ELEMENT ENGINEERING LLC

BACA GRANDE WATER AND SANITATION DISTRICT

WATER & SEWER MASTER PLAN UPDATE

AUGUST 2022

WATER & SEWER MASTER PLAN UPDATE
FOR
BACA GRANDE WATER & SANITATION DISTRICT

PWSID: CO-0155200
CDPS PERMIT NO.: CO-0046914

AUGUST 2022

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1 EXECUTIVE SUMMARY

Element Engineering was retained by the Baca Grande Water and Sanitation District (BGWSD or district) to complete a water and wastewater master plan focusing on project prioritizations for the upcoming five years. This master plan is intended to provide an in-depth review of the district's infrastructure and a roadmap of water and sanitary sewer capital improvement projects, prioritized by need (both regulatory and structural) that are recommended for completion within the next five years.

A Water and Wastewater Master Plan was compiled for the district by JVA, Inc. in August 2019. This Water & Sewer Master Plan Update utilizes information from the 2019 master plan, provides additional updated details, and focuses on recommendations for the system within the next five years.

Limiting the scope to a 5-year master plan is recommended as the district has numerous needs for infrastructure improvements over many decades. Without focusing on those very important projects that the district has the financial, managerial, and technical capabilities to complete within a near-term timeframe, a paralysis of analysis effect can and has occurred.

The goal of this master plan is to create a detailed and informative document that the district can follow to meet future regulatory requirements, replace aging infrastructure, keep up with development and population growth, and manage existing infrastructure. The master plan will be a road map of projects and program prioritized in the short term (0-5 years).

1.1 PROJECT SCOPE

This report will focus on projects that must be completed to remain in compliance with industry standards (such as water loss) and/or CDPHE regulatory requirements within the next five years. The master plan update scope is as follows:

- Recommend steps to quantify, locate, and address the large amounts of finished water loss in the distribution system.
- Integration of the Motel Well, booster pumping system, and raw water pump into the wider Baca Grande system to provide flexibility and redundant water supplies.
- Review the cost of expanding the water treatment facility's pumping capacity.
- Review influent flow and loading to the wastewater treatment plant and determine the need for and timing of treatment plant expansion.
- Review the existing wastewater treatment plant to determine if it is financially feasible to rehabilitate the treatment facility. Facility rehabilitation must include replacement of the existing HVAC system, replacement of all electrical systems that are not rated as explosion proof, rehabilitating structural settling issues, installation of a new control system, addressing EQ basin access, addressing potential mold issues, addressing the lack of UV redundancy, and integration of WAS piping and pumping to the sludge pond and drying bed.
- Review the cost of expansion of the existing treatment facility along with the above referenced rehabilitation requirements.

- Determine the cost of construction of a new and expanded wastewater treatment plant. Compare the cost of rehabilitating the existing wastewater treatment plant to that of constructing a new wastewater treatment plant.

2 LOCATION & SERVICE AREA

The Baca Grande Water and Sanitation District (BGWSD or district) is located in Saguache County on the western slopes of the Sangre De Christo Range. The district is located just southeast of Crestone and approximately 40 miles northeast of Monte Vista. The district's service area encompasses approximately 7,000 acres and provides water distribution and wastewater collection to residential and commercial service connections to customers within the district's service area. The district's serviceable residential and non-residential population taps are made of full-time residents, second homeowners, and tourists. The vicinity map of the area is shown in Figure 1.

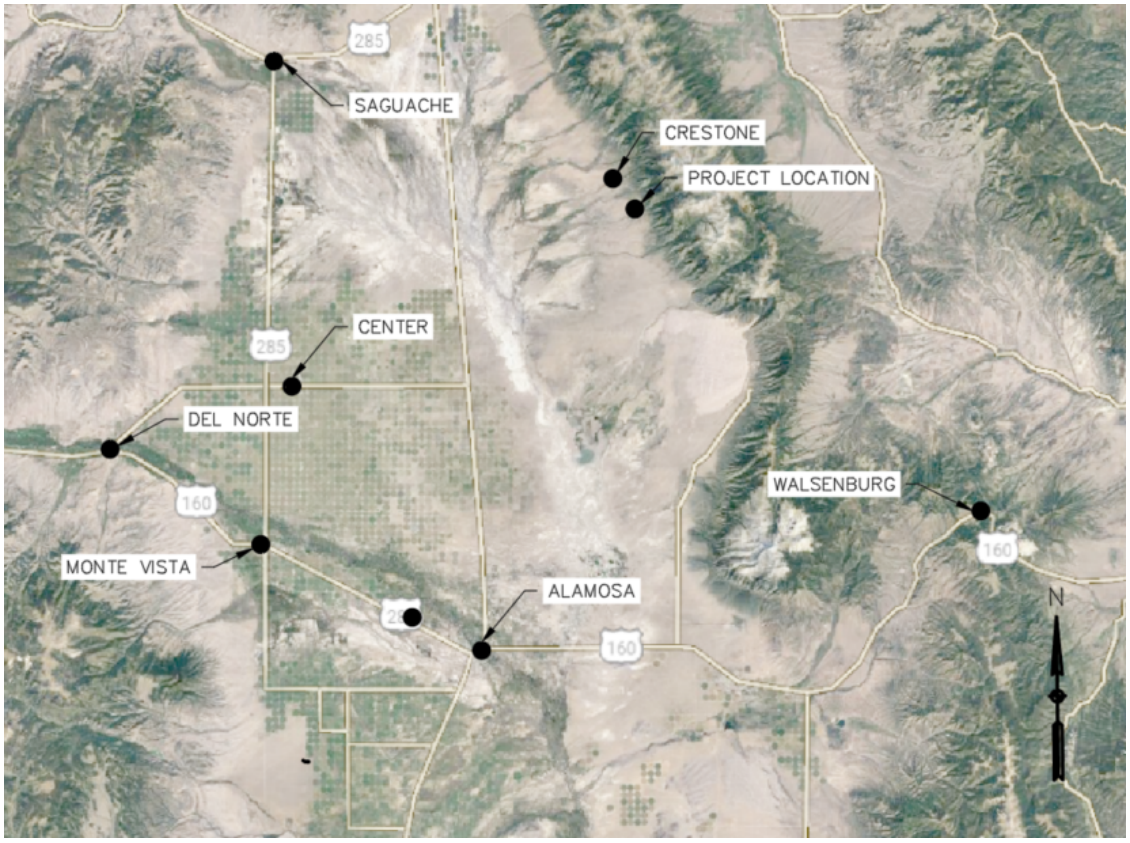


Figure 1: Vicinity Map of the District

The district's service boundary encompasses four subdivisions which include: Chalet 1, Chalet 2, Chalet 3, and the Mobile Home Estates (MHE) also known as Casita Park. The current district population is estimated to be 1,657 people. The water and wastewater service areas are essentially equivalent. The district does not currently have firm plans to expand outside of the existing service area.

The district currently serves 753 residential water taps which account for approximately 70% of the overall water usage within the district. Additionally, there are 22 non-residential taps which comprise of small businesses, religious centers, and the Colorado College Baca Campus. The existing system includes two

groundwater wells, a 47,000-gallon concrete raw water storage tank, a water treatment facility, six booster pump stations, six potable water storage tanks, 64 miles of 2-inch to 8-inch potable water pipe, and appurtenances such as valves, meters, and meter pits.

The district's Wastewater Treatment System is owned by the district and accepts wastewater flows for the district's service area and the nearby Town of Crestone. The system serves 750 residential and non-residential wastewater connections. The system consists of approximately 68 miles of gravity sewers, 9.5 miles of force mains, four lift stations, and the Aspen Institute wastewater treatment facility (WWTF).

The service area of the district is shown in Figure 2.

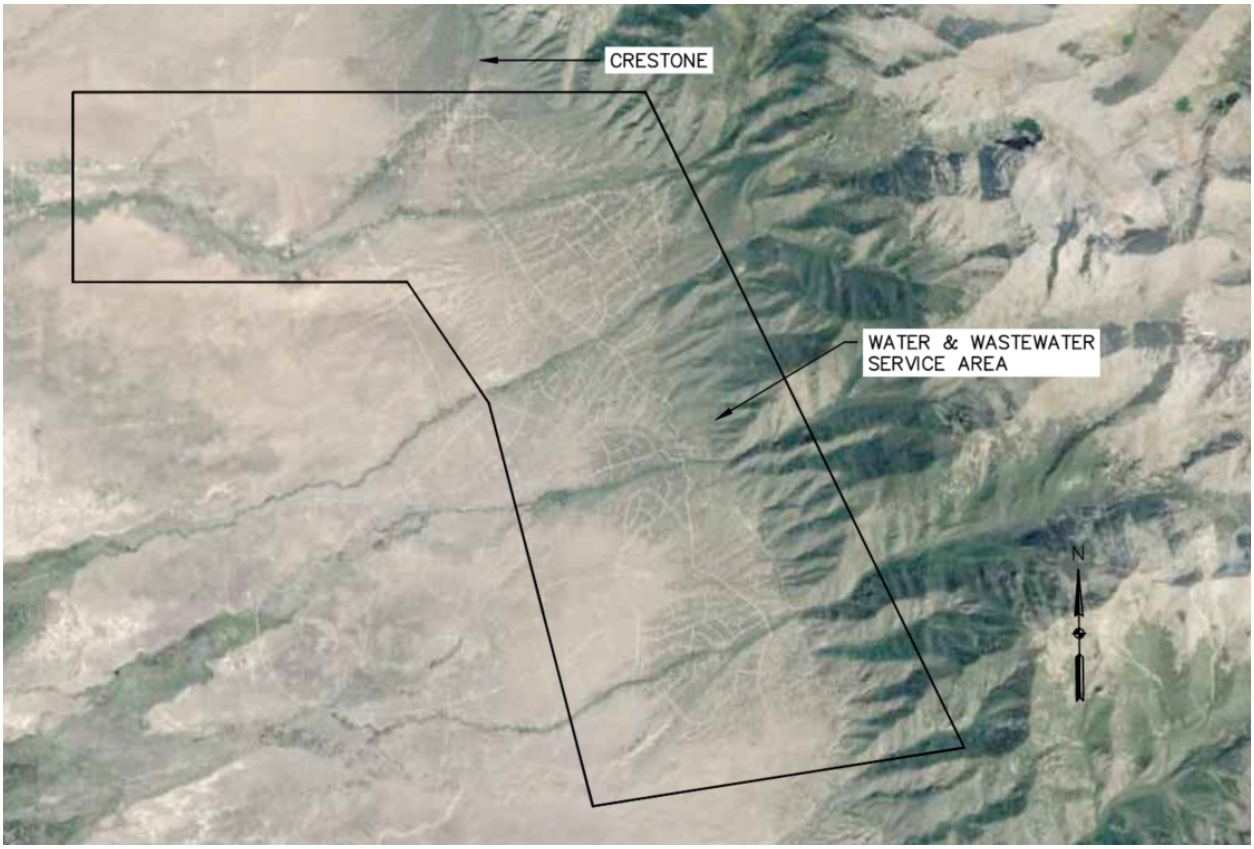


Figure 2: District Service Area

3 POPULATION AND DISTRICT GROWTH

The district is not a census designated area, therefore data on historic population is not available through the United States Census Bureau or the Colorado State Demographers Office. The district's water tap data was provided for years 2014 through 2020, which was used to estimate historical trends. The in-district water and wastewater services area are essentially equivalent. Population estimates for the district service area are based on water services, however these population estimates are considered to be appropriate for both the water and wastewater service areas.

