant was designed for a hydraulic loading of 0.6 MGD, and organic loading of 1,583 pounds/day BOD. Each unit process of the WWTP is reviewed in the sections below.

Sizing requirements for WWTP unit processes is not always intuitive. Some components are rated and sized based on average usage situations, but all units must be able to process the peak hourly flow entering the plant. Due to this, the headworks and disinfection processes are typically rated for the anticipated peak hour flow and the biological treatment processes are rated based on average flow rates.

3.3.1. HEADWORKS

The WWTP headworks is the unit process where flow leaves the collection system and enters the treatment plant. The headworks provides for removal of grit and relatively large suspended solids (such as rags, plastics and other non-sanitary waste solids), flow measurement, and pumping flow into the treatment basins. At the headworks, wastewater flows through a step screen, is measured in a 6-inch Parshall flume, flows thorough the grit removal process, and is finally pumped out of the headworks for further processing and treatment. The influent flow channel is covered, and the foul air is collected by an odor control system that passes the air through an activated carbon filter.

The existing step screen is a Huber SSF series and, like the rest of the headworks, was sized for a peak hour flow rate up to 3 MGD. It has a 3x6 mm screen spacing, effectively removing most solids and placing them in an integral bagging system. The unit has performed as designed since the WWTP startup and is scheduled for preventive maintenance in 2019. There is also a second screening channel with a 1-inch manual bar screen that can be used to bypass the step screen for emergency or maintenance needs.

Influent flow is measured with a 6-inch Parshall flume and data is recorded continuously using an ultrasonic level sensor. The influent flow data is saved in the plant's supervisory control and data acquisition (SCADA) system.

The grit removal system is a Smith & Loveless Pistagrit series vortex type system; it is designed to remove sand, gravel, and other small grit that could damage pumps and become trapped in the treatment basins. The system operates at internal flow rates up to 250 gpm and uses a bagging system to collect the grit removed from the processed wastewater.

Following screening and grit separation, the influent flow is pumped into the SBR basins. The influent pump system utilizes 3 pumps to cover a wide range of possible flow rates. The smallest pump was designed to convey flows as low as 84 gpm, the second pump will turn on if flows exceed 210 gpm, and the third pump will activate if flows are in excess of 420 gpm. The combined capacity of the 3 pumps is 3 MGD. The influent pump layout includes space for a fourth pump if necessary for future expansion.

3.3.2. SEQUENCING BATCH REACTORS

The Town's previous lagoon treatment system (like many other continuous flow facilities) had a constant flow of sewage in and treated water out of the treatment facility. Sequencing Batch Reactor (SBR) plants treat the wastewater in batches and interrupt the effluent flow from the facility. Some SBRs also include influent equalization to allow interruption of flow into the treatment tanks; the Town SBR system uses a continuous inflow design. The SBR is a biological treatment process that provides for the reduction of biochemical oxygen demand, ammonia, suspended solids, and some other wastewater constituents; special operating parameters may be required to effectively reduce some contaminants such as inorganic nitrogen, and phosphorous.

There are 2 existing SBR units and available space for 2 additional treatment trains in the future. The SBRs utilize Sanitaire's Intermittent Cycle Extended Aeration System (ICEAS) process and are rated for an average daily flow of up to 0.6 MGD.

The existing basins are approximately 96-feet long and 34-feet wide and designed to provide a hydraulic retention time of 1.32 days. The basins are each divided into a smaller pre-react zones of approximately 128,900 gallons and a larger SBR tank that holds roughly 962,000 gallons.

Each basin operates on a timed cycle; the cycle time can be automatically reduced if needed to respond to unexpectedly high inflow. The basic cycle time consists of a 120-minute React phase (which is the sum of three 40-minute aeration cycles with adjustable aeration times for each), a 60-minute Settle phase, and a 60-minute Decant phase. Each basin is on an alternating operation cycle so a single blower can operate continuously. During a storm cycle, the normal 4-hour cycle time is reduced to 3-hours by simply reducing the time of each phase by 25 percent. A moving weir allows treated water to flow out from the top of the basin during the Decant phase.

The manufacturer's specifications show planned effluent quality parameters (at design loading) of 20 mg/L TSS and BOD, and a seasonally varying ammonia of either 2 or 10 mg/L (summer or winter, respectively). The design parameters remain appropriate with the current discharge permit requiring a limit of 30 mg/L TSS and BOD, and 13 mg/L for ammonia (see discharge permit in Appendix B).
Each basin also has a dedicated pump to convey waste activated sludge from the SBR basin into

the sludge holding tank. These pumps are submersible, Flygt model NP3102, and rated to convey up to 271 gpm.

3.3.3. UV DISINFECTION SYSTEM

Disinfection of wastewater entering surface waters is required under state and federal regulations. This may be accomplished using a chemical disinfectant such as chlorine or with ultraviolet light. The existing disinfection system utilizes ultraviolet light to inactivate pathogens in the treatment plant effluent. The Trojan Model UV 3000 Plus units are sized for flow rates up to 3 MGD. There are 2 UV channels and reactors to provide redundancy for the disinfection process. Water level in the disinfection channels is held constant by a serpentine weir.

3.3.4. EFFLUENT FLOW METER

The flow rate of treated water leaving the plant is measured with an electromagnetic flow meter upstream of the UV system. There is also a 90-degree V-Notch weir immediately downstream of the UV system's serpentine weir; the V-Notch weir can be used as a secondary measurement point and may also be used to verify accuracy of the electromagnetic flow meter. Flow data is collected continuously and recorded by the SCADA system.

3.3.5. BLOWERS

Blowers provide forced air to the treatment basins to reduce biochemical oxygen demand, ammonia, and other inorganic materials. In theory, it takes approximately 1.1 pounds of oxygen to reduce 1 pound of BOD, and 4.6 pounds of oxygen to reduce 1 pound of ammonia to nitrate (a process called nitrification). Oxygen demands for complete denitrification (reducing the nitrate to nitrite and then to nitrogen gas) can be much greater than simple nitrification. Inefficiencies of oxygen transfer due to aeration bubble size and water depth must also be accounted for in sizing a blower system.

Three existing blowers are available to provide air to the SBR basins and the sludge holding tank. All blowers are Sutorbilt 7MP Series with a sound attenuation package that includes inlet and outlet silencers, and an enclosure over the blower assembly. The blowers are each rated to produce a minimum air flow of 760 scfm. One 8.8 psi capable blower provides air to the sludge holding tank, while two 8.3 psi capable blowers are available to provide air for the SBR basins.

3.3.6. SOLIDS HANDLING

The sludge dewatering and solids handling processes include a sludge holding tank, belt filter press, and associated transfer pumps and polymer feed system. Waste activated sludge (WAS) is transferred from the SBR basins to the sludge holding tank for processing on the belt filter press. The holding tank is designed for a maximum storage volume of 178,800 gallons of liquid while maintaining the required 18-inches of freeboard.

The filter press is a BDP Industries Model 3DP belt filter press with a 3/4-meter wide belt. It was designed to thicken sludge at a rate of 550 lb/hr and 130 gpm, and to dewater thickened sludge at the same mass loading rate but a predicted flow rate of 47 gpm.

The polymer feed system was converted from an automated make-up system to a batch mix tank system in July 2019. WWTP Staff reported a savings in both water and polymer consumption after making this change. The new polymer system utilizes a Hootenanny type eductor to mix dry polymer into water and a tank mixer provides for the full dispersion and activation of the polymer

solution.

Sludge is conveyed from the sludge holding tank to the belt filter press by a dedicated Boerger Pump Model PL 100. A similar model PL 200 Series pump is used to convey thickened sludge back to the sludge holding tank (after primary processing on the filter press). A screwless shaft conveyer is used to move dewatered sludge from the end of the press to a roll off dumpster.

3.3.7. SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM (SCADA)

The SCADA system was installed with the new WWTP and commissioned in 2009. The WWTP is operated from a central programmable logic controller (PLC) that runs the major treatment processes and feeds information into the SCADA system. Several unit processes operate with local PLCs that are controlled through the central WWTP PLC; these include the step screen, grit removal, and belt press. The Operations staff have remote monitoring and alarm viewing ability through the RS Means based SCADA system. An alarm dialer will alert the on-call operator if there is an immediate response need. The SCADA system also records data required for monthly compliance reporting.

4. REGULATORY REQUIREMENTS

Wastewater treatment facilities are regulated by both the Federal Environmental Protection Agency (EPA) and the State of Colorado Department of Public Health and Environment (CDPHE). The CDPHE has primacy over EPA regulations and therefore is the only agency with which Colorado treatment facilities interact. The following sections discuss the major applicable regulations that impact the wastewater collection and treatment systems.

- EPA Clean Water Act
- Colorado Water Quality Control Act
- CDPHE Regulation 22 – Site Location and Design Approval
- CDPHE Regulation 31 – Basic Standards for Surface Water
- CDPHE Regulation 64 - Biosolids
- CDPHE Regulation 85 – Nutrient Removal
- CDPHE Regulation 100 – Operator Certification Requirements
- CDPHE WPC DR 1 – WWTP Design Criteria

4.1. EXISTING REGULATIONS AND TREATMENT REQUIREMENTS

The following sections give brief summaries of the major federal and state regulations that set forth the effluent and treatment quality requirements for the Town WWTP.

4.1.1. EPA CLEAN WATER ACT

The *Clean Water Act* (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly revised and expanded in 1972. “Clean Water Act” became the Act’s common name with amendments in 1972.

Under the CWA, the EPA has implemented pollution control programs; such as, setting wastewater standards for industrial and municipal users. The EPA continues development and occasional revision of quality criteria that regulate pollutants in surface waters.

The CWA made it unlawful to discharge any pollutant from a point source into navigable water, unless a permit was obtained. The EPA’s National Pollutant Discharge Elimination System (NPDES) permit program controls allowable discharges. Point sources are discrete conveyances, such as, pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters.

4.1.2. COLORADO WATER QUALITY CONTROL ACT

The Colorado Water Quality Control Act was most recently updated in 2017; it is published under the Colorado Revised Statues, Section 25-8-501. This regulation defines the State’s ability to regulate water uses and discharges to conserve and maintain the quality of public waters. The requirements related to expansion and construction projects for wastewater treatment facilities are included in this regulation; if a facility exceeds 80 percent of design capacity (as a 30 day average), they are required to begin planning and design of a facility expansion and if a system

exceeds 95 percent of capacity, the facility must begin construction of the planned expansion.

4.1.3. CDPHE REGULATION 22 – SITE LOCATION AND DESIGN APPROVAL

The *Site Location and Design Approval for Domestic Wastewater Treatment Works* (Regulation 22) regulates wastewater treatment facilities, lift stations and large diameter sewer lines. This rule sets forth the minimum standards for location selection and design of the covered systems; however, local government entities are permitted to create more stringent requirements if desired. The CDPHE has also established a fee system to help offset their expenses associated with reviewing site location and design submittals.

Changes in design flow rate and organic loading capacity can require an amendment to the existing site approval. This can impact both lift stations and treatment plants if community growth forces an increase in capacity.

4.1.4. CDPHE REGULATION 31 – BASIC STANDARDS FOR SURFACE WATER

The *Basic Standards and Methodologies for Surface Water* (Regulation 31) was adopted in 1979 and most recently updated in 2017. This regulation sets forth an antidegradation rule for managing potential impacts to surface waters; it also creates a system for classifying water bodies and assigning standards based on those classifications. These standards form the basis for most of the numeric effluent requirements applied to the WWTP. The most notable impacts of the recent revisions are to nutrient limits. For cold water streams (such as the Los Pinos River) interim limits include 110 ug/L total phosphorous and 1,250 ug/L total inorganic nitrogen; however, these limits will likely not be in effect until 2027. A mass balance approach to estimating future Bayfield limits reveals a potential total phosphorus limit less than 1 mg/L and a total inorganic nitrogen limit less than 5 mg/L. WWTP permits will start to adopt limits intended to keep the total nutrient load in the river below these interim limits in the next 10 years.

Regulation 31 also establishes the numerical limits for a long list of substances ranging from common metals (such as iron and copper) to radioactive substances and chemicals of concern. Most regulated substances have been listed for many years and meeting the associated limitations does not represent a challenge for most treatment systems.

4.1.5. CDPHE REGULATION 64 – BIOSOLIDS

Biosolids are a waste product of the treatment process. They are the solids remaining after dewatering waste solids from the treatment process and are commonly disposed of by use as a fertilizer source for specific crops or may alternatively be disposed of in a landfill. The purpose of the biosolids regulation is to control the use of biosolids as a fertilizer and/or organic soil amendment to protect the public health and prevent the discharge of pollutants into state waters.

This regulation applies to facilities that produce biosolids and those that transport or apply them. It establishes limitations to the quantity applied to an area based on cumulative loading of tracked potential pollutants. Biosolids disposed of in a landfill, which is the current practice at the Town's WWTP, are subject to regulation as solid wastes and are not controlled though Regulation 64.

4.1.6. CDPHE REGULATION 85 – NUTRIENT REMOVAL

Regulation 85 provides a technology-based limit approach to reducing nutrient discharges from wastewater treatment facilities. This contrasts with the antidegradation approach to the limits in Regulation 31. The technology-based approach creates limits that are achievable with currently

available equipment, while the antidegradation approach simply looks at the existing stream quality and does not account for current technological or economical limitations.

This regulation went into effect in 2012 and established different limitations for existing versus new facilities. Facilities that went into service after May 31, 2012 are subject to more stringent limits than those in operation previously. WWTP's that meet the requirements of Regulation 84 are eligible for deferred implementation of Regulation 31; the amount of delay is dependent on how regularly the facility meets the current limits. The annual average total inorganic nitrogen and total phosphorous limits created by Regulation 85 are presented in Table 1.

Table 1. Regulation 85 Nutrient Limits

Description	WWTP started before May 31, 2012	WWTP started after May 31, 2012
Total Inorganic Nitrogen (mg/L)	1.0	0.7
Total Phosphorous (mg/L)	15	7

4.1.7. CDPHE REGULATION 100 – OPERATOR CERTIFICATION REQUIREMENTS

The personnel operating the treatment and collection systems must be licensed by the State to a level appropriate for the size and complexity of the facility. There are four licensing levels for treatment and collection operations; treatment licenses are identified as D through A and collection licenses as 1 through 4, with the D or 1 level being introductory and the A or 4 level requiring a minimum of four years' experience. In addition to meeting experience requirements, personnel must also pass a written exam to qualify for each licensing level. The licensing requirements are defined within CDPHE Regulation 100, which was updated in 2019. The collection system currently requires a Class 2 license, while the treatment plant requires a Class B license. The potential combination of adding nutrient removal processes and an increase in treatment plant capacity could change the licensing requirement to an A level.

4.1.8. CDPHE WPC-DR-1 – WWTP DESIGN CRITERIA

The current version of the *State of Colorado Design Criteria for Domestic Wastewater Treatment Works* (WPC-DR-1) was implemented in the Fall of 2012, replacing the former Policy 96-1. This document describes the criteria used by the State for review of wastewater systems and sets forth the requirements for design reports prepared for state review.

The listed criteria are used by the CDPHE to evaluate whether a design, including lift stations, interceptors, treatment facilities, and outfalls, is adequate for the wastewater conveyance and treatment requirements defined in the site location approval, discharge permit, or other applicable criteria. To the maximum extent practical, these criteria are performance-based, providing flexibility to tailor the design to specific project circumstances.

4.2. FUTURE REGULATORY REQUIREMENTS

The major upcoming requirements for treatment facilities are already published in Regulation 31. It establishes the basis for future nutrient removal beyond the current requirements in Regulation 85. There are no published plans for further restrictions on the discharge of municipal wastewater facilities; however, there has been discussion among the regulatory agencies regarding the control of pharmaceutical byproducts and other emerging contaminants of concern. The next major revision to effluent limitations could address the cumulative loading of these contaminants to the water ways.

5. CURRENT AND FUTURE WASTEWATER FLOWS

5.1. POPULATION PROJECTIONS AND GROWTH AREAS

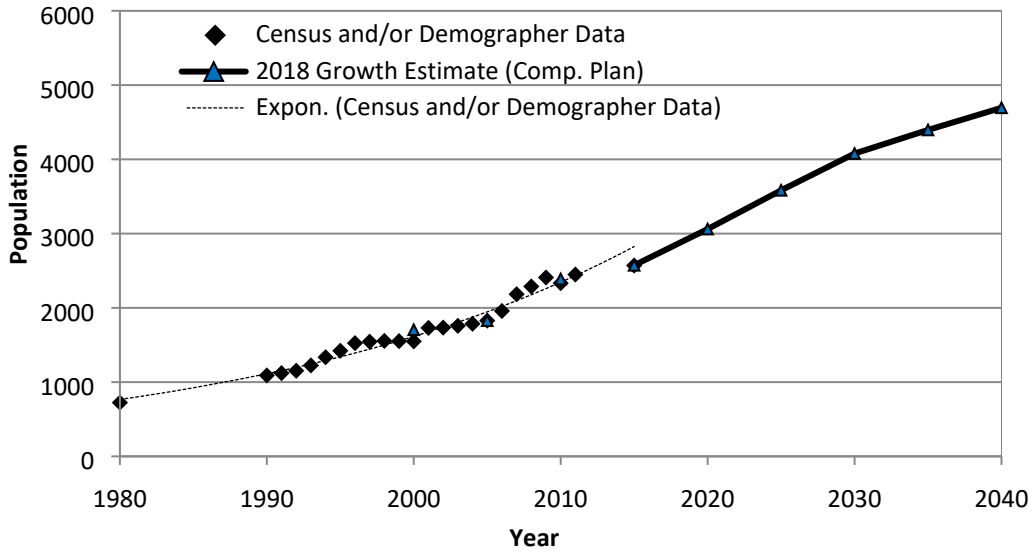
Future growth of the Town of Bayfield is expected to be concentrated to the east of the existing service area. The Clover Meadows Subdivision is currently expanding with active construction that could build up to 123 equivalent units of water and wastewater demand; this development is located east of Clover Drive and south of Orchid Drive. A map of the anticipated wastewater service area growth is included above as Figure 1.

The Town adopted a Comprehensive Plan in 2018 that contains the most recent prediction of future population growth. It shows an annual growth rate close to 3.5 percent for the current period (2015 through 2020), decreasing over time to approximately 1.5 percent by 2035.

5.1.1. 20-YEAR PLANNING PERIOD

The 20-year planning period extends into 2039. The 2018 Comprehensive Plan lists population predictions out to 2045. Figure 7 presents the historical population records and the predicted growth based on the Comprehensive Plan.

Figure 7. Town of Bayfield Historical and Predicted Future Population



5.1.2. POPULATION GROWTH RATES

The Town of Bayfield was incorporated in 1906, with an initial population of 227 people. The population has grown steadily since then; the last census completed in 2010 showed a population of 2,333. More recent estimates predict a current population of approximately 2,950.

Figure 7 depicts both the recorded and predicted population for the Town of Bayfield. National Census Data is included for the four previous U.S. Census cycles (1980, 1990, 2000, and 2010). State demographer estimates are included for the years between US Census cycles. The predicted future population projection is based upon the 2018 Comprehensive Plan growth estimates.

5.1.3. SPECIFIC AREAS OF CONCENTRATED GROWTH

The existing subdivisions within the Bayfield service area are largely built out. Clover Meadows is currently constructing their planned Phase 7 Development; this is anticipated to add 123 residences to the system and is already included in the service area boundary. Future development is predicted to be east of County Road 501 and mostly to the north of Highway 160. The land north of Dove Ranch Road is expected to become a medium density (single family) development area. The land adjacent to the new elementary school is also likely to be developed; a mix of medium and higher density developments is anticipated for this area.