An estimated 2.2 persons per residential tap is used to estimate the population of the service area as appropriate based on the characteristics of the service area. The distribution of residential taps versus total taps is estimated for 2014-2018 based on the existing ratio of residential versus non-residential taps.

Historic taps, population estimates, and estimated annual growth rates for the district are presented in Table 1. Additionally, the Town of Crestone's historic growth rate was analyzed and determined to be less than that of the district. To be conservative, the growth rate of the district will be used for both district and Town of Crestone projected growth.

Table 1: Historic Taps, Population, and Growth Rate

Year	Residential Taps	Non-Residential Taps	Total Taps	Est. Population	Annual Growth Rate
2014	639	18	657	1,406	--
2015	654	19	673	1,439	2.4%
2016	676	19	695	1,487	3.2%
2017	685	20	705	1,507	1.4%
2018	688	20	708	1,514	0.4%
2019	686	38	724	1,509	2.2%
2020	753	22	775	1,657	6.6%
				Average	**2.7%**

Notes:
1. 2014-2018 Residential/Non-Residential Tap split calculated based on 2020 ratio.
2. Estimated population based on 2.2 residents per residential tap.

A detailed breakdown of the number of water taps by type and size as of 2020 is presented in Table 2. A detailed breakdown of the number of wastewater services by type as of 2020 is presented in Table 3.

Table 2: Water Taps by Size

Water Tap Type/Size	No. Water Taps
3/4-inch (Residential)	753
1-inch	6
1 1/2 - inch	6
2-inch	7
Non-Bill Rate	2
Golf Course Irrigation	1
Total	**775**

Table 3: Wastewater Services by Type

Sewer Service Type	No. Services	Est. Population
In-District Residential	739	1,657
Town of Crestone	1	86
1-inch Water Service Equivalent	3	--
1 1/2-inch Water Service Equivalent	5	--
2-inch Water Service Equivalent	2	--
Total	**750**	**1,743**

Table 4 represents the existing and 20-year population and tap projection assuming an average of 2.2 persons per residential water tap and an annual growth rate as documented in Table 1. This growth rate is applied to both residential and non-residential taps.

Table 4: 20-Year Tap and Population Forecast (Water)

Year	Residential Taps	Non-Residential Taps	Total Taps	Est. Population
2020	753	22	775	1,657
2042	1,352	40	1,392	2,974
Notes:				
1. Growth based on annual growth rate of 2.7%.				
2. Estimated population based on 2.2 residents per residential tap.				

Table 5 displays the existing and future population of the district and the Town of Crestone, which is equivalent to the wastewater service area.

Table 5: 20-Year Population Forecast (Wastewater)

Year	District Population	Crestone Population	Total Population (Wastewater)
2020	1,657	86	1,743
2042	2,974	155	3,129
Notes:			
1. Growth based on annual growth rate of 2.7%.			
2. Estimated population based on 2.2 residents per residential tap.			

There are currently 2,610 total available lots within the district. The district anticipates a decrease of 29 lots per year due to lot consolidation (combining of lots) based on historical precedent. The district is projected to reach full buildout capacity at 1,530 taps which is estimated to occur in 2055. Full buildout is not anticipated to be reached within the 20-year planning period.

4 WATER SYSTEM

The district is a Title 32 special district and leases all water rights from the United States of America, Department of Interior, U.S. Fish and Wildlife Service (USFWS) under a water service agreement. The district owns and operates a public water drinking system under PWSID CO0155200 which consists of raw water supply, treatment, distribution, and potable water storage. The district utilizes two groundwater wells: Well 17 and Well 18.

4.1 DRINKING WATER DEMAND, PRODUCTION, AND WATER LOSS

Billing data was obtained to calculate the district's water demands for years 2015-2018. Water production data was estimated using combined totalizing flow data for Well 17 and Well 18. Both sets of data were compared to show historical water losses for the system.

Table 6 represents the water demand (distribution system meters), water production (Well 17 and Well 18 meters), and calculated water loss for the district based on provided data. The distribution system meters are aging, and it is likely the meters are not accurately measuring water volumes, making it difficult to accurately determine water loss percentages. Water loss is discussed in detail in Section 6.1 of this report.

Table 6: Average Water Demand, Water Produced, and Percent Water Loss (2015-2018)

Month	Water Demand (gal/month)	Water Produced (gal/month)	Water Loss (gal/month)	Water Loss (%)
January	1,992,449	6,304,000	4,311,551	68%
February	1,945,663	5,568,250	3,622,587	65%
March	2,245,239	5,514,250	3,269,011	59%
April	2,686,208	5,920,500	3,234,292	55%
May	3,948,090	7,127,500	3,179,410	45%
June	6,597,550	7,650,000	1,052,450	14%
July	6,692,126	10,705,000	4,012,874	37%
August	5,973,788	10,229,750	4,255,962	42%
September	5,437,514	9,044,250	3,606,736	40%
October	4,132,831	6,324,750	2,191,919	35%
November	3,203,043	4,374,500	1,171,457	27%
December	1,914,878	5,372,333	3,457,455	64%
Annual Total (gal/year)	**46,769,381**	**84,135,083**	**37,365,702**	**44%**

Water losses for the system exceed the maximum acceptable water loss of 10-15% for every month except for June. Losses range from 14% to 68% and appear to be higher in the winter when compared to summer months. However, the water loss as totalized gallons per month over the course of the year is relatively stagnant. Water losses in the system come from main breaks, meter reading and calibration errors, and unaccounted water consumption.

Based on the three-year period, water consumption for residential accounts had maximum month demands occur in June with a monthly average of 230 gal/tap/day and a yearly average of 139 gal/tap/day. Non-residential accounts experienced a maximum monthly average of 2,230 gal/tap/day in July and a yearly average of 1,063 gal/tap/day. Table 7 represents average day and maximum daily water demands for the existing system and the 20-year projected service area.

Table 7: Existing and Future Water Demand

	No. Water Taps	Average Daily Demand (gpd)	Maximum Month Daily Demand (gpd)
Existing			
Residential	753	104,730	173,190
Non-Residential	22	23,392	49,060
Total	775	128,121	222,250
Projected 20-Year			
Residential	1,352	188,041	310,960
Non-Residential	40	42,530	89,200
Total	1,392	230,571	400,160

4.2 DRINKING WATER STORAGE REQUIREMENTS

The district's potable water storage requirements are controlled by the Colorado Department of Health and Environment (CDPHE)'s Potable Water Design Criteria. This criterion requires that a system be capable of meeting system demand plus fire flow. The fire flow requirements for this system are estimated to be 180,000 gallons, equivalent to 1,500 gallons per minute for two hours, as appropriate based on the characteristics of the service area.

The district's existing distribution system includes six water storage tanks with a total capacity of 970,000 gallons. Table 8 summarizes the water storage requirement for the existing service area based on average day demand, maximum month daily demand, and standardized fire flow demand.

Table 8: Water Storage

	Existing		Future	
	Average Day	Max Month	Average Day	Max Month
Service Area Demand (gpd)	128,121	222,250	230,571	400,160
Fire Flow Demand (gal)	180,000	180,000	180,000	180,000
Total Storage Volume (gal)	**308,121**	**402,250**	**410,571**	**580,160**
Note: Fire Flow Demand was calculated using 1,500 gpm for 2 hours.				

The system's existing storage tanks provide adequate water storage for the district's existing and future needs.

4.3 WATER CONSERVATION

The district provides educational materials to residents on ways to reduce water consumption and encourages water conservation whenever possible. Additionally, the district uses a tiered structure for water usage which bills users based on water volume consumption.

4.4 WATER SYSTEM - EXISTING FACILITIES

The current system is equipped with 65 miles of pipe, six pump stations, potable water storage, and a treatment facility. The district has ten different pressure zones that exist throughout the service area due to the elevation changes within the system.

The district's service area includes approximately 7,000 acres with the treatment facility located near the north boundary of the district. Figure 3 illustrates a process flow diagram of the raw water and treatment

system. As shown, water is metered at Well 17, Well 18, and after the booster station.

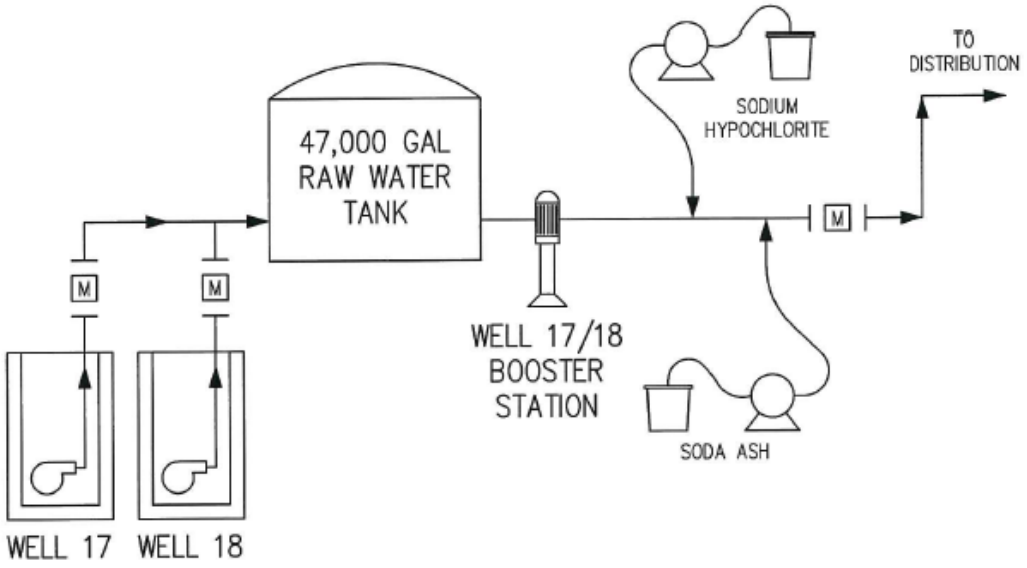


Figure 3: Raw Water Supply and Treatment Process Flow Diagram

4.4.1 Water Supply

Two deep groundwater wells, Well 17 and Well 18, supply the raw water for the district. These wells are drilled into the San Luis Valley unconfined aquifer. The district first constructed Well 18 in 2002 in accordance with Well Permit Number 57623-F-R and later constructed Well 17 in 2012 with Well Permit Number 6051-R. The wells can operate in unison or separately and are both equipped with a 10 horsepower (HP) submersible pump. Historical pumping records show that Well 17 provides up to 230 gpm, while Well 18 provides up to 310 gpm.

Water rights allow the district to divert 475 acre-feet of water per year. Both wells have a decreed production rate of 450 gpm and may be used for municipal, fire protection, irrigation, and domestic uses. Historical water quality data from Consumer Confidence Reports (CCRs) show that water produced from both wells follow Primary Drinking Water Standards and produce high quality water with low solids concentrations. Table 9 summarizes the information on the raw water wells.

Table 9: Raw Water Wells

Well Name	Permit No.	Well Depth (ft)	Pump Size (HP)	Pump TDH (ft)	Permitted Pumping Rate (gpm)	Maximum Draw Rate (gpm)
Well 17	6051-R	94	10	122	450	230
Well 18	57623-F-R	138	10	122	450	310

4.4.2 Raw Water Storage

The district's raw water storage tank was rehabilitated in 2011 and consists of an above ground 47,000-gallon concrete storage tank. Water from Well 17 and Well 18 is conveyed into the raw water storage tank through an 8-inch pipe.

4.4.3 Water Treatment Facility

The district's Water Treatment Facility (WTF) is located on the eastern terminus of County Road T, north of South Crestone Creek and was constructed in 2011. The district's raw water sources are groundwater and only require disinfection prior to disinfection, per CDPHE Regulation 11.

Raw water is pumped from the raw water storage tank into the WTF and to the distribution system by two booster pumps. Sodium hypochlorite is added for disinfection and soda ash is added for pH adjustment prior to entering the distribution system.

The WTF has a permitted raw water pumping capacity of 648,000 gallons per day (gpd) (equal to 450 gpm), which is the maximum permitted pumping capacity allowed by the district's water rights. The booster pumps in the facility consist of two (2) vertical in-line multi-stage centrifugal pumps equipped with 50 horsepower (HP) motors. Both pumps have a pumping capacity of 238 gpm. Therefore, the firm capacity of the system is 342,000 gpd, which equals the pumping capacity with one booster pump out of service. The existing demand during peak day can exceed the existing firm capacity of the booster pumps.

The district's chlorine residual amounts are regulated in accordance with CDPHE Regulation 11. A description of the WTF chemical feed system is shown in Table 10.

Table 10: Chemical Feed System

	Sodium Hypochlorite	Soda Ash
Purpose	Disinfection	pH Adjustment
No. of Pumps	2	2
Type	Larox Peristaltic	Larox Peristaltic
Dosage	13%	12%
Manual Feed Rate	.21-.45 mg/L	Based On Raw Water pH Values
Maximum Feed Rate (gpd)	50.7	50.7
Tank Volume (gal)	55	500
No. Of Storage Tanks	1	1
Monitoring Device	ATI	Scan pH Meter

4.4.4 Distribution System

The district's distribution system consists of approximately 65 miles of finished water pipe, three pressure reducing valves (PRV), six booster stations (including the WTF), and six potable water storage tanks. Pipe sizes range from 2-inch to 8-inch diameters are made of PVC, ductile iron, steel, and asbestos cement piping. Figure 4 illustrates the distribution system process flow diagram. System maps including pressure zone information is attached in Appendix A.

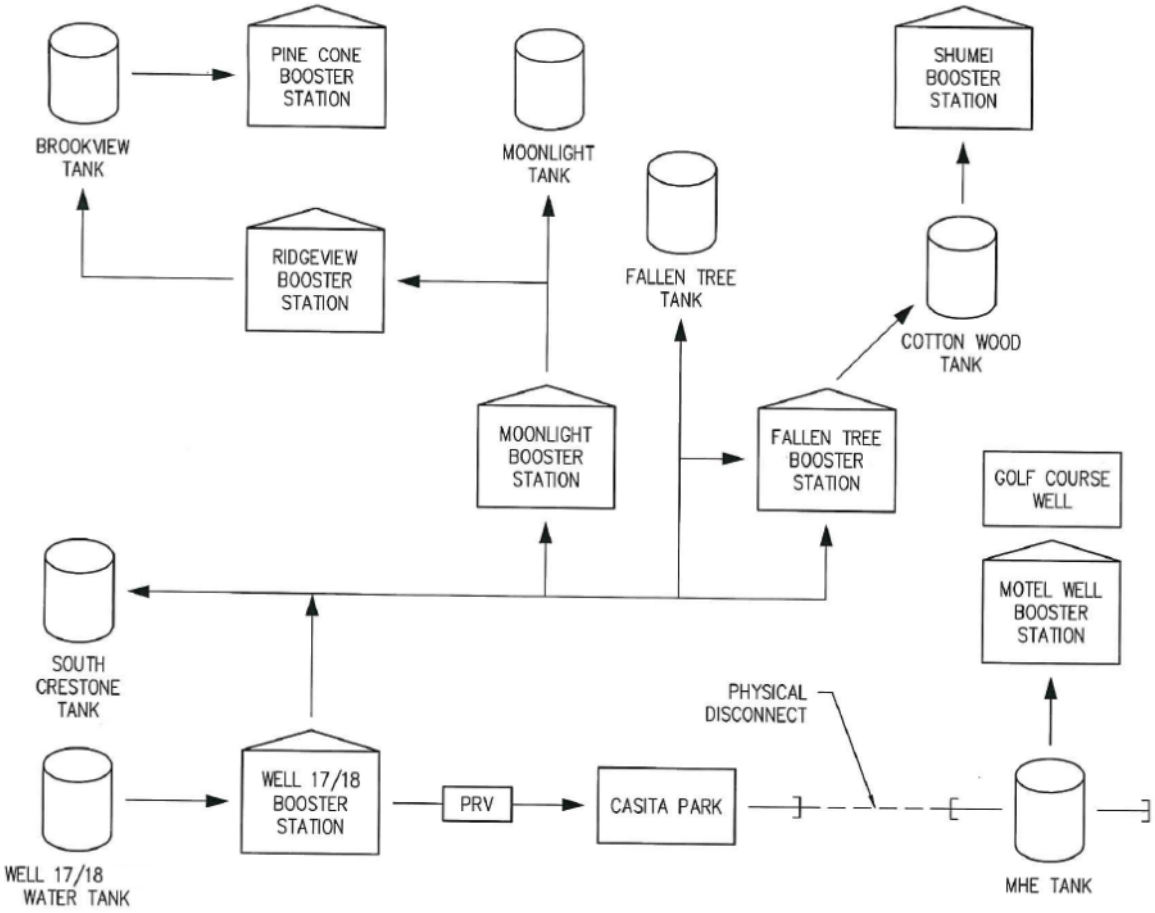


Figure 4: Distribution System Process Flow Diagram

After treatment, water is diverted to either the Mobile Home Estates or the South Crestone zone, which encompasses the majority of the service area. The distribution system includes five pressure reducing valves (PRV) that are located prior to entering the Mobile Home Estates Zone, the South Fallen Tree Zone, and after leaving the South Crestone Zone. Elevations in the distribution system range from approximately 7,639 feet to 8,795 feet and are separated into ten different pressure zones, as shown in Table 11.

Table 11: Distribution System Zones

Zones	Low Elevation (ft)	High Elevation (ft)
Mobile Home Estates	7,639	7,815
Town Houses	7,640	7,880
South Crestone Fallen Tree	8,000	8,200
Moonlight	8,160	8,416
Brookview	8,316	8,635
Pinecone	8,603	8,795
Cottonwood	8,129	8,359
Shumei	8,320	8,380
Fallen Tree Low	7,800	8,000
Ridgecrest PRV	7,880	8,000

All zones excluding the Mobile Home Estate Zone use booster stations. A summary of the current booster pump features is shown in Table 12. Flow meters exist at each booster pump, though based on meter data, the booster station flow meters are inconsistent and may produce erroneous data.

Table 12: Booster Pump Station Details

Pump Station	Elevation (ft)	No. of Pumps	TDH max (ft)	Flow Rate	HP
Well 17/18	7,811	2	279	238	50
Moonlight	8,184	2	400	250	10
Fallen Tree	8,195	2	170	250	15
Shumei	8,338	2	170	250	15
Ridgeview	8,400	2	400	250	10
Pine Cone	8,603	2	450	42	8

Several dead ends exist within the distribution system, resulting in sediment accumulation within pipes, increased water age, water stagnation, degradation of chlorine residual, and potential for bacterial growth.

The existing system connects the South Crestone zone to the Fallen Tree and Cottonwood zones with just one 6-inch water main. A break on this pipe would cut off nearly half of the taps within the district from water service.

4.4.5 Potable Water Storage

The district has six potable water storage tanks, either buried or above ground, which are used for operational, fire, and emergency water storage. Each storage tank is made of either concrete or steel. The existing storage capacity throughout the district is correctly sized to support the CDPHE design criteria of average day water demand and fire flow for the existing system and the district's 20-year projection. Details of the system water storage tanks are shown in Table 13.

Table 13: Potable Water Storage Tanks

Water Tank	Elevation (ft)	Volume (gal)	Material	Location	Tank Type	Dimensions	Year Built
South Crestone	8,258	150,000	Welded Steel	Ground	Circular	H: 16-feet D: 40-feet	1976
Fallen Tree	8,213	150,000	Welded Steel	Ground	Circular	H: 16-feet D: 40-feet	1976
Cottonwood	8,336	100,000	Welded Steel	Ground	Circular	H: 16-feet D: 33-feet	1976
Brookview	8,895	215,000	Concrete	Buried	Rectangular	H: 8-feet L: 60-feet W: 60-feet	2004
Moonlight	8,425	215,000	Concrete	Buried	Rectangular	H: 8-feet L: 60-feet W: 60-feet	2004
MHE	7,639	140,000	Steel	Ground	Circular	H: 20-feet D: 20-feet	Unknown
Total Storage Volume		**970,000**					

4.4.6 Water Meters

All water services in the distribution system are individually metered. Previous studies as well as district staff have reported that numerous meters are malfunctioning, inconsistent, or beyond their useful life, resulting in erroneous meter readings and therefore errors in water accounting.

Most existing meters are located in meter pits outside of homes and buildings. This allows easy access for the district as needed. There are several meters that are located inside homes and buildings. If replaced, these meters should be relocated to new meter pits to ensure access, as necessary.

5 WASTEWATER SYSTEM

The district's Wastewater Treatment System is owned by the district and accepts wastewater flows for the district's service area and the nearby Town of Crestone. The system serves 750 residential and non-residential wastewater connections. The system consists of approximately 68 miles of gravity sewers, 9.5 miles of force mains, four lift stations, and the Aspen Institute wastewater treatment facility (WWTF).

5.1 EXISTING WASTEWATER FLOW AND LOADING

As part of the existing permit conditions for discharge permit CO0046914, the district's WWTF reports influent flow data to the Colorado Department of Public Health and Environment (CDPHE). The existing permit became effective on December 1, 2019 and will expire November 30, 2024. The facility is permitted at a hydraulic loading of 150,000 gallons per day (gpd) and an organic loading of 300 lbs BOD_5 per day. Per CDPHE criteria, planning for the expansion of the facility is required when the facility reaches 80% of the permitted hydraulic or loading capacity. The district's permit is attached in Appendix B.

5.1.1 Existing Wastewater Flows

To illustrate historical monthly flows for the district, Discharge Monitoring Report (DMR) data was obtained for 2018 through May 2022. All DMR data is attached in Appendix C. Master meter data was used to characterize historical flows for Crestone. Average annual and maximum month flows for the district, Crestone, and the total service area are summarized in Table 14. The existing permitted limit for hydraulic loading to the Aspen WWTF is 0.15 MGD. There have been no exceedances of the permitted limit, nor the 80% or 95% threshold, in the previous five years. Figure 5 presents the influent flow data graphically.