Previous predictions have anticipated growth immediately north of Dove Ranch Road. Recent completion of a new elementary school south of Oak Drive may re-focus growth to that vicinity. Additional medium density growth is also anticipated to the southeast of the current service area, adjacent to the existing Mesa Meadows and Clover Meadows Subdivisions. For more detail, see the Future Land Use Map located in Appendix A.

5.1.4. LAND USE

The predominant zoning type in the Town is residential; less than 10 percent of the incorporated area is designated as commercial. Future growth is projected to continue within the existing pattern towards residential zoning with enough commercial development to provide for the major needs of local residents. For visual reference, see the Bayfield Future Land Use Map (developed by RG & Associates) located in Appendix B.

5.2. HISTORICAL WASTEWATER LOADING

5.2.1. ANNUAL WWTP LOADING

There is a significant difference between the average influent flow rate during the summer and winter months. Records from recent years show an approximate doubling of flow rates in the summer; this is attributed to a seasonal rise in the water table level due to unlined ditches that cross through many areas of Town, and possibly a significant number of unwanted sump pump connections. The increased water table leads to infiltration of groundwater to the collection system. Figure 8 (below) presents the monthly average influent flow to the WWTP during the study period and Figure 9 (below) presents the biochemical loading during the same period. Each figure includes a line depicting 80 percent of the applicable permit limit. In accordance with CDPHE regulations, the Town must begin design of a plant upgrade if loading exceeds 80 percent of the permit limit on a 30-day average.

Figure 8. Monthly Average WWTP Influent Flow

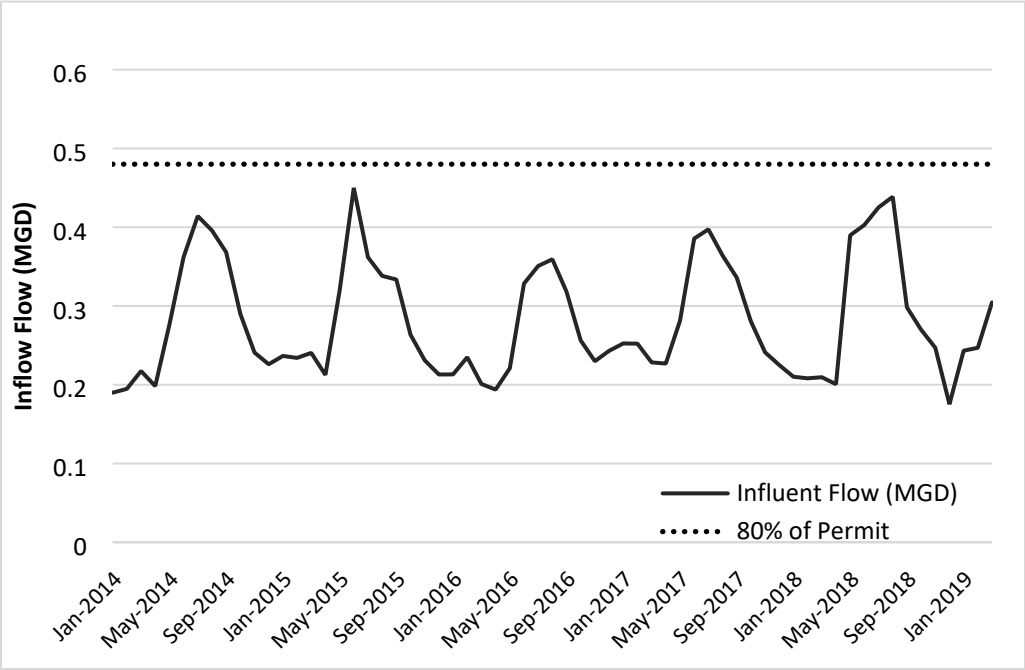
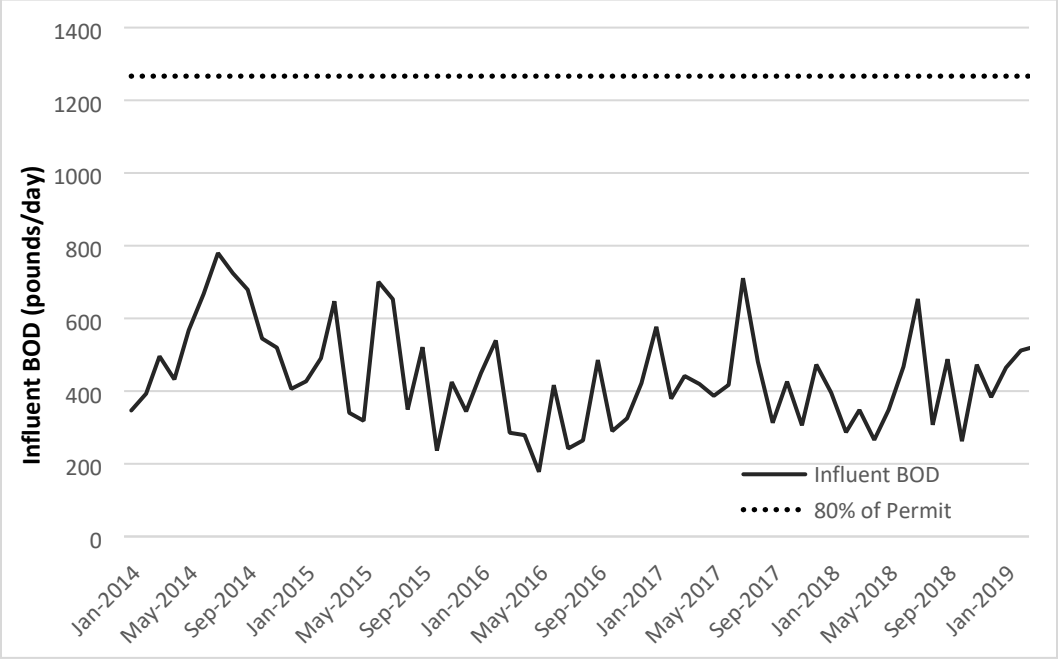


Figure 9. WWTP Monthly Average Biochemical Oxygen Demand



5.2.2. HISTORICAL CONNECTIONS

Historical population data and future growth predictions are summarized above in Section 5.1. Table 2 (below) summarizes the current and predicted future number of service taps in relation to population estimates. The current ratio of population to Equivalent Residential Taps (ERTs) is 1.7 persons per ERT, which has been used to predict the future growth in system connections in relation to population growth.

Table 2. Population and Billed Accounts Prediction

Description	Existing Service Area (2019)	Future Service Area (2039)
Population	2,950	4,650
Billed Accounts	1,700	2,750

5.2.3. CURRENT POPULATION AND PER CAPITA WASTEWATER FLOW

The most recent federal census completed in 2010 recorded a population of 2,333 people in the Town of Bayfield; predictions of 2019 population show approximately 2,950 people. Averaged plant data from 2014 through 2018 shows per capita loading rates of 105 gpcd for the average WWTP influent flow and 155 gpcd for the maximum month average flow.

The maximum flow day during the study period was during June 2015. The WWTP recorded a daily maximum influent flow of 0.62 MG, correlating to a per capita flow of 240 gpcd. The average and max month flows have not significantly changed over the past five years; however, the average flow has grown from 0.28 to 0.29 MGD, and the highest maximum month flow of 0.45 MGD was recorded in 2015.

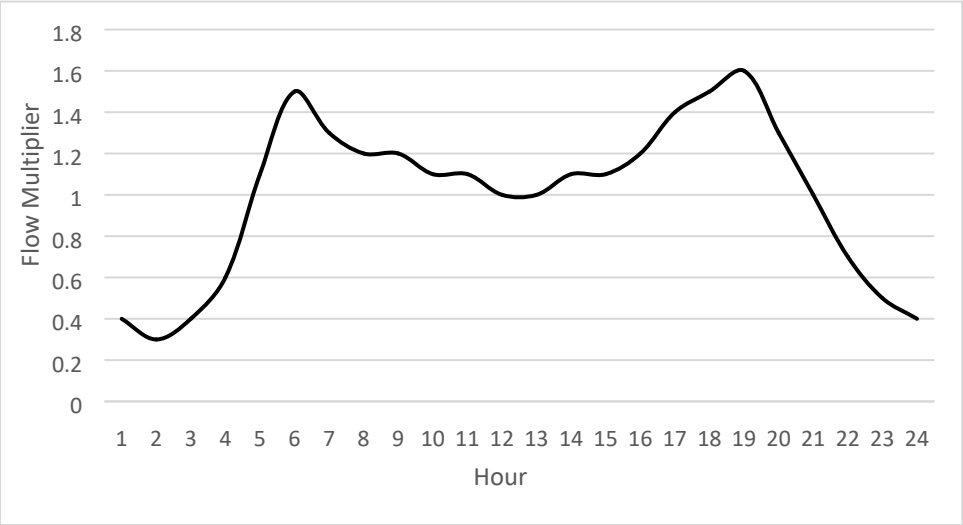
5.3. DIURNAL AND INFLOW AND INFILTRATION PEAKING FACTORS

Diurnal peaking factors are based on typical daily variations of flow within the sewer system attributed to the cycles of human activity. There can also be changes in flow due to seasonal or weather conditions that impact sanitary sewer systems; common weather-related causes are rainfall and snow melt. The peak flow day during the study period was investigated; it was during June, so snowmelt was not a factor, and the 0.7 inches of rain received was also not likely the cause.

Inflow and infiltration (I&I) describe pathways for unwanted water to enter the collection system; inflow refers to water entering from the surface (such as at manhole lids), while infiltration refers to water entering below ground level (associated with poor sealing of manholes, pipes, or service taps). The I&I within the Bayfield collection system appears to be more related to seasonal ditch operation, and the associated change in local groundwater level than to any weather-related impact. The seasonal variation attributed to infiltration leads to the average summer flow exceeding the winter flow rates by a factor of 1.8.

Daily variations show a diurnal curve reflecting the trends in human activity with peak flows in the morning and evening, and very low usage in the nighttime. Figure 10 presents an average diurnal curve that was derived from flow metering in the Bayfield system completed in 2015; this curve is used to predict peak hourly flows within the hydraulic model.

Figure 10. Diurnal Curve of Bayfield Wastewater Flow



5.4. PROJECTED FUTURE WASTEWATER LOADING RATES

The predictions of future flow and biological loading at the plant are based on the population projection and recorded plant data discussed in the sections above. The flow and biological loading are represented on Figure 11 and 12.

If the current influent loading rate per capita holds steady and the growth predictions are correct, the maximum month average influent flow could start to exceed 0.48 MGD before 2025, and the annual average could reach that level within the planning period. As mentioned above in the regulatory review, once the influent flow exceeds 80 percent of either the hydraulic or biological limits, CDPHE regulations require that the Town begin design of a facility expansion.

Figure 11. Measured and Predicted WWTP Influent Flow

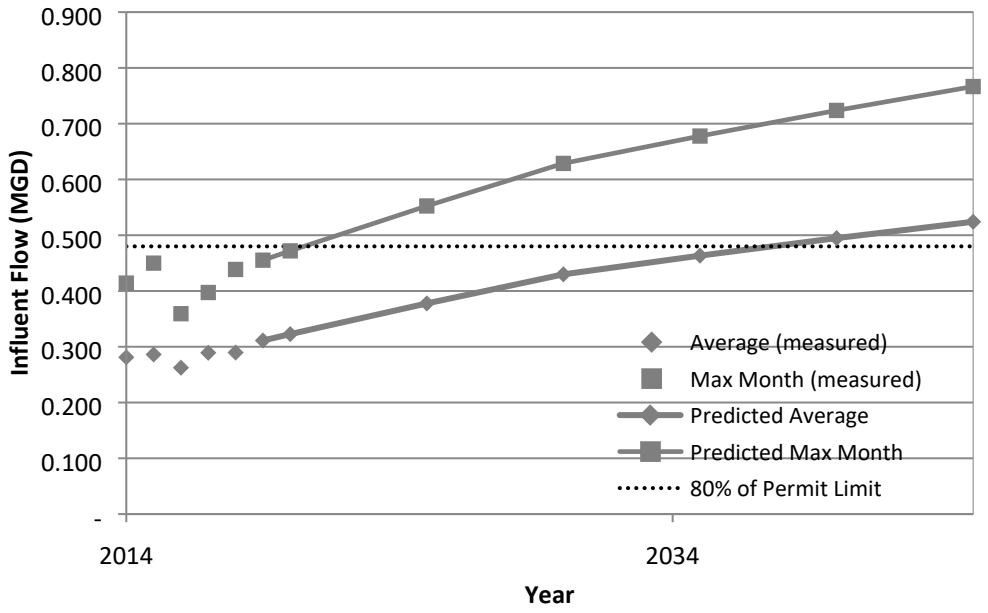
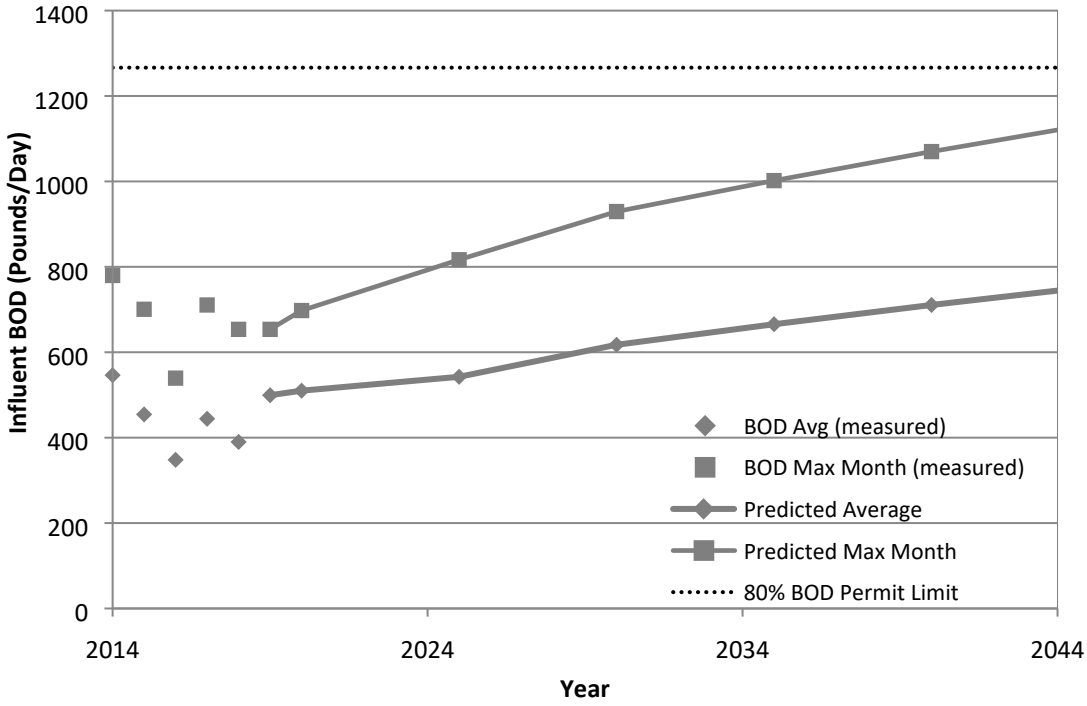


Figure 12. Measured and Predicted Biological Loading



6. HYDRAULIC MODEL

Computer based hydraulic models are commonly used to aid in analysis and design of sewer collection systems. All major components of the collection system (including each manhole, lift station, and all connecting pipes) are represented in the model. Pumps and lift stations are modeled based on manufacturer's performance curves and surveyed elevations. A properly calibrated model is an excellent resource for evaluating existing system conditions and planning for future improvements; however, digitized models of real-world systems are limited to the accuracy of the data used to build and calibrate them.

The model of the Town of Bayfield's sanitary sewer collection system has been updated using Bentley's SewerGEMS computer program; the previously developed model was updated, expanded, and re-calibrated as part of this study. The Existing Facilities Map presented in Section 2 shows the entire collection system as represented in the model.

The SewerGEMS model has been developed using survey data collected by Pinnacle Surveying on behalf of the Town. The model was initially started by Souder Miller and expanded by Plummer to include the entire collection system. An accurate survey is an exceptional data source for a hydraulic model; the relative distances and elevations between the system components is critical data input to a model for a sewer collection system which operates almost entirely by gravity. All system components have been represented as accurately as possible; the lift stations have been modeled based on the manufacturer's pump curves and recorded wet well depths, and the slope of the gravity flow pipes is based on surveyed invert elevations at all manholes.

User demands within the model are distributed based on current records and predictions of future growth usage and locale. The total sewer flow in the model was adjusted to reflect recent WWTP maximum month records and predictions of future demand presented in Section 5. Hourly variations in flow are based on a diurnal curve which was developed from measured sewer flows in the Bayfield collection system. This diurnal curve allows for evaluation of predicted peak hourly flows within the collection system.

6.1. HYDRAULIC MODEL CALIBRATION

The model has been calibrated to reflect the best available records for the collection system. This is based on the recorded influent flow at the WWTP and the run time meters at the lift stations. The Operations staff expressed limited confidence in the run time data due to repeated incidences where vacuum prime pumps have lost prime and run dry, creating a false increase in recorded run times. Due to this, limited emphasis has been placed on run time data and extra care has been taken to ensure an appropriate loading of equivalent units to each area.

Tables 3 and 4 show the recorded versus modeled flows and lift station run times achieved within the calibrated model.

Table 3. Comparison of Measured Versus Modeled Collection Flow Rates

Scenario	Recorded Influent (MGD)	Modeled Influent (MGD)
Average Flow	0.281	0.283
Max Month Flow	0.411	0.408

Table 4. Comparison of Measured Versus Modeled Lift Station Run Times

Scenario	Sunrise LS (hrs)		Shell LS (hrs)		Hwy 160 LS (hrs)		Gem Village LS (hrs)	
	Actual	Model	Actual	Model	Actual	Model	Actual	Model
Average	1	1.6	0.4	1.2	0.35	0.4	2.1	2.7
Max Month	1	1.8	0.6	1.8	1.1	0.55	3.1	4.1

6.2. HYDRAULIC MODEL OF EXISTING CONDITIONS

Two scenarios of the existing conditions have been developed in the model to reflect both the annual average and maximum month flow rates to the WWTP (0.28 and 0.41 MGD, respectively). The modeled results for influent flow and lift station run times are presented above in Tables 3 and 4. The run times presented for the Shell and Sunrise Lift Stations are based on the available operating data for the new pump installations; the new pumps have only been in operation for 2 to 3 months.

The total flow in the modeled system shows good calibration for the average and maximum month flow scenarios. The data fit for the lift station run times show more variability; the modeled results show up to one-hour difference from the field data. Due to the relatively low utilization at all the lift stations, these results are considered acceptable and do not impact the evaluation or recommendations for capital improvements.

6.3. HYDRAULIC MODEL OF FUTURE CONDITIONS

The future conditions are simulated for the 20-year prediction of maximum month loading. The predicted future maximum month flow rate of 0.766 MGD is based on the current 1.8X peaking factor between average and maximum month conditions. Assuming improvements are made to reduce inflow and infiltration rates, this should present a worst-case scenario for the 20-year planning period.