Table 14: Wastewater Influent Flow

	District		Crestone		Total Service Area	
Year	**Average Day Flow (MGD)**	**Max Month Flow (MGD)**	**Average Day Flow (MGD)**	**Max Month Flow (MGD)**	**Average Day Flow (MGD)**	**Max Month Flow (MGD)**
2018	0.042	0.047	0.018	0.022	0.060	0.067
2019	0.051	0.067	0.021	0.025	0.073	0.090
2020	0.054	0.065	0.020	0.028	0.073	0.080
2021	0.059	0.086	0.022	0.031	0.082	0.102
2022	0.048	0.050	0.017	0.021	0.065	0.067
Average	**0.051**	**0.063**	**0.020**	**0.025**	**0.070**	**0.081**
Max	**0.059**	**0.086**	**0.022**	**0.031**	**0.082**	**0.102**

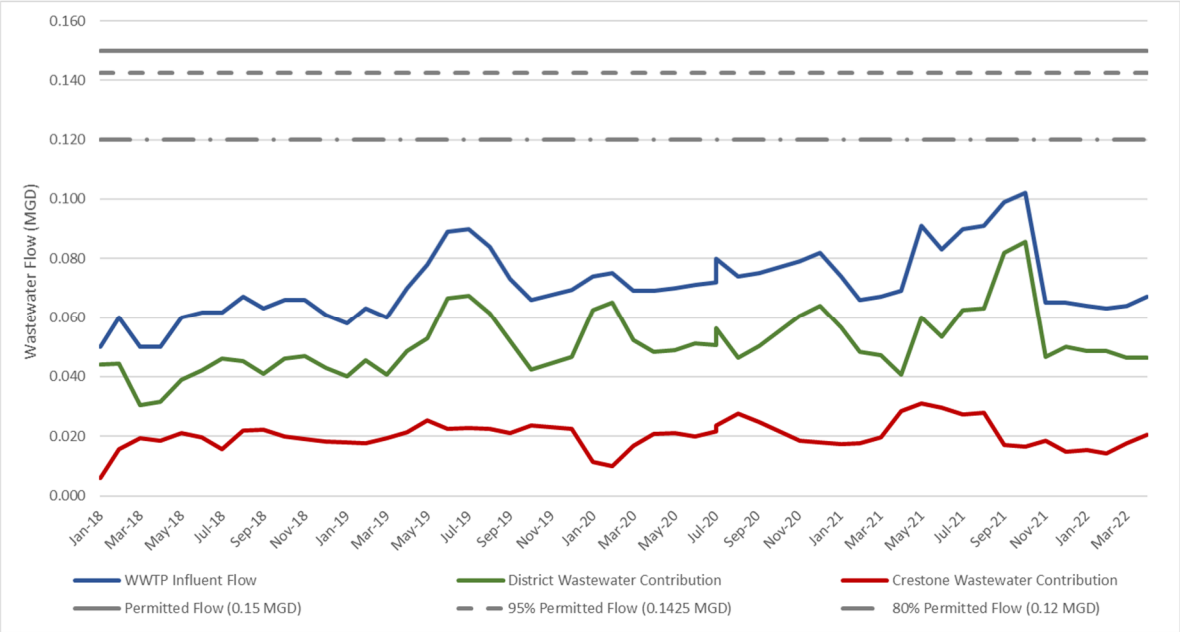


Figure 5: Wastewater Influent Flow

The district has experienced high amounts of infiltration and inflow (I&I) historically, however, maximum month flows have decreased throughout recent years due the district's efforts to reduce I&I. Based on the almost five (5) years of collected data, the average wastewater flow for the district's total service area is 70,000 gallons per day (gpd). The maximum month flow occurred in November 2021 with a flow of 102,000 gallons per day (gpd), approximately 68% of the rated capacity of 0.15 MGD.

The estimated per capita flow was calculated using the existing population and both average day and maximum month flows. The calculation is presented in Table 15. The flow rate presented is the recorded wastewater flows at the treatment plant and therefore includes wastewater contributions from the Town of Crestone. The population presented includes the population of the Baca Grande Water & Sanitation District and the Town of Crestone. The calculation assumes that wastewater contributions from non-residential sources are included in the per capita flow as these contributions are minimal in comparison to residential flows.

Table 15: Wastewater per Capita Flow

Flow Condition	Total Service Area Flow (MGD)	Population	Per Capita Flow (gpdpc)
Average Day Flow	0.070	1,743	40
Maximum Month Flow	0.102	1,743	59
Note: Total Service Area flow is flow recorded at wastewater treatment plant and includes wastewater flows from Crestone. Population includes estimated Crestone population.			

The calculated per capita per day flow is a relatively low flow compared to expected design values. This may be due to an overestimated population as population for the district was estimated using typical design values and not actual census data. The influent meter at the wastewater treatment plant is reliable and the data produced is expected to be accurate, therefore the total service area flow is not assumed to be low,

instead only the per capita flow is possibly lower than actual per capita contributions.

Because average day flows resulted in relatively low flows per capita, the maximum month flow was used for design calculations. The per capita flow rate determined using this method is closer to the estimated wastewater flow of 75 gallons per day per capita (gpdpc) as documented in CDPHE Regulation 43. Note that utilizing a design flow of 75 gpdpc will result in a significantly higher influent flow to the WWTP than is seen in actual, accurate recorded data, and is therefore not a method used in this report.

5.1.2 Existing Organic Loading

Discharge Monitoring Report (DMR) data obtained for 2018 through May 2022 was used to identify BOD loading data for the district's service area and is summarized in Table 16. All DMR data is attached in Appendix C. The permitted limit for organic loading to the Aspen WWTF is 300 lb BOD/ day. In the DMR table attached in Appendix C, all exceedances of this limit are highlighted in red, exceedances of 95% of the organic limit are highlighted in orange, and exceedances of 80% of the organic limit are highlighted in yellow. Figure 6 presents the influent organic loading graphically.

Table 16: Wastewater Influent Organic Loading

Year	Average Day Organic Loading (lbs/day)	Max Month Organic Loading (lbs/day)
2018	237	392
2019	245	374
2020	190	302
2021	180	232
2022	233	273
Average	**203**	**315**
Max	**245**	**392**

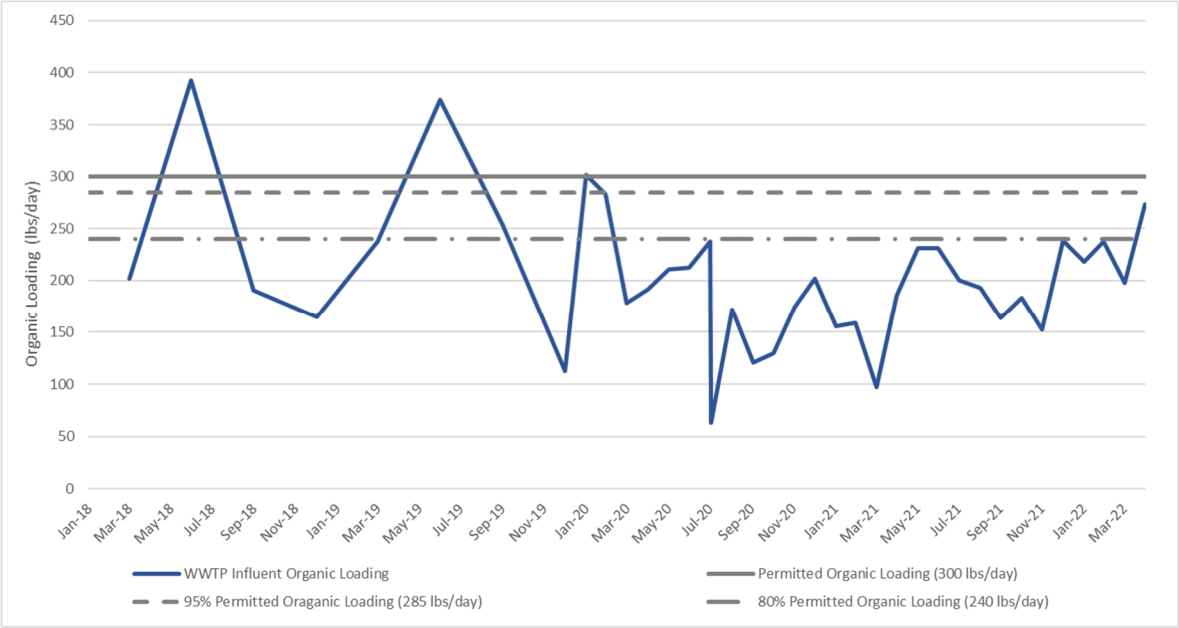


Figure 6: Wastewater Influent Organic Loading

The district has surpassed the allowable organic loading times over the previous five years. Modifications or expansions to the wastewater facility need to be considered and implemented to address this issue and maintain permit compliance.

Based on the district's permitted flow, the permitted loading was calculated based on an influent BOD concentration of 240 mg/L. DMR data shows that this concentration is not appropriate for actual conditions. DMR data attached in Appendix C shows that the actual average influent BOD concentration to the facility over the previous five years was 325 mg/L. Recent data shows an average influent BOD concentration of 465 mg/L (January 2022 through May 2022).

This master plan will address the organic loading issue at the facility.

5.2 PROJECTED WASTEWATER CHARACTERISTICS

5.2.1 Projected Wastewater Flows

An annual population increase of 2.7% for the service area and 59 gpd per capita were used to identify estimated future maximum month flows for the service area and is shown in Table 17. The service area population includes the population of the district and the Town of Crestone. The flow per capita includes contributions from non-residential users. No significant increases in contributions from non-residential users is expected, therefore no additional future flows for non-residential users will be included beyond the 2.7% annual growth rate applied to the population.

Table 17: Projected Wastewater Flows

Year	Service Area Population	Max Month Flow (gpd)	% Permitted Capacity
2020	1,743	102,000	68%
2025	1,991	116,513	78%
2030	2,275	133,133	89%
2035	2,599	152,093	101%
2040	2,969	173,745	116%
2042	3,129	183,108	122%
Notes:			
1. Service Area Population growth based on 2.7% annual growth rate.			
2. Max Month Flow based on 59 gallons per day per capita.			
3. Percent Permitted Capacity based on existing permitted influent flowrate of 0.15 MGD.			

Planning for facility expansion must begin at 80% of the permitted hydraulic capacity. Using these estimates, the facility is expected to reach 80% of the hydraulic capacity by 2026.

5.2.2 Projected Organic Loading

To analyze future maximum loading to the district's wastewater facility, the assumed annual population increase of 2.7%, previously calculated projected maximum month flow, and an average BOD concentration of 400 mg/L were used. Table 18 presents the maximum month annual loading for the district's future service area.

Table 18: Projected Organic Loading

Year	Service Area Population	Max Month Flow (gpd)	Influent Organic Loading (lbs/day)	% Permitted Capacity
2020	1,743	102,000	340	113%
2025	1,991	116,513	389	130%
2030	2,275	133,133	444	148%
2035	2,599	152,093	507	169%
2040	2,969	173,745	580	193%
2042	3,129	183,108	611	204%
Notes:				
1. Service Area Population growth based on 2.7% annual growth rate.				
2. Max Month Flow based on 59 gallons per day per capita.				
3. Influent Organic Loading based on 400 mg/L influent BOD concentration.				
4. Percent Permitted Capacity based on existing permitted influent oragnic loading of 300 lbs/day.				

The 20-year projection for the maximum month influent loading to the Aspen WWTF is 0.18 MGD and 611 lbs BOD per day. Both values exceed the existing influent permitted limits of the facility's permit. The existing facility has already experienced exceedances of the influent organic loading limit. The system's permitted loading capacity will need to be increased to provide adequate capacities for the district's existing and future loading.

5.3 WASTEWATER SYSTEM - EXISTING FACILITIES

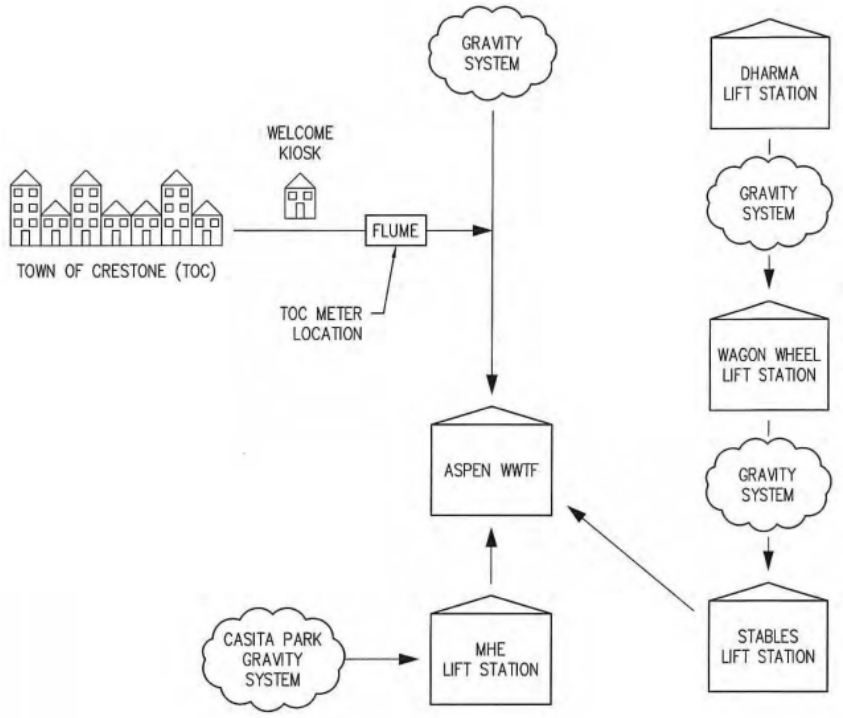
The district's wastewater treatment facility is located south of Crestone in the Luis Maria Baca Grant No. 4. The collection system is approximately 68 miles of gravity sewer, 9.5 miles of force mains, and 798 manholes. The collection system also includes four lift stations.

The district owns and maintains the Aspen Institute Wastewater Treatment Facility (WWTF). The WWTF is permitted for a hydraulic loading rate of 0.15 MGD and an organic loading rate 300 lbs BOD per day. The primary treatment system includes a headworks building with an automatic mechanical fine screen and grit removal system with a manual bypass bar screen. The system uses a flow equalization basin and influent pump prior to being conveyed to two (2) secondary treatment trains. Influent conditioning and waste sludge storage is completed using a Fluidyne ISAM Basin, or anaerobic selector tank. A surge anoxic mix (SAM) reactor is used to equalize influent flow prior to pumping to a Sequencing Batch Reactor (SBR). Decanted effluent flows into a post equalization basin. The system uses UV for disinfection and magnesium hydroxide for pH adjustment before discharging to an Unnamed Dry Wash Tributary to South Crestone Creek. Solids are pumped to the system's recently constructed drying beds.

5.3.1 Collection System

The wastewater collection system that feeds the Aspen Institute Wastewater Facility consists of approximately 68 miles of gravity sewers and 9.5 miles of force mains, which primarily consist of PVC pipe, however Chalet 2 has a significant amount of asbestos cement pipe. The system has four lift stations each equipped with 2 pumps and 798 manholes located throughout the collection system. A process flow diagram of the district's collection system is shown in Figure 7. Details of the wastewater collection system and service area are attached in Appendix A.

Figure 7: Collection System Process Flow Diagram



There are four lift stations within the district's wastewater collection system. Table 19 documents the details of the lift stations based on best available information.

Table 19: Lift Station Summary

Lift Station	No. of Pumps	HP	Firm Pumping Capacity Flow Rate (gpm)	Operating Volume (gal)	Overflow Storage Volume (gal)	Estimated Peak Daily Flows (gpd)	CDPHE Approved Peak Capacity (gpd)
Dharma Ocean	2	20	180	957	1,253	12,025	260,000
Mobile Home Estate	2	8	74	504	2,829	26,404	106,000
Wagon Wheel	2	40	220	466	1,375	41,566	317,000
Stables	2	20	180	955	88,000	177,696	259,200

According to historical information provided by the district, the Stables Lift Station receives the most flows, and peak flows are approximately 69% of the approved CDPHE capacity. Dharma Ocean Lift Station experiences the lowest flows and serves primarily to the Dharma Ocean Center. The Mobile Home Estate Lift Station services the Casita Park zone, and the Stables Lift Station services the area of the Stables Lift Station but also collects flows from the Dharma Ocean and Wagon Wheel Lift Station.

The district has access to a 75 kilowatt (kW) portable generator with a 300-gallon fuel tank for emergency purposes. Currently, only Stables Lift Station and Dharma Ocean Lift Station are equipped with a quick connect for easy hook-up. The Mobile Home Estate Lift Station has its own designated emergency backup generator. No other lift stations have dedicated emergency power backups on site, which could lead to sanitary sewer overflows if power to the lift station cannot be restored quickly. The district also has a vacuum-truck capable of hauling 2,000 gallons in the event of an emergency.

5.3.2 Inflow & Infiltration

The district has historically had problems with significant inflow and infiltration (I&I) in the collection system. The presence of I&I is apparent based on spikes in influent flow to the treatment plant during summer months when runoff is high and rain events are more common. Since 2014, the district has taken steps to reduce the amount of I&I in the system by inspecting, identifying, and rectifying sections in the collection system that are contributing to I&I. This includes manhole infiltration via groundwater or surface water, or sewer main replacements. The effects of I&I have been significantly reduced over the previous years and has not been shown to be a major contribution to the collection system over the previous three years.

I&I was assessed in the Fact Sheet of the most recent permit for the facility, issued on October 31, 2019. The fact sheet states that the facility does not exhibit excessive infiltration as defined by CDPHE. The discharge permit and fact sheet are attached in Appendix B.

5.3.3 Wastewater Treatment Facility

The district owns and maintains the Aspen Institute Wastewater Treatment Facility (WWTF). The WWTF is permitted for a hydraulic loading rate of 0.15 MGD and an organic loading rate 300 lbs BOD per day. The facility discharges to an Unnamed Dry Wash Tributary to South Crestone Creek under Colorado Discharge Permit System (CDPS) Permit Number CO-0046914. This permit was issued on October 31, 2019 and will expire on November 30, 2024. The discharge permit is attached to this report in Appendix B. The site approval number for the facility is 4687. The most recent improvements to the facility occurred in early 2018, which mainly consisted of a new headworks building and grit removal equipment.

Wastewater from the collection system enters the headworks building, which consists of a mechanical fine screen, manual bypass bar screen, and grit removal system. Screenings from the mechanical bar screen are

collected in a dumpster bin for landfill disposal. Grit is collected in the grit chamber and operation staff manually remove grit periodically as needed.

Screened wastewater then enters a flow equalization and influent pump station. The influent pump station pumps wastewater to the secondary treatment building, which contains the Fluidyne Integrated Surge Anoxic Mix (ISAM) process. Influent wastewater enters a large anaerobic chamber for primary settling of solids and some colloidal organic matter.

Wastewater then overflows into the Surge Anoxic Mix (SAM) chamber, followed by the sequencing batch reactor (SBR) process. The Fluidyne SBR process is a continuous flow process that combines a four-step phased sequenced treatment process controlled by the Programmable Logic Controller (PLC) system. The phases include fill, aerobic react, settling, and effluent decant per cycle, and cycles repeat throughout the day.

Air is supplied to the SBR via an aspirating air system from the old pumps that feed the SBR tanks, which pull in air during the liquid transfer. This is an inefficient aeration system for the SBR and forced aeration would provide a higher oxygen transfer efficiency (OTE) as well as additional treatment capacity and operational flexibility. Motive submersible pumps provide the mixing for the SBR and SAM process. A portion of the mixed liquor suspended solids (MLSS) is returned from the SBR to the SAM tank for denitrification. Magnesium hydroxide is added directly to the SAM basin for pH adjustment.

Decanted flow enters an effluent post equalization tank for flow equalization and to pump constant flow for UV disinfection. Effluent flow is then sampled and metered prior to effluent discharge to an unnamed dry wash tributary to South Crestone Creek.

Table 20 details the equipment at the Aspen Institute Wastewater Treatment Facility. A process flow diagram of the treatment process is shown in Figure 8. A site plan of the plant is displayed in Figure 9.

Table 20: Aspen Institute Wastewater Treatment Plant Characteristics

Equipment	Parameter	Value
Wastewater Treatment Plant	Permitted Flow	0.15 MGD
	Permitted Organic Loading	300 lbs BOD per day
Machanical Fine Screen	Capacity	3.0 MGD
	Manual Bar Screen (Bypass) Capacity	0.7 MGD
Grit Concentrator	Capacity	0.54 MGD
Equalization Basin	Number	1
	Capacity	22,000 gal
Equalization Basin Pumps	Number	3
	Type	Grinder
	HP	2
	Operating Point	53.5 gpm @ 33 ft TDH
ISAM	Number	2
	Volume	55,000 gal (total)
	Area	13 ft x 18.5 ft (each)
	Maximum Side Water Depth	14 ft
	Design SRT	22 days
	Design % VSS Destruction	60%
SAM	Number	1
Surge Tank	Volume	22,800 gal
	Area	8 ft x 38 ft
	Maximum Side Water Depth	14 ft
SBR	Number	2
	Volume	100,000 gal (total)
	Area	26 ft x 18.5 ft (each)
	Maximum Side Water Depth	14 ft
	Retention Time	16.1 hrs
Post Equalization Basin	Number	1
	Volume	16,000 gal
	Area	4 ft x 38 ft
	Maximum Side Water Depth	14 ft
Solids Holding Pond	Volume	250,000 gal
	% Solids	3.50%
Sludge Drying Beds	Number of Beds	2
	Loading Rate	18 lbs/sf/yr
	Bed Dimensions	70 ft x 35 ft
Influent & Effluent Monitoring	Type of Device	Magentic FM
	Size	8-inch
	Range of Flows Measured	0.0003-0.445 MGD