The model does not predict any overload conditions within the future scenario. The Gem Village Lift Station is predicted to operate for up to 12 hours per day under a max month condition; however, the peak influent rate at the wet well remains below the pump station design point. Depending on how the growth to the east is connected to the existing system, there could also possibly be a significant increase in flow to either the Shell or Sunrise Lift Stations. Gravity flow pipes are considered overloaded if the predicted flow exceeds 75 percent of capacity; no existing gravity pipes are predicted to exceed this threshold.

7. WASTEWATER SYSTEM EVALUATION

The following section reviews the major system components and their predicted ability to meet future system needs.

7.1. COLLECTION SYSTEM EVALUATION

The existing collection system is mostly constructed of PVC piping and pre-cast concrete manholes which are expected to have a service life in excess of 30 years. There are limited sections of older clay piping that should eventually be replaced (or potentially slip lined depending on overall integrity). Individual aspects of the collection system are discussed in the following sections.

7.1.1. COLLECTION SYSTEM BASINS

The natural geography of the area leads to major branches of the gravity collection system that run into a common pipe before joining the rest of the system. These areas can be conceptualized as collection basins and the common pipe can provide a location for flow measurement for the whole basin. The lift stations also represent distinct basins that can provide additional flow monitoring locations. Several other locations could provide places to logically separate the existing system, including the eastern and western branches of the collection system north of Highway 160, and the branch connections near the intersection of Mustang and Mars.

These basins present ways to divide the collection system into manageable areas to organize cleaning, camera inspections, and repair of the system on a regular basis. It is important to have a sustainable maintenance plan and budget and to keep Inflow & Infiltration (I&I) at acceptable levels. The budget should allow for cleaning, CCTV inspection, and timely repair of identified issues. The total pipe length to be inspected each year should ideally provide for the monitoring of the entire system every 5-10 years (large systems strive for a one-year cycle). Discussions with regional contractors who provide cleaning and CCTV services have resulted in an estimated expense of $2.50 per foot to outsource this work. This rate leads to a potential cost of $290,000 for the whole existing system; if the system were covered on a 10-year cycle the budgeted cost for cleaning and CCTV services would be approximately $30,000 annually. Town staff have been cleaning the entire system annually but have not had manpower to keep up with CCTV inspections; without CCTV inspections, locations in need of repair can be difficult to identify.

7.1.2. INFLOW AND INFILTRATION

I&I within the existing collection system is significant during summer months when the irrigation ditches are in operation. The influent flow rate to the plant during this time period can be close to double of winter flows. Improvements to the collection system should be completed to reduce unwanted groundwater in the collection system and prevent a potential treatment plant expansion that could otherwise be required. Discussions with District staff have identified some known service tap deficiencies which are discussed further in Section 8. In addition to repair of known issues, regular inspections should be completed to identify potentially new areas of root intrusion or other structural issues.

7.1.3. GRAVITY PIPING CAPACITY

The model shows no directly overloaded pipes; however, some sections show low slope which may create maintenance challenges. One section along East Court has predicted flows that can exceed 50 percent of capacity. Staff suggested a potential gravity reroute to reduce loading to that section of pipe; the potential costs for that work are included in Section 8.

Staff also requested a review of options for creating a gravity conveyance line to serve the area along Highway 160 to the east of the current service area. A potential alignment has been identified (see Figure B in Appendix A; it follows existing roadways and property lines). However, due to the conceptual nature of this alignment, existing easements have not been investigated. The cost estimate presented in Section 8 includes a small contingency for easement acquisitions.

7.1.4. LIFT STATION CAPACITY

The existing lift stations show relatively low usage and should require only routine maintenance, including occasional pump replacement. The Shell and Sunrise Lift Stations have received pump replacements during the Summer of 2019.

The Highway 160 Lift Station is being considered for pump replacement using identical pumps as the Shell and Sunrise locations, which would allow the District to keep limited spare parts for any of three lift stations. There is also some potential for this lift station to be eliminated depending on future modifications to the Gem Village Lift Station.

The Gem Village Lift Station uses pumps in series to create the needed pressure to pump over the hill to the east. The Operations staff have reported maintenance issues with this installation and are interested in alternative solutions; potential alternatives are discussed in Section 8. Flow metering for the Gem Village Lift Station has been discussed in the previous master plan and during the 2018 rate study; flow meter installation should be considered for completion.

7.2. TREATMENT FACILITY EVALUATION

The treatment facility is in good condition and most unit processes are sufficiently sized to serve the District's future needs. The major unit processes are discussed separately in the sections below.

7.2.1. HEADWORKS ANALYSIS

The entire headworks is sized for a peak capacity of 3 MGD. To date, the plant has recorded a peak instantaneous influent flow of 1.2 MGD; based on population growth, peak flows at the end of planning period are predicted to be approximately 1.9 MGD. Given appropriate maintenance, the headworks should serve the facilities needs well beyond the current planning period.

7.2.2. TREATMENT SYSTEM ANALYSIS

Overall, the treatment plant is operating well and performing as designed. Major maintenance is current with influent screen servicing in 2019. One regulated and one potential need for major equipment upgrades have been identified for the treatment plant. The regulated upgrade is based on the nutrient removal regulations discussed in Section 4, and the potential upgrade would be due to excess I&I entering the collection system.

The nutrient removal requirements in Regulation 85 went into effect in 2012, shortly after the District's new treatment plant went online. Based on a preliminary evaluation, the WWTP will require several upgrades to meet those limits. These include an upgraded SBR control system, additional sensors and submersible mixers in the treatment basins, coagulant chemical dosing, and a tertiary filter to remove suspended phosphorous. There is also a potential need for an additional carbon source to support the nutrient removal biochemistry. Predicted expenses for the needed upgrades for nutrient removal are discussed in Section 8; a process flow diagram for

the needed plant improvements is included as Figure C in Appendix A. Finalizing the design of upgrades to meet the future nutrient removal requirements will require further collection and evaluation of process data, and possibly limited pilot testing.

The treatment plant flow capacity is regulated based on the monthly average flow; flow rates have been coming close to the 80 percent limitation level for the past several years (during summer months). Without a significant reduction in I&I, flow may exceed the 80 percent trigger level in a few years. Preliminary review by the SBR manufacturer indicates that flow capacity could be doubled by adding a three additional treatment trains (this is due to the combination of nutrient removal needs and hydraulic capacity changes). Population growth is not predicted to require an increase to the treatment plant capacity during the planning period; however, I&I flows, if not reduced, may drive that need within the next 5 years. A process flow diagram showing the potential impacts of both nutrient removal and hydraulic capacity improvements is included as Figure D in Appendix A, and a conceptual-level engineer's opinion of probable costs (OPC) for a treatment capacity expansion are included in Section 8.

7.2.3. DISINFECTION ANALYSIS

The existing disinfection system was designed for a peak flow of 3.0 MGD. This is in accordance with State design criteria, which require the headworks and disinfection equipment to be sized for the peak hour flow rate. Due to the SBR treatment process, the instantaneous effluent flow rate varies cyclically due to the SBR decant cycles but is fairly consistent and is not dependent on the peak influent flow; the flow rate is determined by how quickly the effluent weir lowers into the water and typically peaks below 0.4 MGD. Currently, only one SBR is permitted (by the control system) to discharge at a time, and the existing disinfection system has capacity for multiple SBR trains to be discharging simultaneously.

8. ITEMS FOR INCLUSION IN THE CAPITAL IMPROVEMENTS PLAN

8.1. RECOMMENDED IMPROVEMENTS

The following sections present the recommended capital improvements that were identified through discussions with Town staff, development of the hydraulic model, and review of the existing wastewater system infrastructure. Figure E (in Appendix A) identifies the locations of these recommended improvements. The most critical work is to reduce the system I&I to avoid the expense of a treatment capacity expansion, which would otherwise not be required for approximately 20 years. A secondary focus over the next 5 years should be improvements to meet nutrient removal requirements at the WWTP. Table 5, at the end of this section, provides a summary of the recommended and potential capital improvements.

8.1.1. COLLECTION SYSTEM

The suggested collection system improvements are to address inflow and infiltration, potentially reroute part of the gravity system, and to consider the redesign and rebuild of the Gem Village Lift Station. Additionally, a gravity sewer service to the east of the existing service area could be a desirable future capital improvements project. This would be dependent on future developments; thus, conceptual costs have been provided but no timeframe has been recommended.

8.1.1.1. INFLOW AND INFILTRATION

Reduction of I&I could prevent a mandated increase in treatment plant capacity to process unwanted groundwater. Minimizing the I&I related peak flows observed during the summer irrigation season could possibly allow the existing WWTP to meet community needs for the next 20 years.

The primary target identified for I&I reduction is repair of service taps, largely in the downtown area. Previous CCTV inspections of the collection piping identified 140 taps as potentially significant sources of system infiltration and as potential targets for slip lining or other repairs. There are several regional vendors that specialize in trenchless repair (slip lining) of sewer services. However, there is a significant expense associated with this potential solution and it is recommended to complete a test section to evaluate the impact and assess if further slip lining would provide the desired improvements. Thirty-eight (38) previously identified tap repair locations along North and Park Streets between Buck Highway and Bayfield Parkway are proposed for the potential pilot study. Figure E includes a representation of the tap locations, as created by Souder Miller for the previous collection system study and a conceptual level cost for both the proposed pilot and the lining repair of all 140 taps is included in Appendix C.

Before the Town can implement sewer service repairs, there is an additional issue related to ownership demarcation that must be addressed. The current sanitation regulations state that the property owner is responsible for their individual sewer tap to the connection at the Town's collection pipe, which is typically under a paved roadway. This situation has led to a lack of sewer tap maintenance. Discussions with Town staff have led to the identification of several options to address this situation.

1. Direct the individual property owners to make repairs under the authority provided within

Section 15-116 of the Municipal Code. However, this option could cause the Town to leverage court proceedings to enforce repair compliance by the property owners. Another potential is for the Town to offer financial assistance to help offset costs to the property owners.

2. Amend Town Code to alter the ownership demarcation. This approach could allow the Town to take over ownership and responsibility for the service lines to allow for proper maintenance. This could include the undesired consequence of having Public Works Personnel respond to all service backups or other obstructions.
3. Create a short-term lease of impacted service lines. This option would allow the Town to take temporary ownership of the service lines, make needed repairs, and then return the service line ownership to the individual properties. While this is intended as a one-time event, the public may perceive that the Town is responsible for sewer service repairs in the future.
4. Expand the WWTF to increase hydraulic capacity. Expansion of the treatment facility would allow the system to safely process the extra water associated with I&I. This is an expensive option when compared to the estimated I&I repair cost; however, it would provide a definitive return on the investment.

Town staff favor an incremental approach based on Option 1. Completion of the trenchless service tap lining should be weighed against the expansion of the treatment facility; repairs have the potential to mitigate the need for plant expansion at a lower cost, but success is not guaranteed. While the expansion is anticipated to be more expensive, it would allow treatment of sanitary (and I&I) sewer flows throughout the planning period.

In addition to repairing previously identified service taps, cleaning and CCTV inspection should be completed on the entire collection system on a regular basis (the actual frequency will be dependent on available budgeting). Conceptual level costs for contracting this work are discussed in Section 7.1.1.

8.1.1.2. GRAVITY PIPING

The piping along East Court has a history of poorly installed taps and gravel infiltration, and it carries a significant portion of the collection flow. A simple reroute that involves installation of approximately 300 feet of new gravity piping could alleviate the flow on that section of line. The potential reroute would connect two existing manholes which would be a relatively small project, and the resulting line would have a more favorable slope to alleviate future flow limitations. Completion is not critical but would provide a long-term benefit in reducing the flow along East Court where pipes are predicted to exceed 50 percent of capacity.

A conceptual level cost estimate is also included for the potential eastern expansion of the gravity service area. A preliminary alignment is depicted as Figure B in Appendix A but would be dependent on unknown easement needs.

8.1.1.3. GEM VILLAGE LIFT STATION

The Gem Village Lift Station currently utilizes a Smith & Loveless packaged pump system that has been in service since 2009. The previous master plan identified a need for an electrical service upgrade and flow meter installation at this lift station; this project has not been completed. Staff would also like this lift station changed to a submersible pump system, or to

consider adding an intermediate lift station location to eliminate pumps running in series.

This lift station has a low flow and very high head duty point (160 gpm at 320 feet TDH) that makes pump replacement a challenge; manufacturers of both self-priming and solids handling turbine pumps have declined to offer selections for this duty point. One potential option is to construct a new intermediate lift station near the western intersection of Bayfield Parkway and Highway 160. This would allow the abandonment of the Highway 160 lift station. It would also provide similar duty requirements for both the Gem Village and the new location, allowing for the probable use of identical, submersible, pumps at both lift stations. Conceptual level cost estimates are included for these potential upgrades.

8.1.2. TREATMENT FACILITY

There are two potentially significant capital needs at the treatment plant. The primary need is to improve the nutrient removal capabilities to facilitate compliance with current and expected regulations; the other is to expand the hydraulic capacity, if a reduction in the I&I flows that drive this potential expansion need cannot be attained.

8.1.2.1. NUTRIENT REMOVAL

Performance of the existing treatment facility was reviewed and the improvements for nutrient removal are based on the manufacturer's recommendations. A new controller, additional process sensors, and submersible tank mixers have been identified as necessary upgrades to the SBR treatment systems; tertiary filtration will also be required to meet the new phosphorous limits.

Due to the implementation gap between Regulations 31 and 84, the Town may want to consider making the necessary upgrades to maximize the biological nutrient removal capacity and defer the cost of tertiary filtration needed to remove suspended phosphorus that is not removed through the biological process This approach would allow the system to earn credit towards deferred implementation of Regulation 31 (as set forth in Regulation 84), and therefore have additional time to plan for the tertiary filter installation project. Cost estimates for this phased approach are presented in Appendix C.

8.1.2.2. CAPACITY EXPANSION

The existing treatment plant will eventually require a capacity expansion. If the current levels of I&I can be reduced in the near future, the expansion may not be necessary until at or near the end of the 20-year planning period. However, if efforts to reduce I&I are not completed or are unsuccessful, an expansion of hydraulic capacity may be required in the relatively near future. The costs presented for the potential hydraulic expansion are based on consultation with the SBR manufacturer.

Table 5. Summary of Recommended Capital Improvements

Description	Recommended Completion Time	Conceptual Level Cost Estimate
Sewer Tap Repairs (downtown pilot)	TBD	$418,400
Sewer Tap Repairs (all)	TBD	$1,540,800
Biological Nutrient Removal Upgrades	2022	$394,700
Suspended Phosphorous Removal Upgrades	TBD (likely 2027)	$1,985,900
CCTV & Cleaning (10% of System)	Annual	$30,000
East Court Gravity Realignment	TBD	$43,700
Eastern Gravity Line Installation	TBD	$3,363,500
Gem Village LS Flow Meter Installation	2022	$69,200
Rebuild Gem Village LS + New Intermediate LS	TBD	$814,100
WWTP Capacity Expansion	TBD	$8,932,700

APPENDIX A

Report Figures

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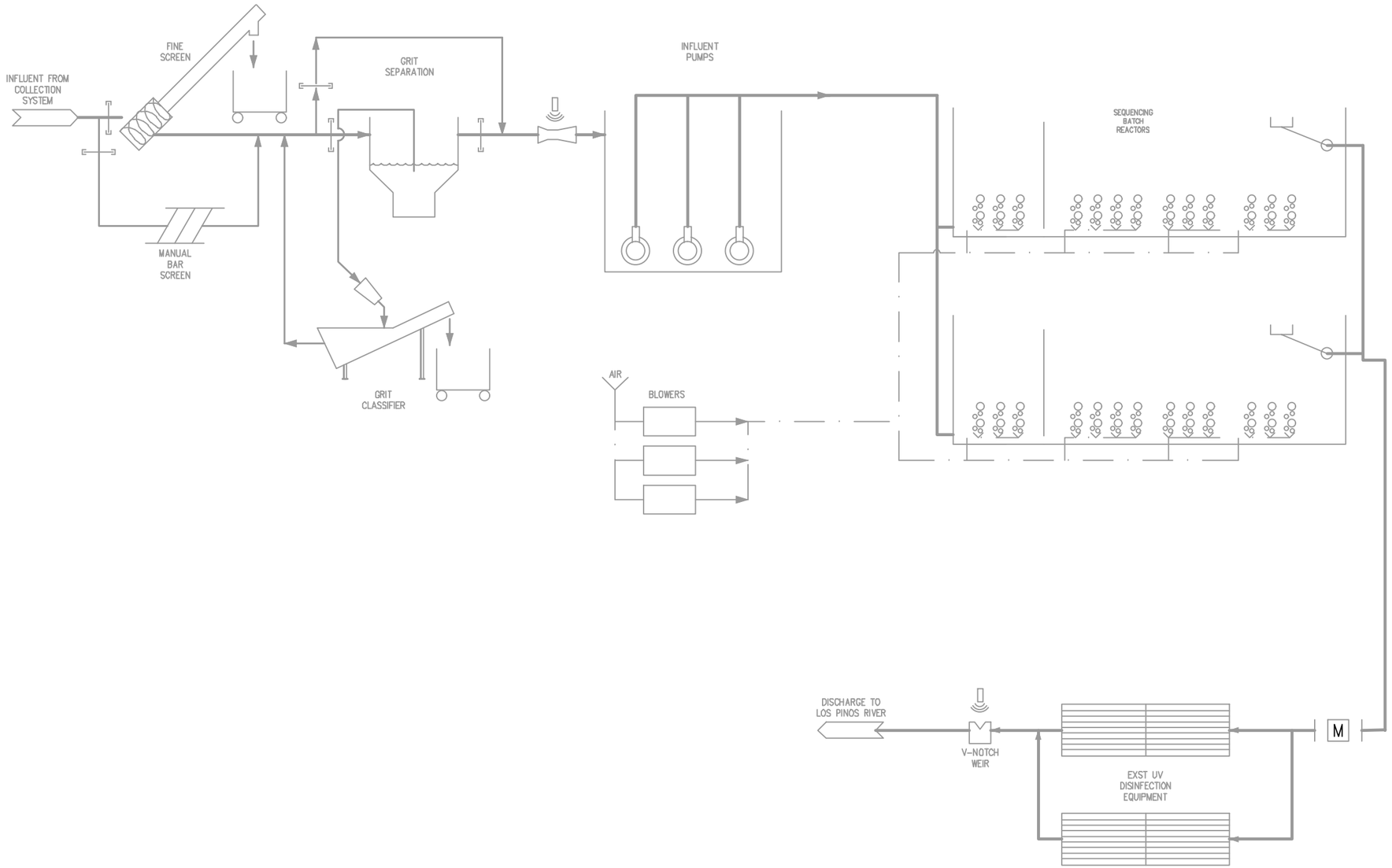

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TOWN OF BAYFIELD
WASTEWATER MASTER PLAN
TREATMENT PROCESS FLOW DIAGRAM