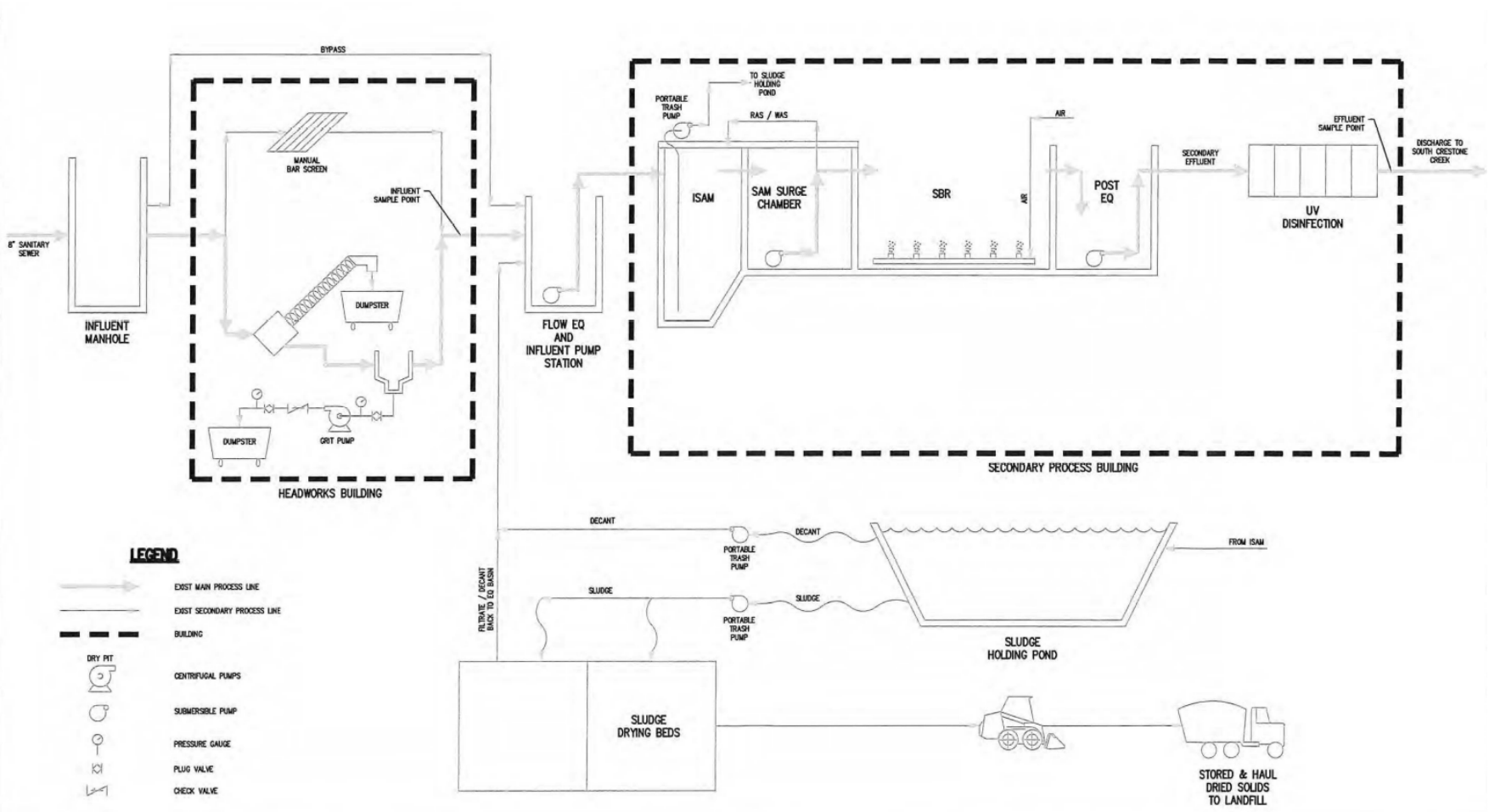


Figure 8: Wastewater Treatment Plant Process Flow Diagram

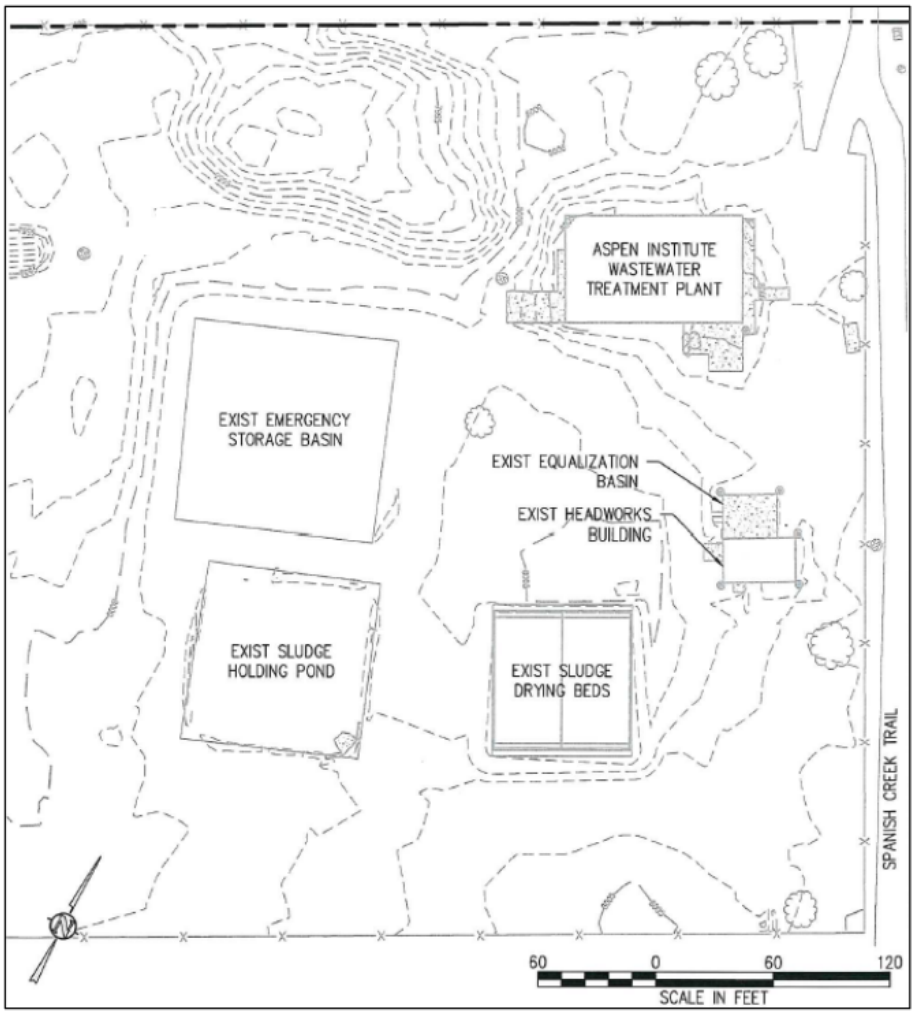


Figure 9: Aspen Institute WWTF Site Plan

5.3.4 Biosolids Management

Sludge from the ISAM tanks (anaerobic tanks) is conveyed through a 6-inch PVC gravity line to the sludge holding pond using a manually operated trash pump and flexible hose. The supernatant is periodically pumped back to the head of the plant. The district has recently installed two new sludge drying beds to handle the settled sludge from the sludge holding pond. The district periodically pumps settled solids to the two sludge drying beds using the same trash pump that is used to convey sludge from the ISAM to the sludge holding pond. Dried solids can be removed from the sludge drying beds using a skid steer and are hauled for landfill disposal. An underdrain system was installed below the drying beds for returning pressate back to the head of the wastewater facility.

The ISAM wastes to the sludge holding pond based on operator control, as this is a manual operation. The sludge wasting rate is not currently metered. The volume of the sludge holding pond is approximately 250,000 gallons. The facility generates approximately 150,000 gallons, or 43,000 pounds, of sludge per year based on the permitted design capacity of the SBR treatment process. The maximum surface loading rate per CDPHE Design Criteria is 20 pounds per square foot of drying bed area per year. Each of the two sludge

drying beds has a surface area of approximately 2,450 square feet (70-ft x 35-ft). The surface loading rate is approximately 18 pounds per square foot per year. The beds are piped in parallel so that each bed can be operated independently. Each bed can accommodate six drying cycles per year, totaling approximately 3,600 pounds per drying cycle.

5.3.5 Wastewater Treatment Facility Deficiencies

- **Influent Organic Capacity at the Aspen Institute WWTF**
  The existing influent organic limit at the WWTF is 300 lbs BOD per day. Based on the influent hydraulic loading of 0.15 MGD, this was calculated based on an influent BOD concentration of 240 mg/L. Historic monitoring data shows that this is not appropriate for existing service area conditions. The influent organic loading rate has been exceeded numerous times over the previous five years and needs to be addressed.

- **Automated Waste Activated Sludge (WAS) Pumping**
  Sludge from the ISAM tanks (anaerobic tanks) is conveyed through a 6-inch PVC gravity line to the sludge holding pond using a manually operated trash pump and flexible hose. The district periodically pumps settled solids to the two sludge drying beds using the same trash pump that is used to convey sludge from the ISAM to the sludge holding pond. Manual WAS pumping is operationally intensive and best practice is to utilize automated WAS pumping. Installing permanent pumps to waste solids from the anaerobic selector tanks to the sludge holding pond, then from the sludge holding pond to the sludge drying beds, could decrease operator attention and allow for process optimization.

- **WWTF Instrumentation & Controls Upgrades**
  There are several instrumentation and controls upgrades that are recommended for the WWTF as a part of the process optimization effort. These include, but are not limited to, replacing the programmable logic controller (PLC) for the SBR, adding oxidation reduction potential (ORP) and dissolved oxygen (DO) probes to the SBR basins, and updating the SCADA system to allow for remote control of the basins. These updates would allow operators to set control points for the various functions of the SBR, including decanting, air on, and air off to optimize the process and maximize organic oxidation and nutrient removal.

- **SBR Decanter Improvement**
  According to the district, the decanting mechanism from the SBR to the post-equalization tank needs to be improved. It is recommended to replace or improve the decanting process to reduce solids leaving the SBR tank as part of the overall process optimization effort within the WWTF. A floating decanter is a good alternative to evaluate for replacing the existing fixed decanters.

- **UV System Redundancy**
  The existing UV system is a single train. This does not allow for the system to be fully brought down for maintenance and repair purposes. To allow for operational and maintenance flexibility, a fully redundant UV system (second treatment train) is needed.

- **Headworks Building HVAC System**
  Based on site observations and input from the district, the HVAC system in the headworks building

should be upgraded. This is important for the health and safety of those working in the facility, as well as protecting the capital assets in the headworks building.

- Secondary Process Building Condition
  District staff have reported the presence of mold in the existing secondary process building. This can cause unhealthy working conditions could be contributing negatively to the health of staff. Additionally, the existing building does not abide by proper electrical codes to meet explosion proof requirements.

5.4 WASTEWATER DISCHARGE PERMIT COMPLIANCE

The Baca Grande Water & Sanitation District's Aspen Institute Wastewater Treatment Facility (WWTF) discharges to an Unnamed Dry Wash Tributary to South Crestone Creek under Colorado Discharge Permit System (CDPS) Permit Number CO-0046914. This permit was issued on October 31, 2019 and will expire on November 30, 2024. The discharge permit is attached to this report in Appendix B.

Discharge Monitoring Report data for the facility is attached in Appendix C. Exceedances of permitted limits are highlighted in red. Effluent violations over the previous five years of data include BOD, TSS, *E. coli,* Ammonia, and Total Residual Chlorine (TRC), though the facility generally maintains compliance with effluent limits.

The facility has not exceeded the influent hydraulic loading of 0.15 MGD, nor has it violated the 80% threshold of this limit. The influent organic loading limit of 300 lbs BOD per day has been violated three times since 2018. Exceedance of the influent organic limit and the 80% threshold is a consistent issue at the facility and should analyzed and addressed. The facility will need to be re-permitted to a higher influent organic loading limit, which may require improvements to the system. This will be discussed later in this report.

5.5 FUTURE DISCHARGE PERMIT ANALYSIS

The Aspen Institute Wastewater Treatment Facility (WWTF) discharges to an Unnamed Dry Wash Tributary to South Crestone Creek, which is stream segment CORGCB03. The designation for this segment is Reviewable, and the Classifications are: Aquatic Life Warm 1, Recreation Class E, Agriculture, and Water Supply. The low flow of the receiving stream is 0 cfs.

The facility is eligible for permit certification under CDPS General permit COG591000. The district should pursue a general permit certification during the next permit application cycle instead of extending the existing individual permit. This is a less costly option for the district, and also allows quicker processing and more flexibility for permit modification.

Using the general permit as guidance, it is estimated that the district would be issued a future effluent total inorganic nitrogen (TIN) limit of 7 mg/L and an effluent total phosphorus (TP) limit of 0.7 mg/L. Consideration of these future regulations should be given when analyzing improvements to the existing treatment plant to better understand the longevity of the existing or improved facility. Based on the current testing and performance, the facility will not be capable of consistently meeting these limits without modifications or improvements.

6 ASSESSMENT OF PROPOSED IMPROVEMENTS

This report will focus on projects that must be completed to remain in compliance with industry standards (such as water loss) and/or CDPHE regulatory requirements within the next five years. The following sections document areas of concern in the district's system that require attention within the 0-5 year planning period.

6.1 DISTRIBUTION SYSTEM WATER LOSS

As shown in Table 6 of this report, the average water loss in the distribution system is calculated to be 44%. Losses range from 14% to 68% and appear to be higher in the winter when compared to summer months. Water losses for the system exceed the maximum acceptable water loss of 10-15% for every month except for June.

Water losses in the system are a result of watermain breaks, meter reading and calibration errors, and unaccounted water consumption. The installation of new meters throughout the water mains in the distribution system will not assist with the identification of areas of water loss. The distribution system is well looped, meaning water is delivered from multiple locations. Due to this, it is very difficult to isolate areas of the distribution system for metering. The following are recommendations to identify and remedy the water loss in the distribution system.

- Test Existing Water Meters

  Previous studies as well as district staff have reported that numerous meters are malfunctioning, inconsistent, or beyond their useful life, resulting in erroneous meter readings and therefore errors in water accounting. Water meters that are aging will begin reading lower, therefore this could account for lower water billed data versus water produced.

  District staff can remove and test numerous meters throughout the system to determine if the meters are reading accurately. If testing reveals a consistent and statistically significant reduction in recorded flow versus actual flow, an estimated water accounting loss due to the meters could be determined.

  If poorly performing meters is identified as a cause of water loss accounting in the distribution system, a meter replacement program should be planned for and instated. This could be in the form of annual replacements, funded by the district's revenue, or a large system wide replacement project, funded by grants and loans.

- Locate Un-Metered Services

  Existing unmetered services in the distribution may account for some water accounting loss. A survey of the system should be performed to confirm that all water usage is appropriately metered. If taps are identified without meters, meters should be installed.

- Leak Detection Testing

  The district could employ the services of a Water Distribution System Leak Detection company. This service is estimated to be 50% effective at identifying areas of existing leaks. This is a potentially very costly service, with estimated pricing of thousands of dollars per day of work.

- Water Line Replacement

  The district should also consider starting a water line replacement program. This should focus on known areas of non-PVC and under sized existing piping replacement as the priority. The district could do this as an annual program, a series of larger replacement projects, or a system wide project. Funding options of a water line replacement project will depend on the size of the project. An annual replacement program should be funded by district revenue. Larger projects could be considered for grant and loan funding packages.

6.2 INTEGRATION OF MOTEL WELL AND BOOSTER STATION INTO SYSTEM

The district wishes to rehabilitate and bring online the decommissioned Mobile Home Estates (MHE) booster pump station, chlorine treatment system, and water storage tank. This infrastructure has not been in use for several years and would provide redundancy and resiliency for the district's system.

Bringing the MHE well, booster pump station, and chlorine disinfection system online would include replacement of the existing pump station with a quad-plex booster pump skid (four pumps) including variable frequency drives (VFD), a new well pump with VFD, and new control panels, disconnects, and interior building piping.

Also, it is recommended that the existing pump building be rehabilitated with new windows, doors, interior insulation, and concrete floor. Installation of the new pump skid would require a temporary building opening that would later be closed. The new system would be capable of providing water to the MHE service area without relying on the district's existing WTP.

Element has completed primary pump sizing to serve the MHE area considering both water system demand and firefighting flow. Preliminary design indicates that the quad-plex pump skid would include 1x Jockey Pump (150 gpm at 139-feet TDH), 2x Duty Pump (300 gpm at 139-feet TDH), and 1x High Service Pump (1,500 gpm at 139-feet TDH).

A new control system would turn the MHE well on and off based on the adjacent water storage tank level. Sodium hypochlorite would be flow paced based on the raw water production measured by a magnetic flow meter housed in the existing pump building.

To provide additional water to assist Well 17/18 in providing water to the district's service area, an additional pump could be added to the MHE pump station. This pump would move water from the MHE tank site to the Well 17/18 site. This would require a dedicated pump be added to the MHE system and yard piping modifications at both the MHE site and the Well 17/18 site.

Table 21 presents the estimated capital cost to install a new booster pump station at the MHE location. This also includes notes for estimated additional costs for a new pump integrating the MHE site to the Well 17/18 site.

Table 21: MHE Distribution, Storage and Treatment System Improvements Cost Estimate

CONSTRUCTION ITEMS					
ITEM	DESCRIPTION	QTY	UNIT	UNIT COST	SUBTOTAL
1	Constant Pressure Quad-Plex Booster Pump Skid (1 Jockey, 2 Duty, 1 High Service) and Controls	1	LS	$ 372,580	$ 372,580
2	Pump Building Interior Piping Modifications	1	LS	$ 24,050	$ 24,050
3	Building Modifications for Installation (Temporary and Repair)	1	LS	$ 11,050	$ 11,050
				Subtotal Construction Items	**$ 407,680**
Instrumentation, Controls, and Electrical					$ 25,000
Mobilization, Bonds, and Insurance (10% Subtotal Construction Items)					$ 40,768
Contractor Overhead and Profit (10% Subtotal Construction Items)					$ 40,768
				Total Construction Cost	**$ 514,216**
Contingency and Non-Construction Costs					
Construction Contingency (10% Total Construction Cost)					$ 51,422
Engineering, Surveying, and Bidding					$ 51,422
				Total Contingency and Non-Construction Costs	**$ 102,843**
				Total Project Cost	**$ 617,059**

Note: Quad-plex booster pump station includes VFDs for all new pumps, and a new VFD for the existing well pump. New control panel includes contacts and control logic to turn existing well pump on and off based on existing MHE water storage tank level.

1x Jockey Pump: 150 GPM at 139' TDH w/ VFD
2x Duty Pump: 300 gpm at 139' TDH w/ VFD
1x High Service Pump: 1,500 gpm at 139' TDH

Option 1: Remove High Service Pump - Deduct Estimated $65,000 from Line Item 1.
Option 2: Pump to Well 18 Site from MHE - Add Estimated $78,000 for Yard Piping Modifications and Estimated $52,000 for Pump Addition.
Engineering cost may vary depending on options selected.

6.3 INCREASE WATER TREATMENT FACILITY'S PUMPING CAPACITY

Two groundwater wells, Well 17 and Well 18, supply the raw water for the district. These wells are drilled into the San Luis Valley unconfined aquifer. The district first constructed Well 18 in 2002 in accordance with Well Permit Number 57623-F-R and later constructed Well 17 in 2012 with Well Permit Number 6051-R. Each well can operate in unison or separately and are both equipped with a 10 horsepower (HP) submersible pump. Historical pumping records show that Well 17 provides up to 230 gpm, while Well 18 provides up to 310 gpm. Both wells have a decreed production rate of 450 gpm and may be used for municipal, fire protection, irrigation, and domestic uses. The wells can operate both separately and in parallel.

Raw water from Well 17 and Well 18 is pumped directly into the raw water storage tank through an 8-inch pipe. The district's raw water storage tank was rehabilitated in 2011 and consists of an above ground 47,000-gallon concrete storage tank.

Raw water is pumped out of the raw water storage tank into the water treatment facility (WTF) utilizing a duplex booster station. The WTF has a permitted raw water pumping capacity of 648,000 gallons per day (gpd) (equal to 450 gpm), which is the maximum permitted pumping capacity allowed by the district's water rights. The booster pumps in the facility consist of two (2) vertical in-line multi-stage centrifugal pumps equipped with 50 horsepower (HP) motors. Both pumps have a pumping capacity of 238 gpm. Therefore, the firm capacity of the system is 342,000 gpd, which equals the pumping capacity with one booster pump out of service. The existing demand during peak day can exceed the existing firm capacity of the booster pumps.

To increase the water treatment facility's pumping capacity, replacement of the existing booster pumps with pumps rated at 450 gpm is proposed. This would increase the firm capacity of the WTP to equate to the permitted pumping capacity of the raw water wells. Table 22 presents the estimated capital cost

estimate to replace the existing booster pumps with two (2) 450 gpm pumps to increase the WTF's pumping capacity. This project will require the submittal of a Basis of Design Report to CDPHE for permitting and design approval.

Table 22: WTF Booster Pumps Replacement Cost Estimate

CONSTRUCTION ITEMS					
Item	**Description**	**Quantity**	**Units**	**Unit Price**	**Cost**
1	Water Treatment Facility Booster Pumps (450 gpm)	2	EA	$ 80,000	$ 160,000
2	Piping, Valves, and Appurtenances	1	LS	$ 20,000	$ 20,000
				Subtotal Construction Items	$ 180,000
Mobilization/Demobilization					$ 10,800
Electrical					$ 30,000
Intstrumentation and Controls					$ 30,000
				Subtotal Construction Items	$ 250,800
Contractor's OH&P and General Conditions					$ 37,620
Total Construction Costs					**$ 288,420**
NON-CONSTRUCTION ITEMS					
Contingency					$ 58,000
Engineering, Permitting, and Bidding					$ 58,000
Construction Administration					$ 15,000
Total Non-Construction Cost					**$ 131,000**
Total Project Cost					**$ 419,420**

6.4 WASTEWATER TREATMENT PLANT IMPROVEMENTS

The existing wastewater treatment plant needs to be considered for improvements. The main driver of upgrades is the influent organic loading limit that has been exceeded. The plant has been below the 80% influent organic threshold for most months over the previous three years, however there have been recent exceedances of the 80% threshold. Planning for a treatment plant expansion or replacement should begin immediately to ensure long term compliance.

The existing influent hydraulic rating of 0.15 MGD is appropriate for the plant. Future improvements should consider an influent BOD concentration of 400 mg/L, as appropriate based on influent testing data. Using a permitted hydraulic rating of 0.15 MGD and an influent BOD concentration of 400 mg/L, the proposed organic influent limit should be estimated at 500 lbs/day for planning purposes. The existing permitted influent organic limit is 300 lbs/day. To increase the organic limit to 500 lbs/day, a third train of the Fluidyne system would need to be constructed.

The existing system cannot be retrofitted as is, nor is a paper re-rating of the plant without physical improvements possible for the organic limit due to the constraints of the installed and operational system. Improvements are required to allow for an increase to the permitted organic limit.