FIGURE No. A

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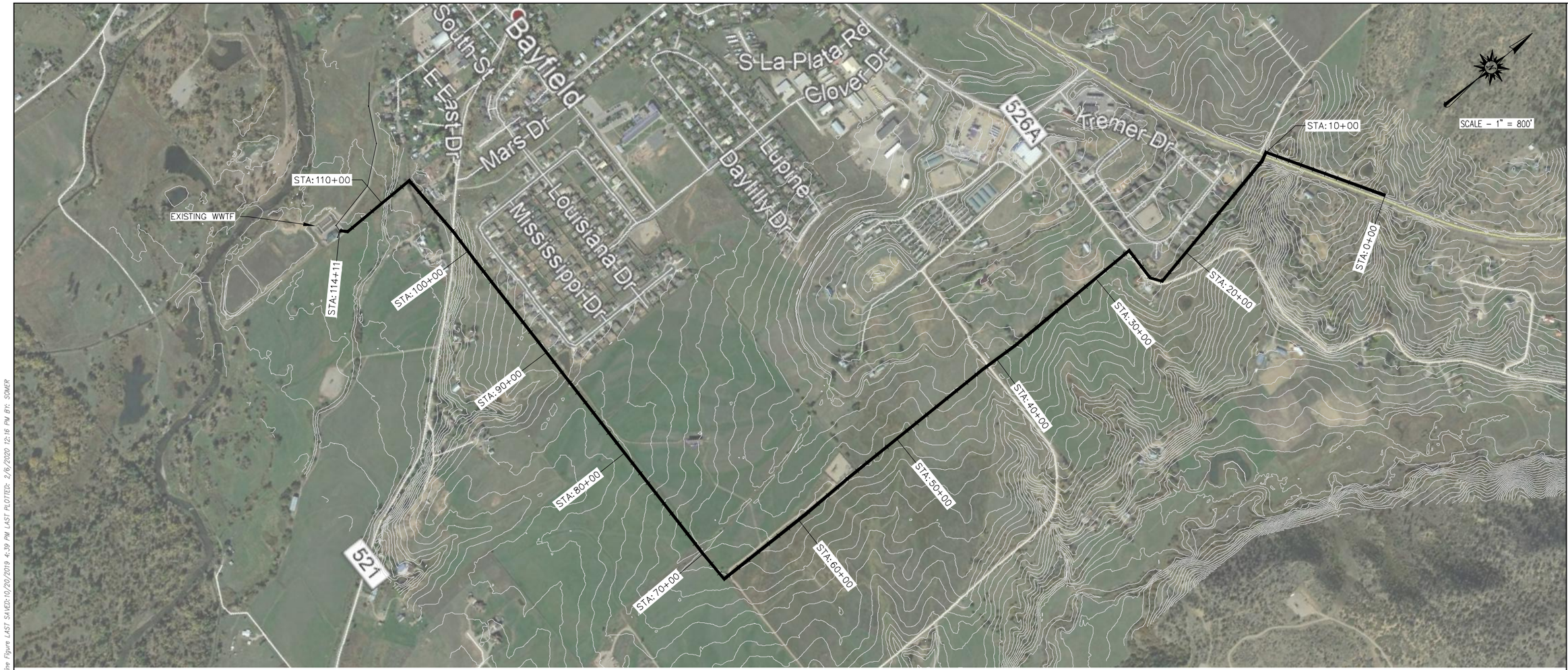

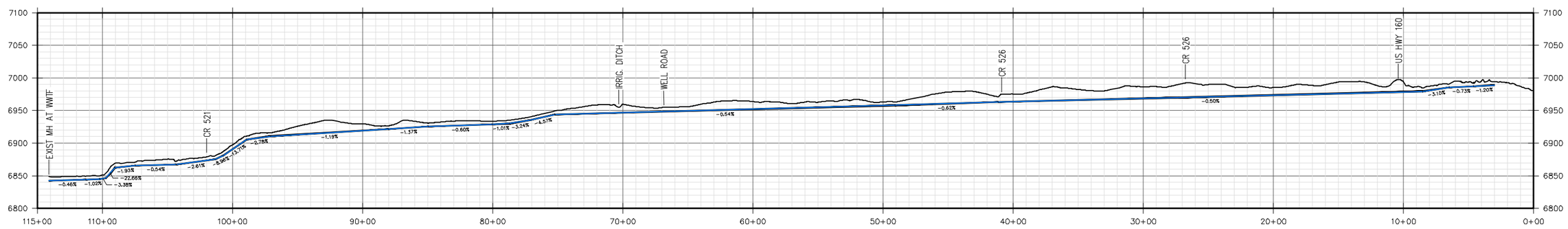

COLLECTION SEWER PROFILE

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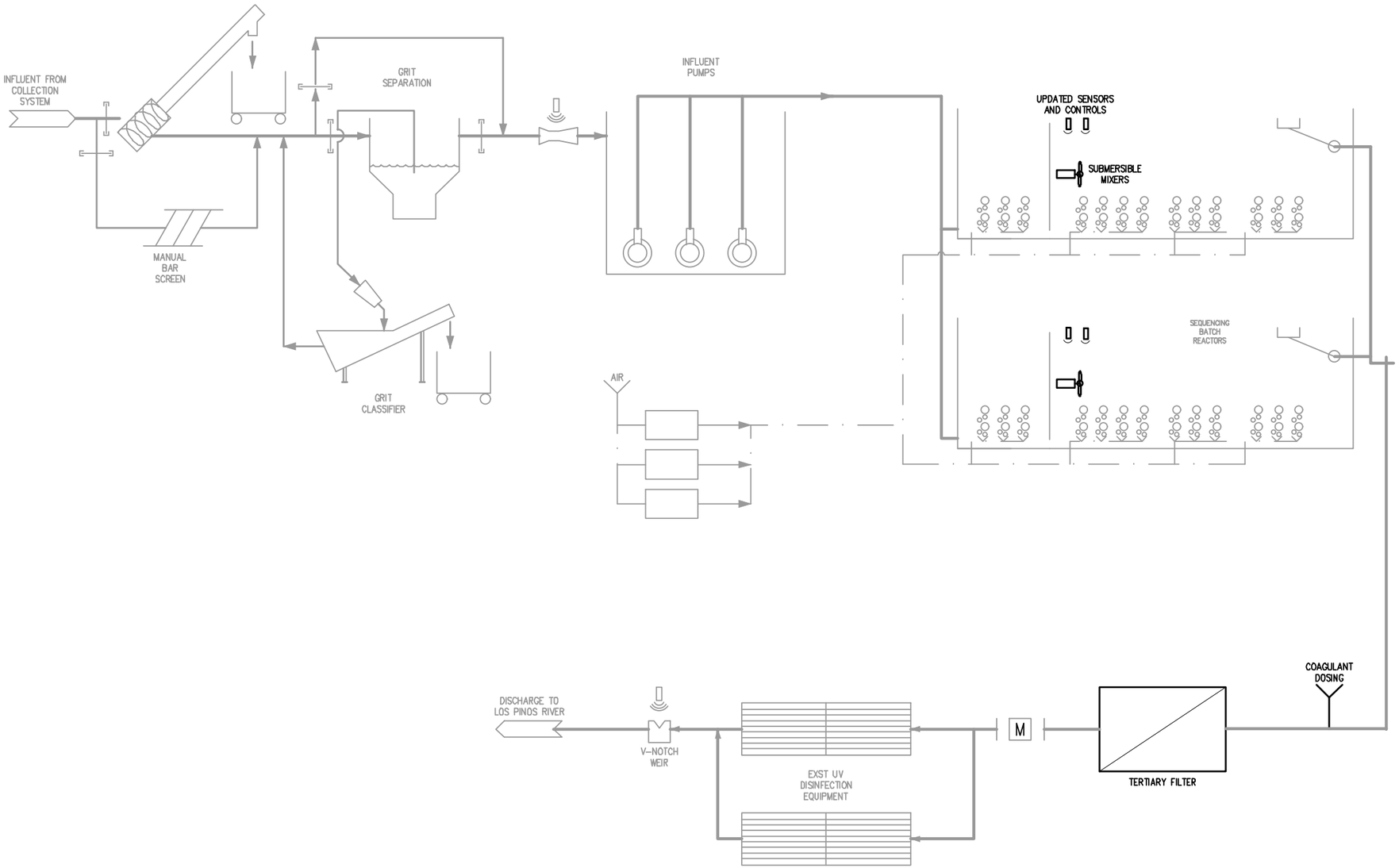
TOWN OF BAYFIELD
WASTEWATER MASTER PLAN
CONCEPTUAL GRAVITY ALIGNMENT

FIGURE No. B



PLUMMER
1485 FLORIDA ROAD, STE C206 | DURANGO, CO 81301
940.247.0724 | TBPE REGISTERED FIRM NUMBER F-13

TOWN OF BAYFIELD
WASTEWATER MASTER PLAN
NUTRIENT REMOVAL UPGRADES PROCESS FLOW DIAGRAM

FIGURE No. C

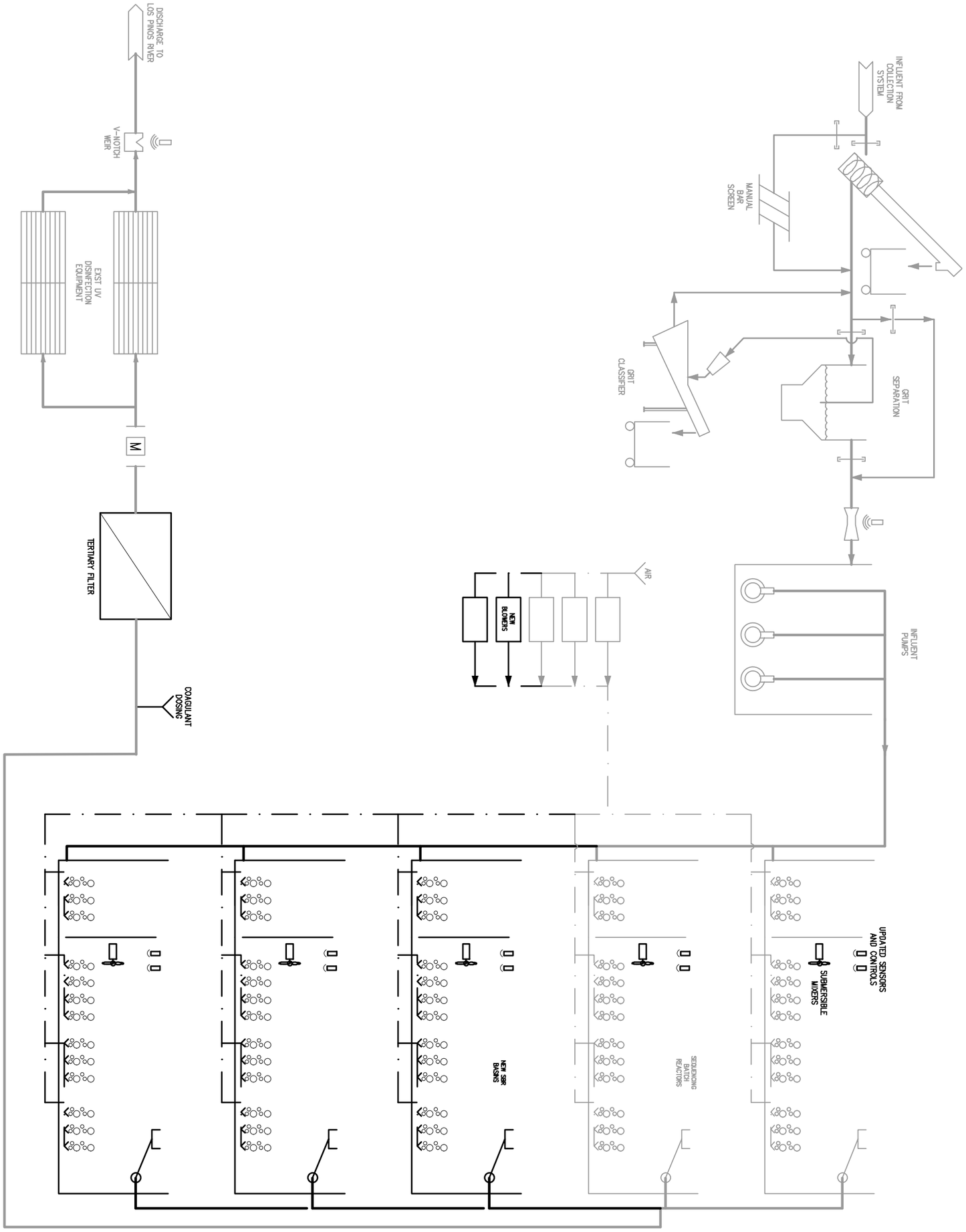


FIGURE No. D

TOWN OF BAYFIELD
WASTEWATER MASTER PLAN
HYDRAULIC EXPANSION PROCESS FLOW DIAGRAM

PLUMMER
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POTENTIAL BASIN DELINEATION (TYP)

AREA OF PROPOSED SEWER TAP REPAIR PILOT PROJECT

SEWER SERVICE REPAIR COUNT AND APPROXIMATE LOCATION (TYP)

POTENTIAL LIFT STATION RELOCATION

SOUTH STREET POTENTIAL GRAVITY RE-ALIGNMENT

WWTP SITE NUTRIENT REMOVAL UPGRADES RECOMMENDED

GEM VILLAGE LIFT STATION. POTENTIAL REBUILD AND/OR FLOW METER INSTALLATION

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TOWN OF BAYFIELD
WASTEWATER MASTER PLAN
MAP OF RECOMMENDED CAPITAL IMPROVEMENTS

FIGURE No. E

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APPENDIX B

NPDES Discharge Permit

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2014 — 2019 Permit

Colorado Department of Public Health and Environment

AUTHORIZATION TO DISCHARGE UNDER THE COLORADO DISCHARGE PERMIT SYSTEM
PERMIT NUMBER CO0048291

In compliance with the provisions of the Colorado Water Quality Control Act, (25-8-101 et seq., CRS, 1973 as amended), for both discharges to surface and ground waters, and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq.; the "Act"), for discharges to surface waters only, the

Town of Bayfield

is authorized to discharge from the Bayfield wastewater treatment plant located **at 1200 South East Street, Bayfield, CO 81122, in the E ½ of the E ½ of S14, T34N, R7W; latitude: 37.2193° North, longitude: 107.5972° West**

to **Los Pinos River**

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I and II hereof. All discharges authorized herein shall be consistent with the terms and conditions of this permit.

The applicant may demand an adjudicatory hearing within thirty (30) calendar days of the date of issuance of the final permit determination, per the Colorado State Discharge Permit System Regulation 61.7(1). Should the applicant choose to contest any of the effluent limitations, monitoring requirements or other conditions contained herein, the applicant must comply with Section 24-4-104 CRS 1973 and the Colorado State Discharge Permit System Regulations. Failure to contest any such effluent limitation, monitoring requirement, or other condition, constitutes consent to the condition by the applicant.

This permit and the authorization to discharge shall expire at midnight, **July 31, 2019**

Issued and Signed this 30th day of June, 2014

NEW

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Janet Kieler

Janet Kieler, Permits Section Manager
Water Quality Control Division

ISSUED AND SIGNED: JUNE 30, 2014
EFFECTIVE: AUGUST 1, 2014

TABLE OF CONTENTS

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Permitted Feature(s)

Beginning no later than the effective date of this permit and lasting through the expiration date, the permittee is authorized to discharge from, and self monitoring samples taken in accordance with the monitoring requirements shall be obtained from permitted feature(s):

Outfall 001A (Latitude: 37.21642° North, Longitude: 107.59667° West), following disinfection and prior to mixing with the receiving stream.

BF1A (Latitude: 37.2309° North, Longitude: 107.6117° West), is an in-stream outfall located upstream from the facility discharge to collect continous ambient temperature data.

The location(s) provided above will serve as the point(s) of compliance for this permit and are appropriate as they are located after all treatment and prior to discharge to the receiving water. Any discharge to the waters of the State from a point source other than specifically authorized by this permit is prohibited.

In accordance with the Water Quality Control Commission Regulations for Effluent Limitations, Section 62.4, and the Colorado Discharge Permit System Regulations, Section 61.8(2), 5 C.C.R. 1002-61, the permitted discharge shall not contain effluent parameter concentrations which exceed the following limitations specified below or exceed the specified flow limitation.

2. Limitations, Monitoring Frequencies and Sample Types for Effluent Parameters

In order to obtain an indication of the probable compliance or noncompliance with the effluent limitations specified in Part I.A, the permittee shall monitor all effluent parameters at the frequencies and sample types specified below. Such monitoring will begin immediately and last for the life of the permit unless otherwise noted. The results of such monitoring shall be reported on the Discharge Monitoring Report form (See Part I.D.)

Self-monitoring sampling by the permittee for compliance with the effluent monitoring requirements specified in this permit, shall be performed at the location(s) noted in Part I.A.1 above. If the permittee, using an approved analytical method, monitors any parameter more frequently than required by this permit, then the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form (DMRs) or other forms as required by the Division. Such increased frequency shall also be indicated.

Percentage Removal Requirements (BOD_5 and TSS Limitations) - If noted in the limits table(s), the arithmetic mean of the BOD5 and TSS concentrations for effluent samples collected during the DMR reporting period shall demonstrate a minimum of eighty-five percent (85%) removal of both BOD5 and TSS, as measured by dividing the respective difference between the mean influent and effluent concentrations for the DMR monitoring period by the respective mean influent concentration for the DMR monitoring period, and multiplying the quotient by 100.

Oil and Grease Monitoring: For every outfall with oil and grease monitoring, in the event an oil sheen or floating oil is observed, a grab sample shall be collected and analyzed for oil and grease, and reported on the appropriate DMR under parameter 03582. In addition, corrective action shall be taken immediately to mitigate the discharge of oil and grease. A description of the corrective action taken should be included with the DMR.

Total Residual Chlorine: Monitoring for TRC is required only when chlorine is in use.

Flow Recording Device: For this facility, two flow recording devices are provided and are located at the point of inflow to and discharge from the treatment plant. Reported flows will be used to monitor compliance with the effluent flow limitation.

Metals: Metals concentrations measured in compliance with the effluent monitoring requirements listed in Part I.A of this permit may be used to satisfy any pretreatment or industrial waste management metals monitoring requirements listed in Part

I.B.6, if the metals are in the same form (i.e. total). The special sampling procedures (e.g. 24-hour composite samples) specified in Part I.B.6 must be followed.

Permitted Feature/Limit Set 001A

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations				Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	2-Year Average	Frequency	Sample Type
50050	Effluent Flow (MGD)	0.6		Report		Continuous	Recorder
00010	Temp Daily Max (°C) April-Oct			Report		Continuous	Recorder
00010	Temp Daily Max (°C) Nov-March			Report		Continuous	Recorder
00010	Temp MWAT (°C) April-Oct		Report			Continuous	Recorder
00010	Temp MWAT (°C) Nov-March		Report			Continuous	Recorder
00400	pH (su)			6.5-9		Daily	Grab
51040	*E. coli* (#/100 ml)	816	1,632			Monthly	Grab
50060	TRC (mg/l)*	0.10		0.11		3 Days/Week	Grab
00640	Total Inorganic Nitrogen (mg/l)			13		Monthly	Composite
00610	Total Ammonia as N (mg/l)						
	January	13		40		Monthly	Composite
	February	13		34		Monthly	Composite
	March	13		45		Monthly	Composite
	April	13		49		Monthly	Composite
	May	13		66		Monthly	Composite
	June	13		100		Monthly	Composite
	July	13		100		Monthly	Composite
	August	13		82		Monthly	Composite
	September	13		81		Monthly	Composite
	October	13		65		Monthly	Composite
	November	13		50		Monthly	Composite
	December	13		43		Monthly	Composite
00310	BOD5, effluent (mg/l)	30	45			Monthly	Composite
81010	BOD5 (% removal)	85 (min)				Monthly	Calculated
00530	TSS, effluent (mg/l)	30	45			Monthly	Composite
81011	TSS (% removal)	85 (min)				Monthly	Calculated
84066	Oil and Grease (visual)			Report		2 Days/Week	Visual
03582	Oil and Grease (mg/l)			10		Contingent	Grab
70295	TDS (mg/l)	Report				Quarterly	Composite
01046	Fe, Dis (µg/l)	2,395			316	Monthly	Composite
01056	Mn, Dis (µg/l)	274			199	Monthly	Composite
81020	Sulfate (mg/l)	2,245			407	Quarterly	Composite

*TRC need only be monitored when in use.

Permitted Feature/ Limit Set BF1A

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations				Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	2-Year Average	Frequency	Sample Type
00010	Temp Daily Max (°C) April-Oct, starting January 1, 2015			Report		Continuous	Recorder
00010	Temp Daily Max (°C) Nov-March, starting January 1, 2015			Report		Continuous	Recorder
00010	Temp MWAT (°C) April-Oct, starting January 1, 2015		Report			Continuous	Recorder
00010	Temp MWAT (°C) Nov-March, starting January 1, 2015		Report			Continuous	Recorder

3. **Monitoring Frequency and Sample Type Influent Parameters**

Regardless of whether or not an effluent discharge occurs and in order to obtain an indication of the current influent loading as compared to the approved capacity specified in Part I.A.3 and Part I.B.2; the permittee shall monitor influent parameters at the following required frequencies, the results to be reported on the Discharge Monitoring Report (See Part I.D):

If the permittee monitors any parameter more frequently than required by the permit, using an approved test procedure or as specified in the permit, the result of this monitoring shall be included in the calculation and reporting of data to the Division.

Self-monitoring samples taken in compliance with the monitoring requirements specified below shall be taken at the following location(s): **Outfall 300I, at a representative point prior to biological treatment.**

Permitted Feature 300I

ICIS Code	Parameter	Discharge Limitations Maximum Concentrations			Monitoring Frequency	Sample Type
		30-Day Average	7-Day Average	Daily Max.		
50050 G	Flow, mgd	Report		Report	Continuous [1]	Recorder [1]
00180 G	Plant Capacity (% of Capacity - Hydraulic) [1]	Report			Monthly	Calculated [1]
00310 G	BOD_5, mg/l	Report	Report		Monthly	Composite
00310 G	BOD_5, lbs/day	Report	Report		Monthly	Calculated
00180 G	Plant Capacity (% of Capacity - Organic) [1]	Report			Monthly	Calculated [1]
00530G	Total Suspended Solids, mg/l	Report	Report		Monthly	Composite
70295 G	Total Dissolved Solids *	Report			Quarterly	Composite

* TDS measurements only required when the discharge is in the Colorado River Basin. Samples are to be of the raw water supply. If more than one source is being utilized, a composite sample proportioned to flow shall be prepared from individual grab samples.

[1]The % capacity is to be reported against the listed capacities of **0.6 MGD** for the hydraulic capacity and **1,583 lbs. BOD5/day** for the organic capacities as noted in **Site Approval 4973**. The percentage should be calculated using the 30-day average values divided by the corresponding capacity, times 100.

4. **Salinity Parameters**

In order to obtain an indication of the increase in salinity due to the treatment and use of water within this service area, the permittee shall monitor the raw water source and the wastewater effluent at the following required frequencies, the results to be reported on the Discharge Monitoring Report (See Part I, Section D.1.):

Self-monitoring samples taken in compliance with the monitoring requirements specified above shall be taken prior to treatment of the raw drinking water source (with a composite sample proportioned to flow prepared from individual grab samples if more than one source is being utilized), and at the established wastewater treatment facility effluent sampling point identified above in Part I, Section B.2.

5. **Special Studies and Additional Monitoring**

   a. Temperature Monitoring Equipment- The facility is required to install continuous temperature monitoring equipment by December 31, 2014 to comply with the in-stream temperature monitoring 'continuous' requirements listed Part I.A. 2.

B. TERMS AND CONDITIONS

1. Service Area

All wastewater flows contributed in the service area may be accepted by the Bayfield WWTF for treatment at the permittee's wastewater treatment plant provided that such acceptance does not cause or contribute to an exceedance of the throughput or design capacity of the treatment works or the effluent limitations in Part I.A, or constitute a substantial impact to the functioning of the treatment works, degrade the quality of the receiving waters, or harm human health, or the environment.

In addition, the permittee shall enter into and maintain service agreements with any municipalities that discharge into the wastewater treatment facility. The service agreements shall contain all provisions necessary to protect the financial, physical, and operational integrity of the wastewater treatment works.

2. Design Capacity

Based on Site Approval **4973**, the design capacity of this domestic wastewater treatment works is **0.6 million gallons per day** (MGD) for hydraulic flow (30-day average) and **1,583 lbs. BOD_5 per day** for organic loading (30-day average).

3. Expansion Requirements

Pursuant to Colorado Law, C.R.S. 25-8-501 (5 d & e), the permittee is required to initiate engineering and financial planning for expansion of the domestic wastewater treatment works whenever throughput reaches eighty (80) percent of the treatment capacity. Such planning may be deemed unnecessary upon a showing that the area served by the domestic wastewater treatment works has a stable or declining population; but this provision shall not be construed as preventing periodic review by the Division should it be felt that growth is occurring or will occur in the area.

The permittee shall commence construction of such domestic wastewater treatment works expansion whenever throughput reaches ninety-five (95) percent of the treatment capacity or, in the case of a municipality, either commence construction or cease issuance of building permits within such municipality until such construction is commenced; except that building permits may continue to be issued for any construction which would not have the effect of increasing the input of wastewater to the sewage treatment works of the municipality involved.

Where unusual circumstances result in throughput exceeding 80% of treatment capacity, the permittee may, in lieu of initiating planning for expansion, submit a report to the Division that demonstrates that it is unlikely that the event will reoccur, or even if it were to reoccur, that 95% of the treatment capacity would not be exceeded.

Where unusual circumstances result in throughput exceeding 95% of the treatment capacity, the permittee may, in lieu of initiating construction of the expansion, submit a report to the Division that demonstrates that the domestic wastewater treatment works was in compliance at all times during the events and that it is extremely unlikely that the event will reoccur.

Where the permittee submits a report pursuant to unusual circumstances, and the Division, upon review of such report, determines in writing to the permittee that the report does not support the required findings, the permittee shall initiate planning and/or construction of the domestic wastewater treatment works as appropriate.

4. **Facilities Operation and Maintenance**

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control including all portions of the collection system and lift stations owned by the permittee (and related appurtenances) which are installed or used by the permittee as necessary to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes effective performance, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems when installed by the permittee only when necessary to achieve compliance with the conditions of the permit.

Any sludge produced at the wastewater treatment facility shall be disposed of in accordance with State and Federal regulations. The permittee shall take all reasonable steps to minimize or prevent any discharge of sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. As necessary, accelerated or additional monitoring to determine the nature and impact of the noncomplying discharge is required.

5. **Pretreatment Program- Industrial Waste Management**

a. The Permittee has the responsibility to protect the Domestic Wastewater Treatment Works (DWTW), as defined at section 25.8.103(5) of the Colorado Water Quality Control Act, or the Publicly-Owned Treatment Works (POTW), as defined at 40 CFR section 403.3(q) of the federal pretreatment regulations, from pollutants which would cause pass through or interference, as defined at 40 CFR 403.3(p) and (k), or otherwise be incompatible with operation of the treatment works including interference with the use or disposal of municipal sludge.

b. Pretreatment Standards (40 CFR Section 403.5) developed pursuant to Section 307 of the Federal Clean Water Act (the Act) require that the Permittee shall not allow, under any circumstances, the introduction of the following pollutants to the DWTW from any source of non-domestic discharge:

i. Pollutants which create a fire or explosion hazard in the DWTW, including, but not limited to, wastestreams with a closed cup flashpoint of less than sixty (60) degrees Centigrade (140 degrees Fahrenheit) using the test methods specified in 40 CFR Section 261.21;

ii. Pollutants which will cause corrosive structural damage to the DWTW, but in no case discharges with a pH of lower than 5.0 s.u., unless the treatment facilities are specifically designed to accommodate such discharges;

iii. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the DWTW, or otherwise interfere with the operation of the DWTW;

iv. Any pollutant, including oxygen demanding pollutants (e.g., BOD), released in a discharge at a flow rate and/or pollutant concentration which will cause Interference with any treatment process at the DWTW;

v. Heat in amounts which will inhibit biological activity in the DWTW resulting in Interference, but in no case heat in such quantities that the temperature at the DWTW treatment plant exceeds forty (40) degrees Centigrade (104 degrees Fahrenheit) unless the Approval Authority, upon request of the DWTW, approves alternate temperature limits;

vi. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause Interference or Pass Through;

vii. Pollutants which result in the presence of toxic gases, vapors, or fumes within the DWTW in a quantity that may cause acute worker health and safety problems;

viii. Any trucked or hauled pollutants, except at discharge points designated by the DWTW; and

ix. Any specific pollutant that exceeds a local limitation established by the Permittee in accordance with the requirements of 40 CFR Section 403.5(c) and (d).

x. Any other pollutant which may cause Pass Through or Interference.

c. EPA shall be the Approval Authority and the mailing address for all reporting and notifications to the Approval Authority shall be: USEPA 1595 Wynkoop St. 8ENF-W-NP, Denver, CO 80202-1129. Should the State be delegated authority to implement and enforce the Pretreatment Program in the future, the Permittee shall be notified of the delegation and the state permitting authority shall become the Approval Authority.

d. In addition to the general limitations expressed above, more specific Pretreatment Standards have been and will be promulgated for specific industrial categories under Section 307 of the Act (40 CFR Part 405 et. seq.).

e. The Permittee must notify the state permitting authority and the Approval Authority, of any new introductions by new or existing industrial users or any substantial change in pollutants from any industrial user within sixty (60) calendar days following the introduction or change. Such notice must identify:

i. Any new introduction of pollutants into the DWTW from an industrial user which would be subject to Sections 301, 306, or 307 of the Act if it were directly discharging those pollutants; or

ii. Any substantial change in the volume or character of pollutants being introduced into the DWTW by any industrial user;

iii. For the purposes of this section, adequate notice shall include information on:

(A) The identity of the industrial user;

(B) The nature and concentration of pollutants in the discharge and the average and maximum flow of the discharge to be introduced into the DWTW; and

(C) Any anticipated impact of the change on the quantity or quality of effluent to be discharged from or biosolids or sludge produced at such DWTW.

iv. For the purposes of this section, an industrial user shall include:

(A) Any discharger subject to Categorical Pretreatment Standards under Section 307 of the Act and 40 CFR chapter I and subchapter N;

(B) Any discharger which has a process wastewater flow of 25,000 gallons or more per day;

(C) Any discharger contributing five percent or more of the average dry weather hydraulic or organic capacity of the DWTW treatment plant;

(D) Any discharger who is designated by the Approval Authority as having a reasonable potential for adversely affecting the DWTWs operation or for violating any Pretreatment Standard or requirements;

f. At such time as a specific Pretreatment Standard or requirement becomes applicable to an industrial user of the Permittee, the state permitting authority and/or Approval Authority may, as appropriate:

i. Amend the Permittee's CDPS discharge permit to specify the additional pollutant(s) and corresponding effluent limitation(s) consistent with the applicable national Pretreatment Standards;

ii. Require the Permittee to specify, by ordinance, order, or other enforceable means, the type of pollutant(s) and the maximum amount which may be discharged to the Permittee's DWTW for treatment. Such requirement shall be imposed in a manner consistent with the program development requirements of the General Pretreatment Regulations at 40 CFR Part 403; and/or,

iii. Require the Permittee to monitor its discharge for any pollutant which may likely be discharged from the Permittee's DWTW, should the industrial user fail to properly pretreat its waste.

The state permitting authority and the Approval Authority retains, at all times, the right to take legal action against any source

of nondomestic discharge, whether directly or indirectly controlled by the Permittee, for violations of a permit, order or similar enforceable mechanism issued by the Permittee, violations of any Pretreatment Standard or requirement, or for failure to discharge at an acceptable level under national standards issued by EPA under 40 CFR, chapter I, subchapter N. In those cases where a CDPS permit violation has occurred because of the failure of the Permittee to properly develop and enforce Pretreatment Standards and requirements as necessary to protect the DWTW, the state permitting authority and/or Approval Authority shall hold the Permittee and/or industrial user responsible and may take legal action against the Permittee as well as the Industrial user(s) contributing to the permit violation.

C. DEFINITION OF TERMS

1. "Acute Toxicity" - The acute toxicity limitation is exceeded if the LC50 is at any effluent concentration less than or equal to the IWC indicated in this permit.

2. "Antidegradation limits" – See "Two (2) - Year Rolling Average".

3. "Chronic toxicity", which includes lethality and growth or reproduction, occurs when the NOEC and IC25 are at an effluent concentration less than the IWC indicated in this permit.

4. "Composite" sample is a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow. For a SBR type treatment system, a composite sample is defined as sampling equal aliquots during the beginning, middle and end of a decant period, for two consecutive periods during a day (if possible).

5. "Continuous" measurement, is a measurement obtained from an automatic recording device which continually measures the effluent for the parameter in question, or that provides measurements at specified intervals.

6. "Daily Maximum limitation" for all parameters (except temperature, pH and dissolved oxygen) means the limitation for this parameter shall be applied as an average of all samples collected in one calendar day. For these parameters the DMR shall include the highest of the daily averages. For pH and dissolved oxygen, this means an instantaneous maximum (and/or instantaneous minimum) value. The instantaneous value is defined as the analytical result of any individual sample. For pH and dissolved oxygen, DMRs shall include the maximum (and/or minimum) of all instantaneous values within the calendar month. Any value beyond the noted daily maximum limitation for the indicated parameter shall be considered a violation of this permit. For temperature, see Daily Maximum Temperature.

7. "Daily Maximum Temperature (DM)" is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as the highest two-hour average water temperature recorded during a given 24-hour period. This will be determined using a rolling 2-hour maximum temperature. If data is collected every 15 minutes, a 2 hour maximum can be determined on every data point after the initial 2 hours of collection. Note that the time periods that overlap days (Wednesday night to Thursday morning) do not matter as the reported value on the DMR is the greatest of all the 2-hour averages.

   For example data points collected at:
   08:15, 08:30, 08:45, 09:00, 09:15, 09:30, 09:45, 10:00, would be averaged for a single 2 hour average data point
   08:30, 08:45, 09:00, 09:15, 09:30, 09:45, 10:00, 10:15, would be averaged for a single 2 hour average data point
   08:45, 09:00, 09:15, 09:30, 09:45, 10:00, 10:15, 10:30, would be averaged for a single 2 hour average data point

   This would continue throughout the course of a calendar day. The highest of these 2 hour averages over a month would be reported on the DMR as the daily maximum temperature. At the end/beginning of a month, the collected data should be used for the month that contains the greatest number of minutes in the 2-hour maximum. Data from 11 pm to 12:59 am, would fall in the previous month. Data collected from 11:01 pm to 1:00 am would fall in the new month.

8. "Dissolved (D) metals fraction" is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as that portion of a water and suspended sediment sample which passed through a 0.40 or 0.45 UM (micron) membrane filter. Determinations of "dissolved" constituents are made using the filtrate. This may include some very small (colloidal) suspended particles which passed through the membrane filter as well as the amount of substance present in true chemical solution.

9. "Geometric mean" for *E. coli* bacteria concentrations, the thirty (30) day and seven (7) day averages shall be determined as the geometric mean of all samples collected in a thirty (30) day period and the geometric mean of all samples taken in a seven

(7) consecutive day period respectively. The geometric mean may be calculated using two different methods. For the methods shown, a, b, c, d, etc. are individual sample results, and n is the total number of samples.

Method 1:

Geometric Mean = $(a*b*c*d*...)^{(1/n)}$ "*" - means multiply

Method 2:

Geometric Mean = antilog ([log(a)+log(b)+log(c)+log(d)+...]/n)

Graphical methods, even though they may also employ the use of logarithms, may introduce significant error and may not be used.

In calculating the geometric mean, for those individual sample results that are reported by the analytical laboratory to be "less than" a numeric value, a value of 1 should be used in the calculations. If all individual analytical results for the month are reported to be less than numeric values, then report "less than" the largest of those numeric values on the monthly DMR. Otherwise, report the calculated value.

For any individual analytical result of "too numerous to count" (TNTC), that analysis shall be considered to be invalid and another sample shall be promptly collected for analysis. If another sample cannot be collected within the same sampling period for which the invalid sample was collected (during the same month if monthly sampling is required, during the same week if weekly sampling is required, etc.), then the following procedures apply:

i. A minimum of two samples shall be collected for coliform analysis within the next sampling period.

ii. If the sampling frequency is monthly or less frequent: For the period with the invalid sample results, leave the spaces on the corresponding DMR for reporting coliform results empty and attach to the DMR a letter noting that a result of TNTC was obtained for that period, and explain why another sample for that period had not been collected.

If the sampling frequency is more frequent than monthly: Eliminate the result of TNTC from any further calculations, and use all the other results obtained within that month for reporting purposes. Attach a letter noting that a result of TNTC was obtained, and list all individual analytical results and corresponding sampling dates for that month.

10. "Grab" sample, is a single "dip and take" sample so as to be representative of the parameter being monitored.

11. "IC25" or "Inhibition Concentration" is a point estimate of the toxicant concentration that would cause a given percent reduction in a non-lethal biological measurement (e.g. growth or reproduction) calculated from a continuous model (i.e. interpolation method). IC25 is a point estimate of the toxic concentration that would cause a 25-percent reduction in a non-lethal biological measurement.

12. "In-situ" measurement is defined as a single reading, observation or measurement taken in the field at the point of discharge.

13. "Instantaneous" measurement is a single reading, observation, or measurement performed on site using existing monitoring facilities.

14. "LC50" or "Lethal Concentration" is the toxic or effluent concentration that would cause death in 50 percent of the test organisms over a specified period of time.

15. "Maximum Weekly Average Temperature (MWAT)" is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as an implementation statistic that is calculated from field monitoring data. The MWAT is calculated as the largest mathematical mean of multiple, equally spaced, daily temperatures over a seven-day consecutive period, with a minimum of three data points spaced equally through the day. For lakes and reservoirs, the MWAT is assumed to be equivalent to the maximum WAT from at least three profiles distributed throughout the growing season (generally July-September).

The MWAT is calculated by averaging all temperature data points collected during a calendar day, and then averaging the daily average temperatures for 7 consecutive days. This 7 day averaging period is a rolling average, i.e. on the 8th day, the

MWAT will be the averages of the daily averages of days 2-8. The value to be reported on the DMR is the highest of all the rolling 7-day averages throughout the month. For those days that are at the end/beginning of the month, the data shall be reported for the month that contains 4 of the 7 days.

Day 1: Average of all temperature data collected during the calendar day.
Day 2: Average of all temperature data collected during the calendar day.
Day 3: Average of all temperature data collected during the calendar day.
Day 4: Average of all temperature data collected during the calendar day.
Day 5: Average of all temperature data collected during the calendar day.
Day 6: Average of all temperature data collected during the calendar day.
Day 7: Average of all temperature data collected during the calendar day.
1st MWAT Calculation as average of previous 7 days
Day 8: Average of all temperature data collected during the calendar day.
2nd MWAT Calculation as average of previous 7 days
Day 9: Average of all temperature data collected during the calendar day.
3rd MWAT Calculation as average of previous 7 days

16. "NOEC" or "No-Observed-Effect-Concentration" is the highest concentration of toxicant to which organisms are exposed in a full life cycle or partial life cycle (short term) test, that causes no observable adverse effects on the test organisms (i.e. the highest concentration of toxicant in which the values for the observed responses are not statistically different from the controls). This value is used, along with other factors, to determine toxicity limits in permits.

17. "Potentially dissolved (PD) metals fraction" is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as that portion of a constituent measured from the filtrate of a water and suspended sediment sample that was first treated with nitric acid to a pH of 2 or less and let stand for 8 to 96 hours prior to sample filtration using a 0.40 or 0.45-UM (micron) membrane filter. Note the "potentially dissolved" method cannot be used where nitric acid will interfere with the analytical procedure used for the constituent measured.

18. "Practical Quantitation Limit (PQL)" means the minimum concentration of an analyte (substance) that can be measured with a high degree of confidence that the analyte is present at or above that concentration. The use of PQL in this document may refer to those PQLs shown in Part I.D of this permit or the PQLs of an individual laboratory.

19. "Quarterly measurement frequency" means samples may be collected at any time during the calendar quarter if a continual discharge occurs. If the discharge is intermittent, then samples shall be collected during the period that discharge occurs.

20. "Recorder" requires the continuous operation of a chart and/or totalizer (or drinking water rotor meters or pump hour meters where previously approved.)

21. SAR and Adjusted SAR - The equation for calculation of SAR-adj is:

$$SAR\text{-}adj = \frac{Na^{+}}{\sqrt{\frac{Ca_{x} + Mg^{++}}{2}}}$$

Where:

Na+ = Sodium in the effluent reported in meq/l
Mg++ = Magnesium in the effluent reported in meq/l
Cax = calcium (in meq/l) in the effluent modified due to the ratio of bicarbonate to calcium

The values for sodium (Na+), calcium (Ca++), bicarbonate (HCO3-) and magnesium (Mg++) in this equation are expressed in units of milliequivalents per liter (meq/l). Generally, data for these parameters are reported in terms of mg/l, which must then be converted to calculate the SAR. The conversions are:

$$\text{meq/l} = \frac{\text{Concentration in mg/l}}{\text{Equivalent weight in mg/meq}}$$

Where the equivalent weights are determined based on the atomic weight of the element divided by the ion's charge:

Na+ = 23.0 mg/meq (atomic weight of 23, charge of 1)
Ca++ = 20.0 mg/meq (atomic weight of 40.078, charge of 2)
Mg++ = 12.15 mg/meq (atomic weight of 24.3, charge of 2)
HCO3- = 61 mg/mep (atomic weight of 61, charge of 1)

The EC and the HCO3 -/Ca++ ratio in the effluent (calculated by dividing the HCO3 - in meq/l by the Ca++ in meq/l) are used to determine the Cax using the following table.

Table – Modified Calcium Determination for Adjusted Sodium Adsorption Ratio

HCO3/Ca Ratio And EC 1, 2, 3												
Salinity of Effluent (EC)(dS/m)												
		0.1	0.2	0.3	0.5	0.7	1.0	1.5	2.0	3.0	4.0	6.0	8.0
Ratio of HCO3/Ca	.05	13.20	13.61	13.92	14.40	14.79	15.26	15.91	16.43	17.28	17.97	19.07	19.94
	.10	8.31	8.57	8.77	9.07	9.31	9.62	10.02	10.35	10.89	11.32	12.01	12.56
	.15	6.34	6.54	6.69	6.92	7.11	7.34	7.65	7.90	8.31	8.64	9.17	9.58
	.20	5.24	5.40	5.52	5.71	5.87	6.06	6.31	6.52	6.86	7.13	7.57	7.91
	.25	4.51	4.65	4.76	4.92	5.06	5.22	5.44	5.62	5.91	6.15	6.52	6.82
	.30	4.00	4.12	4.21	4.36	4.48	4.62	4.82	4.98	5.24	5.44	5.77	6.04
	.35	3.61	3.72	3.80	3.94	4.04	4.17	4.35	4.49	4.72	4.91	5.21	5.45
	.40	3.30	3.40	3.48	3.60	3.70	3.82	3.98	4.11	4.32	4.49	4.77	4.98
	.45	3.05	3.14	3.22	3.33	3.42	3.53	3.68	3.80	4.00	4.15	4.41	4.61
	.50	2.84	2.93	3.00	3.10	3.19	3.29	3.43	3.54	3.72	3.87	4.11	4.30
	.75	2.17	2.24	2.29	2.37	2.43	2.51	2.62	2.70	2.84	2.95	3.14	3.28
	1.00	1.79	1.85	1.89	1.96	2.01	2.09	2.16	2.23	2.35	2.44	2.59	2.71
	1.25	1.54	1.59	1.63	1.68	1.73	1.78	1.86	1.92	2.02	2.10	2.23	2.33
	1.50	1.37	1.41	1.44	1.49	1.53	1.58	1.65	1.70	1.79	1.86	1.97	2.07
	1.75	1.23	1.27	1.30	1.35	1.38	1.43	1.49	1.54	1.62	1.68	1.78	1.86
	2.00	1.13	1.16	1.19	1.23	1.26	1.31	1.36	1.40	1.48	1.54	1.63	1.70
	2.25	1.04	1.08	1.10	1.14	1.17	1.21	1.26	1.30	1.37	1.42	1.51	1.58
	2.50	0.97	1.00	1.02	1.06	1.09	1.12	1.17	1.21	1.27	1.32	1.40	1.47
	3.00	0.85	0.89	0.91	0.94	0.96	1.00	1.04	1.07	1.13	1.17	1.24	1.30
	3.50	0.78	0.80	0.82	0.85	0.87	0.90	0.94	0.97	1.02	1.06	1.12	1.17
	4.00	0.71	0.73	0.75	0.78	0.80	0.82	0.86	0.88	0.93	0.97	1.03	1.07
	4.50	0.66	0.68	0.69	0.72	0.74	0.76	0.79	0.82	0.86	0.90	0.95	0.99
	5.00	0.61	0.63	0.65	0.67	0.69	0.71	0.74	0.76	0.80	0.83	0.88	0.93
	7.00	0.49	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.64	0.67	0.71	0.74
	10.00	0.39	0.40	0.41	0.42	0.43	0.45	0.47	0.48	0.51	0.53	0.56	0.58
	20.00	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.32	0.33	0.35	0.37
	30.00	0.18	0.19	0.20	0.20	0.21	0.21	0.22	0.23	0.24	0.25	0.27	0.28

1 Adapted from Suarez (1981).

2 Assumes a soil source of calcium from lime (CaCO3) or silicates; no precipitation of magnesium, and partial pressure of CO2 near the soil surface (PCO2) is 0.0007 atmospheres.

3 Cax, HCO3, Ca are reported in meq/l; EC is in dS/m (deciSiemens per meter).

Because values will not always be quantified at the exact EC or HCO3– /Ca++ ratio in the table, the resulting Cax must be determined based on the closest value to the calculated value. For example, for a calculated EC of 2.45 dS/m, the column for the EC of 2.0 would be used. However, for a calculated EC of 5.1, the corresponding column for the EC of 6.0 would be used. Similarly, for a HCO3– /Ca++ ratio of 25.1, the row for the 30 ratio would be used.

The Division acknowledges that some effluents may have electrical conductivity levels that fall outside of this table, and others have bicarbonate to calcium ratios that fall outside this table. For example, some data reflect HCO3– /Ca++ ratios greater than 30 due to bicarbonate concentrations reported greater than 1000 mg/l versus calcium concentrations generally less than 10 mg/l (i.e., corresponding to HCO3– /Ca++ ratios greater than 100). Despite these high values exceeding the chart's boundaries, it is noted that the higher the HCO3– /Ca++ ratio, the greater the SAR-adj. Thus, using the Cax values corresponding to the final row containing bicarbonate/calcium ratios of 30, the permittee will actually calculate an SAR-adj that is less than the value calculated if additional rows reflecting HCO3– /Ca++ ratios of greater than 100 were added.

22. "Seven (7) day average" means, with the exception of fecal coliform or *E. coli* bacteria (see geometric mean), the arithmetic mean of all samples collected in a seven (7) consecutive day period. Such seven (7) day averages shall be calculated for all calendar weeks, which are defined as beginning on Sunday and ending on Saturday. If the calendar week overlaps two months (i.e. the Sunday is in one month and the Saturday in the following month), the seven (7) day average calculated for that calendar week shall be associated with the month that contains the Saturday. Samples may not be used for more than one (1) reporting period. **(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.5 for guidance on calculating averages and reporting analytical results that are less than the PQL).**

23. "Thirty (30) day average" means, except for fecal coliform or *E. coli* bacteria (see geometric mean), the arithmetic mean of all samples collected during a thirty (30) consecutive-day period, which represents a calendar month. The permittee shall report the appropriate mean of all self-monitoring sample data collected during the calendar month on the Discharge Monitoring Reports. Samples shall not be used for more than one (1) reporting period. **(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.5 for guidance on calculating averages and reporting analytical results that are less than the PQL).**

24. Toxicity Identification Evaluation (TIE) is a set of site-specific procedures used to identify the specific chemical(s) causing effluent toxicity.

25. "Total Inorganic Nitrogen (T.I.N.)" is an aggregate parameter determined based on ammonia, nitrate and nitrite concentrations. To determine T.I.N. concentrations, the facility must monitor for total ammonia and total nitrate plus nitrite (or nitrate and nitrite individually) on the same days. The calculated T.I.N. concentrations in mg/L shall then be determined as the sum of the analytical results of same-day sampling for total ammonia (as N) in mg/L, and total nitrate plus nitrite (as N) in mg/L (or nitrate as N and nitrite as N individually). From these calculated T.I.N. concentrations, the daily maximum and thirty (30) day average concentrations for T.I.N. shall be determined in the same manner as set out in the definitions for the daily maximum and thirty (30) day average. **(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.5 for guidance on calculating averages and reporting analytical results that are less than the PQL).**

26. "Total Metals" means the concentration of metals determined on an unfiltered sample following vigorous digestion (Section 4.1.3), or the sum of the concentrations of metals in both the dissolved and suspended fractions, as described in Manual of Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, March 1979, or its equivalent.

27. "Total Recoverable Metals" means that portion of a water and suspended sediment sample measured by the total recoverable analytical procedure described in Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, March 1979 or its equivalent.

28. Toxicity Reduction Evaluation (TRE) is a site-specific study conducted in a step-wise process to identify the causative agents of effluent toxicity, isolate the source of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity after the control measures are put in place.

29. "Twenty four (24) hour composite" sample is a combination of at least eight (8) sample aliquots of at least 100 milliliters, collected at equally spaced intervals during the operating hours of a facility over a twenty-four (24) hour period. For volatile pollutants, aliquots must be combined in the laboratory immediately before analysis. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the

wastewater or effluent flow at the time of sampling or the total wastewater or effluent flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

30. "Twice Monthly" monitoring frequency means that two samples shall be collected each calendar month on separate weeks with at least one full week between the two sample dates. Also, there shall be at least one full week between the second sample of a month and the first sample of the following month.

31. "Two (2) -Year Rolling Average" (Antidegradation limits)- the average of all monthly average data collected in a two year period. Collection of the data required to calculate a two-year rolling average shall start immediately upon the effective date of the permit, but the data is not reported on a DMR until two years after the effective date of the permit. To calculate a two-year rolling average, add the current monthly average to the previous 23 monthly averages and divide the total by 24. This methodology continues on a rolling basis for the permit term (ie., in the first reporting period use data from month 1 to month 24, in the second reporting period use data from month 2 to month 25, then month 3 to month 26, etc).

Example: Two year rolling average = $(MA_C + MA_1 + MA_2 + ... + MA_{23}) \div \mathbf{24}$

MA_C = Current monthly average
MA_1 = First prior month's monthly average
MA_2 = Second prior month's monthly average
MA_{23} = Twenty third prior month's monthly average

Note, if there is not a discharge from the facility in a month during a two year period **do not use zero (0) to represent the data for that month in the calculation**, but do consider that month as part of the two year time span. The denominator in the two-year rolling average calculation will change to represent the actual number of months there was a discharge.

Example: Two year rolling average = $(30 + 45 + ... + 25) \div \mathbf{22}$

Current monthly average= 30 mg/l
First prior month's monthly average= no discharge
Second prior month's monthly average= no discharge
Third prior month's monthly average=45 mg/l
Twenty third prior month's monthly average= 25 mg/l

For ammonia, two-year rolling averages may be set up for individual months, or may be grouped together for several months. When individual months have a specific limit, calculate the two-year rolling average as follows:

Example: Permit is effective Jan 2010 and there is a two-year rolling average limit specific to the month of January.

January 2010 DMR – Nothing to Report
January 2011 DMR – Two-year rolling average = $(MA_C + MA_1) \div \mathbf{2}$
MA_C = January 2011 monthly average
MA_1 = January 2010 monthly average
January 2012 DMR – Two-year rolling average = $(MA_C + MA_1) \div \mathbf{2}$
MA_C = January 2012 monthly average
MA_1 = January 2011 monthly average

Where several months are grouped together and have the same limit, calculate the two-year rolling average as follows:

Example: Permit is effective January 2010 and there is a two-year rolling average limit specific to the months of January, February, and June.

January, February, June 2010 DMR- Nothing to Report
1st Reportable DMR – June 2011 DMR:
Two year rolling average = $(MA_C + MA_1 + MA_2 + MA_3 + MA_4 + MA_5) \div \mathbf{6}$
MA_C = June 2011 monthly average
MA_1 = February 2011 monthly average
MA_2 = January 2011 monthly average
MA_3= June 2010 monthly average
MA_4 = February 2010 monthly average
MA_5 = January 2010 monthly average
2nd Reportable DMR – January 2012 DMR:
Two year rolling average = $(MA_C + MA_1 + MA_2 + MA_3 + MA_4 + MA_5) \div \mathbf{6}$
MA_C = January 2012 monthly average
MA_1 = June 2011 monthly average

MA_2 = February 2011 monthly average
MA_3= January 2011 monthly average
MA_4 = June 2010 monthly average
MA_5 = February 2010 monthly average

(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.5 for guidance on calculating averages and reporting analytical results that are less than the PQL).

32. "Visual" observation is observing the discharge to check for the presence of a visible sheen or floating oil.

33. "Water Quality Control Division" or "Division" means the state Water Quality Control Division as established in 25-8-101 et al.)

Additional relevant definitions are found in the Colorado Water Quality Control Act, CRS §§ 25-8-101 et seq., the Colorado Discharge Permit System Regulations, Regulation 61 (5 CCR 1002-61) and other applicable regulations.

D. GENERAL MONITORING, SAMPLING AND REPORTING REQUIREMENTS

1. Routine Reporting of Data

Reporting of the data gathered in compliance with Part I.A or Part I.B shall be on a **monthly** basis. Reporting of all data gathered shall comply with the requirements of Part I.D. (General Requirements). Monitoring results shall be summarized for each calendar month and reported on Division approved discharge monitoring report (DMR) forms (EPA form 3320-1).

The permittee must submit these forms either by mail, or by using the Division's Net-DMR service (when available). If mailed, one form shall be mailed to the Division, as indicated below, so that the DMR is received no later than the 28th day of the following month (for example, the DMR for the first calendar quarter must be received by the Division by April 28th). If no discharge occurs during the reporting period, "No Discharge" shall be reported.

The original signed copy of each discharge monitoring report (DMR) shall be submitted to the Division at the following address:

Colorado Department of Public Health and Environment
Water Quality Control Division
WQCD-P-B2
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

The Discharge Monitoring Report forms shall be filled out accurately and completely in accordance with requirements of this permit and the instructions on the forms. They shall be signed by an authorized person as identified in Part I.D.8.

2. Annual Biosolids Report

The permittee shall provide the results of all biosolids monitoring and information on management practices, land application sites, site restrictions and certifications. Such information shall be provided no later than **February 19th** of each year. Reports shall be submitted addressing all such activities that occurred in the previous calendar year. If no biosolids were applied to the land during the reporting period, "no biosolids applied" shall be reported. Until further notice, biosolids monitoring results shall be reported on forms, or copies of forms, provided by the Division. Annual Biosolids Reports required herein, shall be signed and certified in accordance with the Signatory Requirements, Part I.D.1, and submitted as follows:

The original copy of each form shall be submitted to the following address:

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT,
WATER QUALITY CONTROL DIVISION

WQCD-PERMITS-B2
4300 CHERRY CREEK DRIVE SOUTH
DENVER, COLORADO 80246-1530

A copy of each form shall be submitted to the following address:

WATER PROGRAM REGIONAL BIOSOLIDS PROGRAM
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION VIII,
1595 WYNKOOP STREET
DENVER, CO 80202-2466

ATTENTION: BIOSOLIDS PROGRAM MANAGER

3. **Representative Sampling**

Samples and measurements taken for the respective identified monitoring points as required herein shall be representative of the volume and nature of: 1) all influent wastes received at the facility, including septage, biosolids, etc.; 2) the monitored effluent discharged from the facility; and 3) biosolids produced at the facility. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the influent, effluent, or biosolids wastestream joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and prior approval by the Division.

4. **Influent and Effluent Sampling Points**

Influent and effluent sampling points shall be so designed or modified so that: 1) a sample of the influent can be obtained after preliminary treatment and prior to primary or biological treatment and 2) a sample of the effluent can be obtained at a point after the final treatment process and prior to discharge to state waters. The permittee shall provide access to the Division to sample at these points.

5. **Analytical and Sampling Methods for Monitoring and Reporting**

The permittee shall install, calibrate, use and maintain monitoring methods and equipment, including biological and indicated pollutant monitoring methods. All sampling shall be performed by the permittee according to specified methods in 40 C.F.R. Part 136; methods approved by EPA pursuant to 40 C.F.R. Part 136; or methods approved by the Division, in the absence of a method specified in or approved pursuant to 40 C.F.R. Part 136.

Numeric Limits

If the permit contains a numeric effluent limit for a parameter, the analytical method and PQL selected for all monitoring conducted in accordance with this permit for that parameter shall be the one that can measure at or below the numeric effluent limit. If all specified analytical methods and corresponding PQLs are greater than the numeric effluent limit, then the analytical method with the lowest PQL shall be used.

When the analytical method which complies with the above requirements has a PQL greater than the permit limit, and the permittee's analytical result is less than the PQL (the PQL achieved by the lab), the permittee shall report "BDL" on the DMR. Such reports will not be considered as violations of the permit limit, as long as the PQL obtained is lower or equal to the PQL in the table below.

When the analytical method which complies with the above requirements has a PQL that is equal to or less than the permit limitation, and the permittee's analytical result is less than the PQL, "< X" (where X = the actual PQL achieved by the laboratory) shall be reported on the DMR. For parameters that have a report only limitation, and the permittee's analytical result is less than the PQL, "< X" (where X = the actual PQL achieved by the laboratory) shall be reported on the DMR.

Report Only Limits

If the permit contains a report only requirement for a parameter, the analytical method and PQL chosen shall be one that can measure at or below the potential numeric effluent limit(s) (maximum allowable pollutant concentration as shown in the WQA or fact sheet). If all analytical methods and corresponding PQLs are greater than the potential numeric effluent limit(s), then the analytical method with the lowest PQL shall be used.

When the analytical method which complies with the above requirements has a PQL that is equal to or less than the permit limitation, and the permittee's analytical result is less than the PQL, "< X" (where X = the actual PQL achieved by the laboratory) shall be reported on the DMR. For parameters that have a report only limitation, and the permittee's analytical result is less than the PQL, "< X" (where X = the actual PQL achieved by the laboratory) shall be reported on the DMR.

Interim Report Only Followed By a Numeric Limit

If the permit contains an interim effluent limitation (a limit is report until such time as a numeric effluent limit becomes effective) for a parameter, the analytical method and PQL chosen for all monitoring conducted in accordance with this permit for the parameter shall be one that can measure to the final numeric effluent limit. If all analytical methods and corresponding PQLs are greater than the final numeric effluent limit (s), then the analytical method with the lowest PQL shall be used.

While the report only limit is effective, the reporting requirements shall follow those under the Report Only Limits section. Once the numeric limit is effective, the reporting requirements shall follow the numeric limits reporting requirements.

T.I.N.

For parameters such as TIN, the analytical methods chosen shall be those that can measure to the potential or final numeric effluent limit, based on the sum of the PQLs for nitrate, nitrite and ammonia.

Calculating Averages

In the calculation of average concentrations (i.e. daily average, 7- day average, 30-day average, 2-year rolling average) any individual analytical result that is less than the PQL shall be considered to be zero for the calculation purposes. When reporting:

If all individual analytical results are less than the PQL, the permittee shall report either "BDL" or "<X" (where X = the actual PQL achieved by the laboratory), following the guidance above.

If one or more individual results is greater than the PQL, an average shall be calculated and reported. Note that it does not matter if the final calculated average is greater or less than the PQL, **it must be reported as a value**.

Note that when calculating T.I.N. for a single sampling event, any value less than the PQL (for total ammonia, total nitrite, or total nitrate) shall be treated as zero. The T.I.N. concentration for a single sampling event shall then be determined as the sum of the analytical results (zeros if applicable) of same day sampling for total ammonia and total nitrite and total nitrate. From these calculated T.I.N. concentrations, the daily maximum and thirty day average concentrations shall be calculated and must be reported as a value.

PQLs

The PQLs for specific parameters, as determined by the State Laboratory (November 2008) are provided below for reference. If the analytical method cannot achieve a PQL that is less than or equal to the permit limit, then the method, or a more precise method, must achieve a PQL that is less than or equal to the PQL in the table below. A listing of the PQLs for further organic parameters that must meet the above requirement can be found in the

Division's Practical Quantitation Limitation Guidance Document, July 2008. This document is available on the Division's website at www.coloradowaterpermits.com.

These limits apply to the total recoverable or the potentially dissolved fraction of metals.

For hexavalent chromium, samples must be unacidified so dissolved concentrations will be measured rather than potentially dissolved concentrations.

Effluent Parameter	Practical Quantitation Limits	Effluent Parameter	Practical Quantitation Limits
Aluminum	50 µg/l		
Arsenic	1 µg/l	N-Ammonia	1 mg/l
Barium	5 µg/l	N-Ammonia (low-level)	50 µg/l
Beryllium	1 µg/l	N-Nitrate/Nitrite	0.5 mg/l
BOD / CBOD	1 mg/l	N-Nitrate	0.5 mg/l
Boron	50 µg/l	N-Nitrite	10 µg/l
Cadmium	1 µg/l	Total Nitrogen	0.5 mg/l
Calcium	20 µg/l	Total Phosphorus	10 µg/l
Chloride	2 mg/l		
Chlorine	0.1 mg/l	Radium 226	1 pCi/l
Total Residual Chlorine		Radium 228	1 pCi/l
DPD colorimetric	0.10 mg/l	Selenium	1 µg/l
Amperometric titration	0.05 mg/l	Silver	0.5 µg/l
Chromium	20 µg/l	Sodium	0.2 mg/l
Chromium, Hexavalent	20 µg/l	Sulfate	5 mg/l
Copper	5 µg/l	Sulfide	0.2 mg/l
Cyanide (Direct / Distilled)	10 µg/l	Total Dissolved Solids	10 mg/l
Cyanide, WAD+A47	10 µg/l	Total Suspended Solids	10 mg/l
Fluoride	0.1 mg/l	Thallium	1 µg/l
Iron	10 µg/l	Uranium	1 µg/l
Lead	1 µg/l	Zinc	10 µg/l
Magnesium	20 µg/l		
Manganese	2 µg/l	Phenols	15 µg/l
Mercury	0.1 µg/l	Nonylphenol D7065	10 µg/l
Mercury (low-level)	0.003 µg/l	Nonylphenol D7485	0.33 µg/l
Nickel	50 µg/l		

6. **Records**

a. The permittee shall establish and maintain records. Those records shall include, but not be limited to, the following:

i. The date, type, exact place, and time of sampling or measurements;
ii. The individual(s) who performed the sampling or measurements;
iii. The date(s) the analyses were performed;
iv. The individual(s) who performed the analyses;
v. The analytical techniques or methods used; and
vi. The results of such analyses.
vii. Any other observations which may result in an impact on the quality or quantity of the discharge as indicated in 40 CFR 122.44 (i)(1)(iii).

b. The permittee shall retain for a minimum of three (3) years records of all monitoring information, including all original strip chart recordings for continuous monitoring instrumentation, all calibration and maintenance records, copies of all

reports required by this permit and records of all data used to complete the application for this permit. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the permittee or when requested by the Division or Regional Administrator.

7. **Flow Measuring Devices**

Unless exempted in Part I.A of this permit, flow metering at the headworks shall be provided to give representative values of throughput and treatment of the wastewater system. The metering device shall be equipped with a local flow indication instrument and a flow indication-recording-totalization device suitable for providing permanent flow records, which should be in the plant control building.

For mechanical facilities, where influent flow metering is not practical and the same results may be obtained from metering at the effluent end of the treatment facility, this type of flow metering arrangement will be considered, and if approved, noted in Part I.A of this permit. For lagoons, an instantaneous or continuous effluent flow measuring device shall be required in addition to the above described influent flow measuring device.

At the request of the Division, the permittee must be able to show proof of the accuracy of any flow-measuring device used in obtaining data submitted in the monitoring report. The flow-measuring device must indicate values within ten (10) percent of the actual flow being measured.

8. **Signatory Requirements**

a. All reports and other information required by the Division, shall be signed and certified for accuracy by the permittee in accord with the following criteria:

i) In the case of corporations, by a responsible corporate officer. For purposes of this section, the responsible corporate officer is responsible for the overall operation of the facility from which the discharge described in the form originates;

ii) In the case of a partnership, by a general partner;

iii) In the case of a sole proprietorship, by the proprietor;

iv) In the case of a municipal, state, or other public facility, by either a principal executive officer, or ranking elected official. For purposes of this section, a principal executive officer has responsibility for the overall operation of the facility from which the discharge originates;

v) By a duly authorized representative of a person described above, only if:

1) The authorization is made in writing by a person described in i, ii, iii, or iv above;

2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and,

3) The written authorization is submitted to the Division.

b. If an authorization as described in this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of this section must be submitted to the Division prior to or together with any reports, information, or applications to be signed by an authorized representative.

The permittee, or the duly authorized representative shall make and sign the following certification on all such documents:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

PART II

A. NOTIFICATION REQUIREMENTS

1. Notification to Parties

All notification requirements under this section shall be directed as follows:

a. Oral Notifications, during normal business hours shall be to:

Water Quality Protection Section - Domestic Compliance Program
Water Quality Control Division
Telephone: (303) 692-3500

b. Written notification shall be to:

Water Quality Protection Section - Domestic Compliance Program
Water Quality Control Division
Colorado Department of Public Health and Environment
WQCD-WQP-B2
4300 Cherry Creek Drive South
Denver, CO 80246-1530

2. Change in Discharge

The permittee shall give advance notice to the Division, in writing, of any planned physical alterations or additions to the permitted facility. Notice is required only when:

a. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged, or;

b. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported pursuant to an approved land application plan.

Whenever notification of any planned physical alterations or additions to the permitted facility is required pursuant to this section, the permittee shall furnish the Division such plans and specifications which the Division deems reasonably necessary to evaluate the effect on the discharge, the stream, or ground water. If the Division finds that such new or altered discharge might be inconsistent with the conditions of the permit, the Division shall require a new or revised permit application and shall follow the procedures specified in Sections 61.5 through 61.6, and 61.15 of the Colorado Discharge Permit System Regulations.

3. Noncompliance Notification

The permittee shall give advance notice to the Division, in writing, of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

a. If, for any reason, the permittee does not comply with or will be unable to comply with any discharge limitations or standards specified in this permit, the permittee shall, at a minimum, provide the Division with the following information:

i) A description of the noncompliance and its cause;

ii) The period of noncompliance, including exact dates and times and/or the anticipated time when the discharge will return to compliance; and

iii) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. The permittee shall report the following circumstances **orally within twenty-four (24) hours** from the time the permittee becomes aware of the circumstances, and shall mail to the Division a written report containing the information requested in Part II.A.4 (a) **within five (5) working days** after becoming aware of the following circumstances:

i) Circumstances leading to any noncompliance which may endanger health or the environment regardless of the cause of the incident;

ii) Circumstances leading to any unanticipated bypass which exceeds any effluent limitations in the permit;

iii) Circumstances leading to any upset which causes an exceedance of any effluent limitation in the permit;

iv) Daily maximum violations for any of the pollutants limited by Part I.A of this permit as specified in Part III of this permit. This includes any toxic pollutant or hazardous substance or any pollutant specifically identified as the method to control any toxic pollutant or hazardous substance.

c. Unless otherwise indicated in this permit, the permittee shall report instances of non-compliance which are not required to be reported within 24-hours at the time Discharge Monitoring Reports are submitted. The reports shall contain the information listed in sub-paragraph (a) of this section.

4. Transfer of Ownership or Control

The permittee shall notify the Division, in writing, thirty (30) calendar days in advance of a proposed transfer of the permit.

a. Except as provided in paragraph b. of this section, a permit may be transferred by a permittee only if the permit has been modified or revoked and reissued as provided in Section 61.8(8) of the Colorado Discharge Permit System Regulations, to identify the new permittee and to incorporate such other requirements as may be necessary under the Federal Act.

b. A permit may be automatically transferred to a new permittee if:

i) The current permittee notifies the Division in writing 30 calendar days in advance of the proposed transfer date; and

ii) The notice includes a written agreement between the existing and new permittee(s) containing a specific date for transfer of permit responsibility, coverage and liability between them; and

iii) The Division does not notify the existing permittee and the proposed new permittee of its intent to modify, or revoke and reissue the permit.

iv) Fee requirements of the Colorado Discharge Permit System Regulations, Section 61.15, have been met.

5. Other Notification Requirements

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule in the permit, shall be submitted on the date listed in the compliance schedule section. The fourteen (14) calendar day provision in Regulation 61.8(4)(n)(i) has been incorporated into the due date.

The permittee's notification of all anticipated noncompliance does not stay any permit condition.

All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Division as soon as they know or have reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

i) One hundred micrograms per liter (100 µg/l);

ii) Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2.4-dinitrophenol and 2-methyl-4.6-dinitrophenol; and one milligram per liter (1.0 mg/l) for antimony;

iii) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with Section 61.4(2)(g).

iv) The level established by the Division in accordance with 40 C.F.R. § 122.44(f).

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

i) Five hundred micrograms per liter (500 µg/l);

ii) One milligram per liter (1 mg/l) for antimony; and

iii) Ten (10) times the maximum concentration value reported for that pollutant in the permit application.

iv) The level established by the Division in accordance with 40 C.F.R. § 122.44(f).

6. **Bypass Notification**

If the permittee knows in advance of the need for a bypass, a notice shall be submitted, at least ten (10) calendar days before the date of the bypass, to the Division. The bypass shall be subject to Division approval and limitations imposed by the Division. Violations of requirements imposed by the Division will constitute a violation of this permit.

7. **Bypass**

a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

b. Bypasses are prohibited and the Division may take enforcement action against the permittee for bypass, unless:

i) The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;

ii) There were no feasible alternatives to bypass such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

iii) Proper notices were submitted in compliance with Part II.A.5.

c. "Severe property damage" as used in this Subsection means substantial physical damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

d. The permittee may allow a bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance or to assure optimal operation. These bypasses are not subject to the provisions of paragraph (a) above.

e. The Division may approve an anticipated bypass, after considering adverse effects, if the Division determines that the bypass will meet the conditions specified in paragraph (a) above.

8. **Upsets**

a. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

b. Effect of an Upset

An upset constitutes an affirmative defense to an action brought for noncompliance with permit effluent limitations if the requirements of paragraph (b) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions Necessary for a Demonstration of Upset

A permittee who wishes to establish the affirmative defense of upset shall demonstrate through properly signed contemporaneous operating logs, or other relevant evidence that:

i) An upset occurred and that the permittee can identify the specific cause(s) of the upset; and

ii) The permitted facility was at the time being properly operated and maintained; and

iii) The permittee submitted proper notice of the upset as required in Part II.A.4. of this permit (24-hour notice); and
iv) The permittee complied with any remedial measure necessary to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reason able likelihood of adversely affecting human health or the environment.

In addition to the demonstration required above, a permittee who wishes to establish the affirmative defense of upset for a violation of effluent limitations based upon water quality standards shall also demonstrate through monitoring, modeling or other methods that the relevant standards were achieved in the receiving water.

d. Burden of Proof

In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

9. **Submission of Incorrect or Incomplete Information**

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Division, the permittee shall promptly submit such facts or information.

B. RESPONSIBILITIES

1. **Reduction, Loss, or Failure of Treatment Facility**

The permittee has the duty to halt or reduce any activity if necessary to maintain compliance with the effluent limitations of the permit. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production, control sources of wastewater, or all discharges, until the facility is restored or an alternative method of treatment is provided. This provision also applies to power failures, unless an alternative power source sufficient to operate the wastewater control facilities is provided.

It shall not be a defense for a permittee in an enforcement action that it would be necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. **Inspections and Right to Entry**

The permittee shall allow the Division and/or the authorized representative, upon the presentation of credentials:

a. To enter upon the permittee's premises where a regulated facility or activity is located or in which any records are required to be kept under the terms and conditions of this permit;

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit and to inspect any monitoring equipment or monitoring method required in the permit; and

c. To enter upon the permittee's premises in a reasonable manner and at a reasonable time to inspect and/or investigate, any actual, suspected, or potential source of water pollution, or to ascertain compliance or non compliance with the Colorado Water Quality Control Act or any other applicable state or federal statute or regulation or any order promulgated by the Division. The investigation may include, but is not limited to, the following: sampling of any discharge and/or process waters, the taking of photographs, interviewing of any person having knowledge related to the discharge permit or alleged violation, access to any and all facilities or areas within the permittee's premises that may have any affect on the discharge, permit, or alleged violation. Such entry is also authorized for the purpose of inspecting and copying records required to be kept concerning any effluent source.

d. The permittee shall provide access to the Division to sample the discharge at a point after the final treatment process but prior to the discharge mixing with state waters upon presentation of proper credentials.

In the making of such inspections, investigations, and determinations, the Division, insofar as practicable, may designate as its authorized representatives any qualified personnel of the Department of Agriculture. The Division may also request assistance from any other state or local agency or institution.

3. **Duty to Provide Information**

The permittee shall furnish to the Division, within a reasonable time, any information which the Division may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Division, upon request, copies of records required to be kept by this permit.

4. **Availability of Reports**

Except for data determined to be confidential under Section 308 of the Federal Clean Water Act and the Colorado Discharge Permit System Regulations 5 CCR 1002-61, Section 61.5(4), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division and the Environmental Protection Agency.

The name and address of the permit applicant(s) and permittee(s), permit applications, permits and effluent data shall not be considered confidential. Knowingly making false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Clean Water Act, and Section 25-8-610 C.R.S.

5. **Modification, Suspension, Revocation, or Termination of Permits By the Division**

The filing of a request by the permittee for a permit modification, revocation and reissuance, termination or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

a. A permit may be modified, suspended, or terminated in whole or in part during its term for reasons determined by the Division including, but not limited to, the following:

   i) Violation of any terms or conditions of the permit;

   ii) Obtaining a permit by misrepresentation or failing to disclose any fact which is material to the granting or denial of a permit or to the establishment of terms or conditions of the permit; or

   iii) Materially false or inaccurate statements or information in the permit application or the permit.

   iv) A determination that the permitted activity endangers human health or the classified or existing uses of state waters and can only be regulated to acceptable levels by permit modifications or termination.

b. A permit may be modified in whole or in part for the following causes, provided that such modification complies with the provisions of Section 61.10 of the Colorado Discharge Permit System Regulations:

i) There are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit.

ii) The Division has received new information which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of different permit conditions at the time of issuance. For permits issued to new sources or new dischargers, this cause includes information derived from effluent testing required under Section 61.4(7)(e) of the Colorado Discharge Permit System Regulations. This provision allows a modification of the permit to include conditions that are less stringent than the existing permit only to the extent allowed under Section 61.10 of the Colorado Discharge Permit System Regulations.

iii) The standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued. Permits may be modified during their terms for this cause only as follows:

(A) The permit condition requested to be modified was based on a promulgated effluent limitation guideline, EPA approved water quality standard, or an effluent limitation set forth in 5 CCR 1002-62, § 62 et seq.; and

(B) EPA has revised, withdrawn, or modified that portion of the regulation or effluent limitation guideline on which the permit condition was based, or has approved a Commission action with respect to the water quality standard or effluent limitation on which the permit condition was based; and

(C) The permittee requests modification after the notice of final action by which the EPA effluent limitation guideline, water quality standard, or effluent limitation is revised, withdrawn, or modified; or

(D) For judicial decisions, a court of competent jurisdiction has remanded and stayed EPA promulgated regulations or effluent limitation guidelines, if the remand and stay concern that portion of the regulations or guidelines on which the permit condition was based and a request is filed by the permittee in accordance with this Regulation, within ninety (90) calendar days of judicial remand.

iv) The Division determines that good cause exists to modify a permit condition because of events over which the permittee has no control and for which there is no reasonable available remedy.

v) Where the Division has completed, and EPA approved, a total maximum daily load (TMDL) which includes a wasteload allocation for the discharge(s) authorized under the permit.

vi) The permittee has received a variance.

vii) When required to incorporate applicable toxic effluent limitation or standards adopted pursuant to § 307(a) of the Federal act.

viii) When required by the reopener conditions in the permit.

ix) As necessary under 40 C.F.R. 403.8(e), to include a compliance schedule for the development of a pretreatment program.

x) When the level of discharge of any pollutant which is not limited in the permit exceeds the level which can be achieved by the technology-based treatment requirements appropriate to the permittee under Section 61.8(2) of the Colorado Discharge Permit System Regulations.

xi) To establish a pollutant notification level required in Section 61.8(5) of the Colorado Discharge Permit System Regulations.

xii) To correct technical mistakes, such as errors in calculation, or mistaken interpretations of law made in determining permit conditions, to the extent allowed in Section 61.10 of the Colorado State Discharge Permit System Regulations.

xiii) When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.

xiv) When another State whose waters may be affected by the discharge has not been notified.

xv) For any other cause provided in Section 61.10 of the Colorado Discharge Permit System Regulations.

c. At the request of a permittee, the Division may modify or terminate a permit and issue a new permit if the following conditions are met:

i) The Regional Administrator has been notified of the proposed modification or termination and does not object in writing within thirty (30) calendar days of receipt of notification,

ii) The Division finds that the permittee has shown reasonable grounds consistent with the Federal and State statutes and regulations for such modifications or termination;

iii) Requirements of Section 61.15 of the Colorado Discharge Permit System Regulations have been met, and

iv) Requirements of public notice have been met.

d. For permit modification, termination, or revocation and reissuance, the Division may request additional information from the permittee. In the case of a modified permit, the Division may require the submission of an updated application. In the case of revoked and reissued permit, the Division shall require the submission of a new application.

e. Permit modification (except for minor modifications), termination or revocation and reissuance actions shall be subject to the requirements of Sections 61.5(2), 61.5(3), 61.6, 61.7 and 61.15 of the Colorado Discharge Permit System Regulations. The Division shall act on a permit modification request, other than minor modification requests, within 180 calendar days of receipt thereof. Except for minor modifications, the terms of the existing permit govern and are enforceable until the newly issued permit is formally modified or revoked and reissued following public notice.

f. Upon consent by the permittee, the Division may make minor permit modifications without following the requirements of Sections 61.5(2), 61.5(3), 61.7, and 61.15 of the Colorado Discharge Permit System Regulations. Minor modifications to permits are limited to:

i) Correcting typographical errors; or

ii) Increasing the frequency of monitoring or reporting by the permittee; or

iii) Changing an interim date in a schedule of compliance, provided the new date of compliance is not more than 120 calendar days after the date specific in the existing permit and does not interfere with attainment of the final compliance date requirement; or

iv) Allowing for a transfer in ownership or operational control of a facility where the Division determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage and liability between the current and new permittees has been submitted to the Division; or

v) Changing the construction schedule for a discharger which is a new source, but no such change shall affect a discharger's obligation to have all pollution control equipment installed and in operation prior to discharge; or

vi) Deleting a point source outfall when the discharge from that outfall is terminated and does not result in discharge of pollutants from other outfalls except in accordance with permit limits.

vii) Incorporating conditions of a POTW pretreatment program that has been approved in accordance with the procedures in 40 CFR 403.11 (or a modification thereto that has been approved in accordance with the procedures in 40 CFR 403.18) as enforceable conditions of the POTW's permits.

g. When a permit is modified, only the conditions subject to modification are reopened. If a permit is revoked and reissued, the entire permit is reopened and subject to revision and the permit is reissued for a new term.

should be promptly notified so that it can terminate the permit in accordance with Part II.B.4.

13. **Section 307 Toxics**

If a toxic effluent standard or prohibition, including any applicable schedule of compliance specified, is established by regulation pursuant to Section 307 of the Federal Act for a toxic pollutant which is present in the permittee's discharge and such standard or prohibition is more stringent than any limitation upon such pollutant in the discharge permit, the Division shall institute proceedings to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition.

14. **Effect of Permit Issuance**

a. The issuance of a permit does not convey any property or water rights in either real or personal property, or stream flows or any exclusive privilege.

b. The issuance of a permit does not authorize any injury to person or property or any invasion of personal rights, nor does it authorize the infringement of federal, state, or local laws or regulations.

c. Except for any toxic effluent standard or prohibition imposed under Section 307 of the Federal act or any standard for sewage sludge use or disposal under Section 405(d) of the Federal act, compliance with a permit during its term constitutes compliance, for purposes of enforcement, with Sections 301, 302, 306, 318, 403, and 405(a) and (b) of the Federal act. However, a permit may be modified, revoked and reissued, or terminated during its term for cause as set forth in Section 61.8(8) of the Colorado Discharge Permit System Regulations.

d. Compliance with a permit condition which implements a particular standard for biosolid use or disposal shall be an affirmative defense in any enforcement action brought for a violation of that standard for biosolid use or disposal.

PART III

CATEGORICAL INDUSTRIES

Aluminum Forming
Asbestos Manufacturing
Battery Manufacturing
Builders' Paper and Board Mills
Canned & Preserved Fruits and Vegetables Processing
Canned & Preserved Seafood Processing
Carbon Black Manufacturing
Cement Manufacturing
Coal Mining
Coil Coating
Copper Forming
Dairy Products Processing
Electrical and Electronic Components
Electroplating
Explosives Manufacturing
Feedlots
Ferroalloy Manufacturing
Fertilizer Manufacturing
Glass Manufacturing
Grain Mills
Gum and Wood Chemicals Manufacturing
Hospital
Ink Formulation
Inorganic Chemicals Manufacturing
Iron and Steel Manufacturing
Leather Tanning and Finishing
Meat Products
Metal Finishing
Metal Molding and Casting (Foundries)
Mineral Mining and Processing
Nonferrous Metals Manufacturing
Nonferrous Metals Forming and Metal Powders
Oil and Gas Extraction
Organic Chemicals, Plastics, and Synthetic Fibers
Ore Mining and Dressing
Paint Formulation
Paving and Roofing Materials (Tars and Asphalt)
Pesticide Chemicals
Petroleum Refining
Pharmaceutical Manufacturing
Phosphate Manufacturing
Photographic
Plastics Molding and Forming
Porcelain Enameling
Pulp, Paper, and Paperboard Manufacturing
Rubber Manufacturing
Soap and Detergent Manufacturing
Steam Electric Power Generating
Sugar Processing
Textile Mills
Timber Products Processing

PRIORITY POLLUTANTS AND HAZARDOUS SUBSTANCES

ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS
IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GC/MS)

Volatiles

acrolein
acrylonitrile
benzene
bromoform
carbon tetrachloride
chlorobenzene
chlorodibromomethane
chloroethane
2-chloroethylvinyl ether
chloroform
dichlorobromomethane
1,1-dichlorethane
1,2-dichlorethane
1,1-dichlorethylene
1,2-dichlorpropane
1,3-dichlorpropylene
ethylbenzene
methyl bromide
methyl chloride
methylene chloride

Base/Neutral

acenaphthene
acenaphthylene
anthracene
benzidine
benzo(a)anthracene
benzo(a)pyrene
3,4-benzofluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
butylbenzyl phthalate
2-chloronaphthalene
4-chlorophenyl phenyl ether
chrysene
dibenzo(a,h)anthracene
1,2-dichlorobenzene

Acid Compounds

2-chlorophenol
2,4-dichlorophenol
2,4,-dimethylphenol
4,6-dinitro-o-cresol
2,4-dinitrophenol
2-nitrophenol
4-nitrophenol
p-chloro-m-cresol
pentachlorophenol
phenol
2,4,6-trichlorophenol

Pesticides

aldrin
alpha-BHC
beta-BHC
gamma-BHC
delta-BHC
chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
dieldrin
alpha-endosulfan
beta-endosulfan
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide
PCB-1242
PCB-1254
PCB-1221

PRIORITY POLLUTANTS AND HAZARDOUS SUBSTANCES

ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GC/MS)

Volatiles

1,1,2,2-tetrachloroethane
tetrachloroethylene
toluene
1,2-trans-dichloroethylene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethylene
vinyl chloride

Base/Neutral

1,3-dichlorobenzene
1,4-dichlorobenzene
3,3-dichlorobenzidine
diethyl phthalate
dimethyl phthalate
di-n-butyl phthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
di-n-octyl phthalate
1,2-diphenylhydrazine (as azobenzene)
fluorene
fluoranthene
hexachlorobenzene
hexachlorobutadiene
hexachlorcyclopentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
naphthalene
nitrobenzene
N-nitrosodimethylamine
N-nitrosodi-n-propylamine
N-nitrosodiphenylamine
phenanthrene
pyrene
1,2,4-trichlorobenzene

Acid Compounds

Pesticides

PCB-1232
PCB-1248
PCB-1260
PCB-1016
toxaphene

OTHER TOXIC POLLUTANTS (AMMONIA, METALS AND CYANIDE) AND TOTAL PHENOLS

Antimony, Total
Arsenic, Total
Beryllium, Total
Cadmium, Total
Chromium, Total
Copper, Total
Lead, Total
Mercury, Total
Nickel, Total
Selenium, Total
Silver, Total
Thallium, Total
Zinc, Total
Cyanide, Total
Phenols, Total

TOXIC POLLUTANTS AND HAZARDOUS SUBSTANCES
REQUIRED TO BE IDENTIFIED BY EXISTING DISCHARGERS
IF EXPECTED TO BE PRESENT

Toxic Pollutants

Asbestos

Hazardous Substances

Acetaldehyde
Allyl alcohol
Allyl chloride
Amyl acetate
Aniline
Benzonitrile
Benzyl chloride
Butyl acetate
Butylamine
Captan
Carbaryl
Carbofuran
Carbon disulfide
Chlorpyrifos
Coumaphos
Cresol
Crotonaldehyde
Cyclohexane
2,4-D(2,4-Dichlorophenoxy acetic acid)
Diazinon
Dicamba
Dichlobenil
Dichlone
2,2-Dichloropropionic acid
Dichlorvos
Diethyl amine
Dimethyl amine
Dinitrobenzene
Diquat
Disulfoton
Diuron
Epichlorohydrin
Ethanolamine
Ethion
Ethylene diamine
Ethylene dibromide
Formaldehyde
Furfural
Guthion
Isoprene
Isopropanolamine
Keithane
Kepone
Malathion
Mercaptodimethur
Methoxychlor
Methyl mercaptan
Methyl methacrylate
Methyl parathion
Mexacarbate
Monoethyl amine
Monomethyl amine
Naled
Napthenic acid
Nitrotoluene
Parathion
Phenolsulfanate
Phosgene
Propargite
Propylene oxide
Pyrethrins
Quinoline
Resorcinol
Strontium
Strychnine
Styrene
TDE (Tetrachlorodiphenylethane)
2,4,5-T (2,4,5-Trichlorophenoxy acetic acid)
2,4,5-TP [2-(2,4,5-Trichlorophenoxy) propanoic acid]
Trichlorofan
Triethylamine
Trimethylamine
Uranium
Vandium
Vinyl Acetate
Xylene
Xylenol
Zirconium

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APPENDIX C

Capital Improvement Cost Estimates

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Town of Bayfield Wastewater Collection Service Tap Repairs
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**0**
	Survey	0	LF	10	1.0	0
	Geotechnical Allowance	0	LS	5,000	1.0	0
33	**Utilities**					**220,400**
	Sewer Service Slip Lining (near side of road, ~20 feet)	19	LS	4,100	1.0	77,900
	Sewer Service Slip Lining (far side of road, ~30 feet)	19	LS	5,100	1.0	96,900
	Vac-A-Tee Install	38	LS	1,200	1.0	45,600
					SUBTOTAL 1	**220,400**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	22,040	1.0	22,100
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	33,060	1.0	33,100
					SUBTOTAL 2	**275,600**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	88,160	1.0	88,200
					SUBTOTAL 3	**363,800**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	54,570	1.0	54,600
					TOTAL	**418,400**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Collection Service Tap Repairs
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**0**
	Survey	0	LF	10	1.0	0
	Geotechnical Allowance	0	LS	5,000	1.0	0
33	**Utilities**					**812,000**
	Sewer Service Slip Lining (near side of road, ~20 feet)	70	LS	4,100	1.0	287,000
	Sewer Service Slip Lining (far side of road, ~30 feet)	70	LS	5,100	1.0	357,000
	Vac-A-Tee Install	140	LS	1,200	1.0	168,000
					SUBTOTAL 1	**812,000**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	81,200	1.0	81,200
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	121,800	1.0	121,800
					SUBTOTAL 2	**1,015,000**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	324,800	1.0	324,800
					SUBTOTAL 3	**1,339,800**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	200,970	1.0	201,000
					TOTAL	**1,540,800**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Collection South St Gravity Re-Routing
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**8,000**
	Survey	300	LF	10	1.0	3,000
	Geotechnical Allowance	1	LS	5,000	1.0	5,000
33	**Utilities**					**15,000**
	Manholes	1	LS	15,000	1.0	15,000
	Gravity Sewer Piping	300	LF	140	1.0	42000
					SUBTOTAL 1	**23,000**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	2,300	1.0	2,300
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	3,450	1.0	3,500
					SUBTOTAL 2	**28,800**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	9,200	1.0	9,200
					SUBTOTAL 3	**38,000**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	5,700	1.0	5,700
					TOTAL	**43,700**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Collection Eastern Gravity Expansion
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**71,000**
	Survey	11500	LF	4	1.0	46,000
	Geotechnical Allowance	1	LS	25,000	1.0	25,000
33	**Utilities**					**1,701,500**
	Manholes (including Excavation,Backfill & Compaction)	30	LS	6,500	1.0	195,000
	Gravity Sewer Piping (including Trenching, Backfill, & Compaction)	11500	LF	130	1.0	1,495,000
	Easement Allowance	11500	LF	1	1.0	11,500
					SUBTOTAL 1	**1,772,500**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	177,250	1.0	177,300
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	265,875	1.0	265,900
					SUBTOTAL 2	**2,215,700**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	709,000	1.0	709,000
					SUBTOTAL 3	**2,924,700**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	438,705	1.0	438,800
					TOTAL	**3,363,500**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and special

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs and profits.

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Collection Gem Village Flow Meter Installation
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**0**
	Geotechnical Allowance	0	LS	5,000	1.0	0
26	**Electrical**					**25,000**
	Electrical & Controls	1	LS	25,000	1.0	25,000
31	**Earthwork**					**1,800**
	Excavation & Fill for Flow Meter Vault	35	CY	50	1.0	1,800
33	**Utilities**					**9,500**
	Force Main (4" DIP, including TB&C)	30	LF	115	1.0	3,500
	Flow Meter Vault	1	LS	6,000	1.0	6,000
					SUBTOTAL 1	**36,300**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	3,630	1.0	3,700
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	5,445	1.0	5,500
					SUBTOTAL 2	**45,500**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	14,520	1.0	14,600
					SUBTOTAL 3	**60,100**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	9,015	1.0	9,100
					TOTAL	**69,200**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Collection Gem Village + Intermediate Lift Station
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**5,000**
	Geotechnical Allowance	1	LS	5,000	1.0	5,000
9	**Finishes**					**5,000**
	Protective Coatings	1	LS	5,000	1.0	5,000
26	**Electrical**					**55,000**
	Electrical & Controls	1	LS	15,000	1.0	15,000
	Generator & ATS	1	LS	40,000	1.0	40,000
31	**Earthwork**					**37,500**
	Excavation & Fill for Lift Station	100	CY	50	1.0	5,000
	Excavation & Fill for Emergency Storage	500	CY	50	1.0	25,000
	BMPs	1	LS	2,500	2.0	5,000
	Clear & Grub	1	LS	1,500	1.0	1,500
	Re-Seeding	1	LS	1,000	1.0	1,000
32	**Exterior Improvements**					**0**
	Access Road	0	CY	175	1.0	0
33	**Utilities**					**326,500**
	Force Main (6" DIP, including TB&C)	75	LF	120	1.0	9,000
	Wet Well	1	LS	7,500	1.0	7,500
	Emergency Storage Tank	1	LS	120,000	1.0	120,000
	Pumping Equipment Package	2	LS	90,000	1.0	180,000
	Traffic Control	1	LS	10,000	1.0	10,000
					SUBTOTAL 1	**429,000**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	42,900	1.0	42,900
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	64,350	1.0	64,400
					SUBTOTAL 2	**536,300**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	171,600	1.0	171,600
					SUBTOTAL 3	**707,900**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	106,185	1.0	106,200
					TOTAL	**814,100**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Treatment Biological Nutrient Removal
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**0**
	Geotechnical Allowance	0	LS	20,000	1.0	0
26	**Electrical**					**33,000**
	Electrical & Controls Installation	1	LS	25,000	1.0	25,000
	SCADA Updates	1	LS	8,000	1.0	8,000
33	**Utilities**					**175,000**
	Sanitaire NDNP Control Package	1	LS	175,000	1.0	175,000
	Polishing Filter	0	LS	644,000	1.0	0
	Polishing Filter Building	0	LS	500,000	1.0	0
	Chemical Feed Equipment	0	LS	12,000	1.0	0
	Chemical Storage Tank	0	LS	7,500	1.0	0
					SUBTOTAL 1	**208,000**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	20,800	1.0	20,800
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	31,200	1.0	31,200
					SUBTOTAL 2	**260,000**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	83,200	1.0	83,200
					SUBTOTAL 3	**343,200**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	51,480	1.0	51,500
					TOTAL	**394,700**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Treatment Suspended Phosphorous Removal
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**0**
	Geotechnical Allowance	0	LS	20,000	1.0	0
26	**Electrical**					**33,000**
	Electrical & Controls Installation	1	LS	25,000	1.0	25,000
	SCADA Updates	1	LS	8,000	1.0	8,000
33	**Utilities**					**1,013,500**
	Sanitaire NDNP Control Package	0	LS	175,000	1.0	0
	Polishing Filter	1	LS	644,000	1.0	644,000
	Polishing Filter Building	1	LS	350,000	1.0	350,000
	Chemical Feed Equipment	1	LS	12,000	1.0	12,000
	Chemical Storage Tank	1	LS	7,500	1.0	7,500
					SUBTOTAL 1	**1,046,500**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	104,650	1.0	104,700
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	156,975	1.0	157,000
					SUBTOTAL 2	**1,308,200**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	418,600	1.0	418,600
					SUBTOTAL 3	**1,726,800**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	259,020	1.0	259,100
					TOTAL	**1,985,900**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

Town of Bayfield Wastewater Treatment Capacity Expansion
Opinion of Probable Construction Costs (ASCE Class 4)

Division	Description	Quantity	Units	Cost per Unit ($)	Installation Multiplier	Cost (nearest $100)
1	**General Requirements**					**25,000**
	Geotechnical Allowance	1	LS	25,000	1.0	25,000
3	**Concrete**					**1,900,000**
	Concrete Base Slab	862	cy	$700	1.2	724,400
	Concrete Walls	1,178	cy	$750	1.2	1,060,600
	Concrete Suspended Roof Slab	73	cy	$1,200	1.2	105,000
	Leak Testing of new Tanks	40	hrs	$250	1.0	10,000
9	**Finishes**					**5,000**
	Protective Coatings	1	LS	5,000	1.0	5,000
26	**Electrical**					**65,000**
	Electrical & Controls	1	LS	50,000	1.0	50,000
	SCADA Integration	1	LS	15,000	1.0	15,000
31	**Earthwork**					**19,000**
	Excavation & Fill for Lift Station Concrete Tank	400	CY	15	1.0	6,000
	Site Grading	1	LS	10,000	1.0	10,000
	BMPs	1	LS	2,000	1.0	2,000
	Re-Seeding	1	LS	1,000	1.0	1,000
33	**Utilities**					**2,693,500**
	SBR Equipment Package	1	LS	624,000	1.0	624,000
	New Blower Building	1	LS	250,000	1.0	250,000
	Polishing Filter	2	LS	644,000	1.0	1,288,000
	Polishing Filter Building	1	LS	500,000	1.0	500,000
	Chemical Feed Equipment	2	LS	12,000	1.0	24,000
	Chemical Storage Tank	1	LS	7,500	1.0	7,500
					SUBTOTAL 1	**4,707,500**
	CONSTRUCTION PRORATES(See Note 1)	10.0%	of Subtotal 1	470,750	1.0	470,800
	CONTRACTOR'S OVERHEAD & PROFIT (See Note 2)	15.0%	of Subtotal 1	706,125	1.0	706,200
					SUBTOTAL 2	**5,884,500**
	CONTINGENCY (See Note 4)	40.0%	of Subtotal 1	1,883,000	1.0	1,883,000
					SUBTOTAL 3	**7,767,500**
	ENGINEERING COSTS (See Note 5)	15.0%	of Subtotal 3	1,165,125	1.0	1,165,200
					TOTAL	**8,932,700**

Notes

1 **Construction Prorates** [a] [b] **10%**

(a) General conditions includes cost associated with permits, licenses, insurance, environmental safe guards, sediment and drainage control, and

2 **Contractor's Overhead & Profit** [a] **15%**

(a) Contractor's overhead and profit include costs for mobilization/demobilization, administration, and contractor/subcontractor overhead costs

4 **Design Contingency** [a] **40%**

(a) The design continency is added to the subtotal based on the conceptual nature of information developed for this evaluation.

5 **Engineering Costs** **15%**

Costs incurred during Design and Construction

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