Although the main driver for the need for improvements is the influent organic loading limit, the existing plant has numerous deficiencies, as outlined in Section 5.3.5, that need to be considered when formulating an improvements project. This includes the automation of WAS pumping, facility instrumentation and controls (SCADA), the SBR decanter, UV system redundancy, and headworks and secondary process building improvements. Facility rehabilitation must include replacement of the existing HVAC system in the headworks building, replacement of all electrical systems that are not rated as explosion proof, rehabilitating structural settling issues, installation of a new control system, addressing EQ basin access, addressing potential mold issues, addressing the lack of UV redundancy, and integration of WAS piping and pumping to the sludge pond and drying bed.

The estimated cost to complete an improvements project as outlined, including the construction of a third Fluidyne treatment train including decanters, blowers, WAS pumps, mixers, and an aeration grid, an expansion to the secondary treatment building to house the new train, and all other miscellaneous needed improvements listed above, is approximately $6,500,000 to $8,000,000. Further improvements to the facility are likely to be necessary in the next 10 years to meet future nutrient limits.

Because of the significant number of improvements needed at the existing plant, a complete replacement should also be considered as a viable alternative. This would also allow for consideration and construction of processes to meet future nutrient limits and ensure long term compliance. This option would include the decommissioning of most of the existing facility. The existing headworks building and processes could be considered for continued operation as these facilities are relatively new, but HVAC improvements to the building would be required. All other equipment should be decommissioned and replaced. To construct a new facility, the estimated cost is $9,000,000 to $12,000,000.

The district should determine if an improvements or replacement project is acceptable. Detailed cost estimates of the selected alternative can then be provided.

6.5 IMPROVEMENTS TIMELINE

Planning for a wastewater treatment plant improvements or replacement project should begin immediately. The timeline from the start of planning to commissioning and operation of an improved or new facility is approximately 3 to 4 years. This is the highest priority project for the district as well as the longest project timeline.

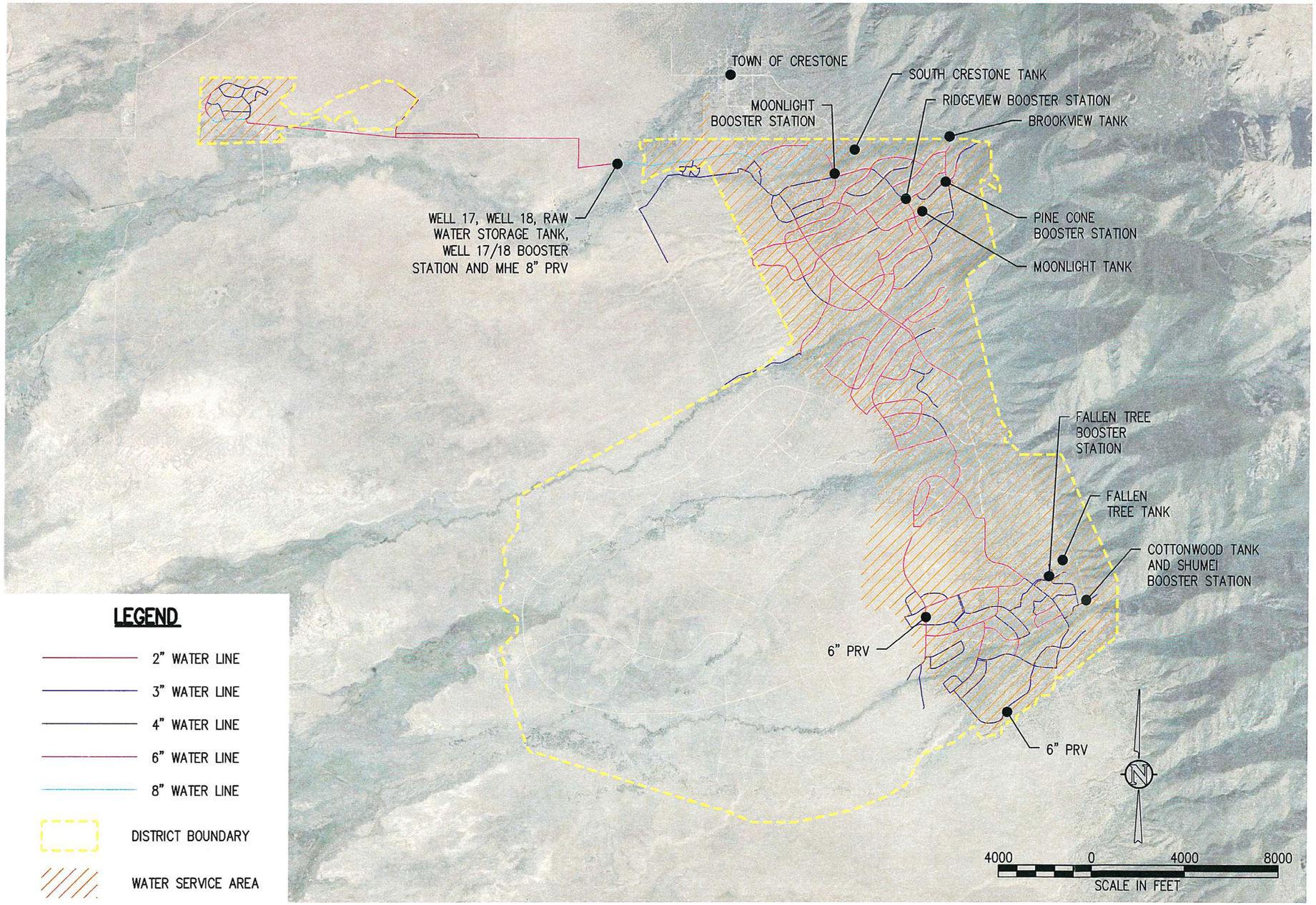
It is suggested that planning for the proposed water improvements begin approximately six months after the wastewater treatment plant improvements project planning begins. This is recommended in order to stagger the district's project, as the management of all proposed water and wastewater projects concurrently will likely exceed the time and resources that district staff can provide.

APPENDIX A

DISTRICT WATER AND WASTEWATER MAPS

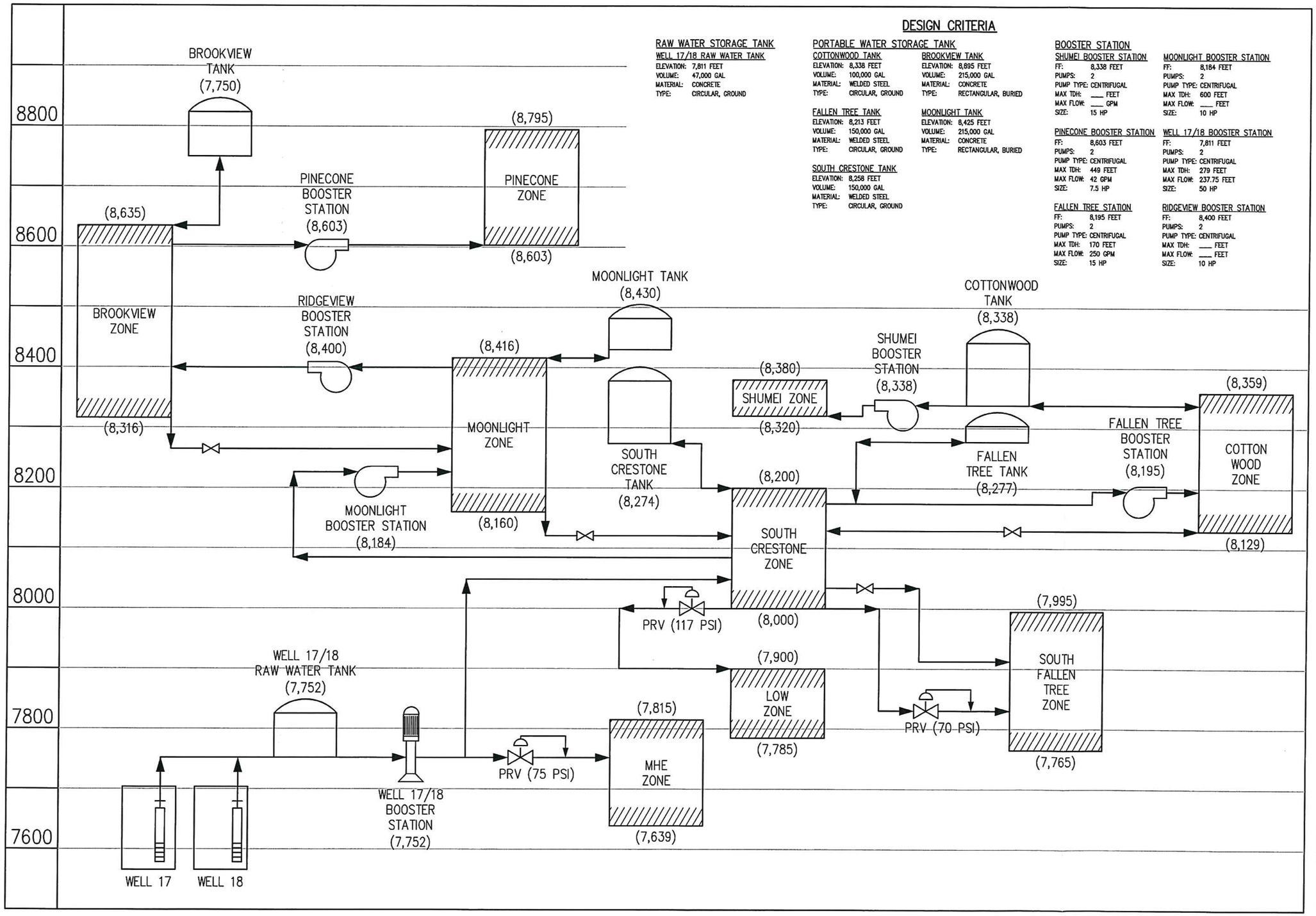
Baca Grande Water & Sanitation District

Water System Map



Baca Grande Water & Sanitation District

Water System Pressure Zones



DESIGN CRITERIA

RAW WATER STORAGE TANK

WELL 17/18 RAW WATER TANK
- ELEVATION: 7,811 FEET
- VOLUME: 47,000 GAL
- MATERIAL: CONCRETE
- TYPE: CIRCULAR, GROUND

PORTABLE WATER STORAGE TANK

COTTONWOOD TANK
- ELEVATION: 8,338 FEET
- VOLUME: 100,000 GAL
- MATERIAL: WELDED STEEL
- TYPE: CIRCULAR, GROUND

FALLEN TREE TANK
- ELEVATION: 8,213 FEET
- VOLUME: 150,000 GAL
- MATERIAL: WELDED STEEL
- TYPE: CIRCULAR, GROUND

SOUTH CRESTONE TANK
- ELEVATION: 8,258 FEET
- VOLUME: 150,000 GAL
- MATERIAL: WELDED STEEL
- TYPE: CIRCULAR, GROUND

BROOKVIEW TANK
- ELEVATION: 8,895 FEET
- VOLUME: 215,000 GAL
- MATERIAL: CONCRETE
- TYPE: RECTANGULAR, BURIED

MOONLIGHT TANK
- ELEVATION: 8,425 FEET
- VOLUME: 215,000 GAL
- MATERIAL: CONCRETE
- TYPE: RECTANGULAR, BURIED

BOOSTER STATION

SHUMEI BOOSTER STATION
- FF: 8,338 FEET
- PUMPS: 2
- PUMP TYPE: CENTRIFUGAL
- MAX TDH: ___ FEET
- MAX FLOW: ___ GPM
- SIZE: 15 HP

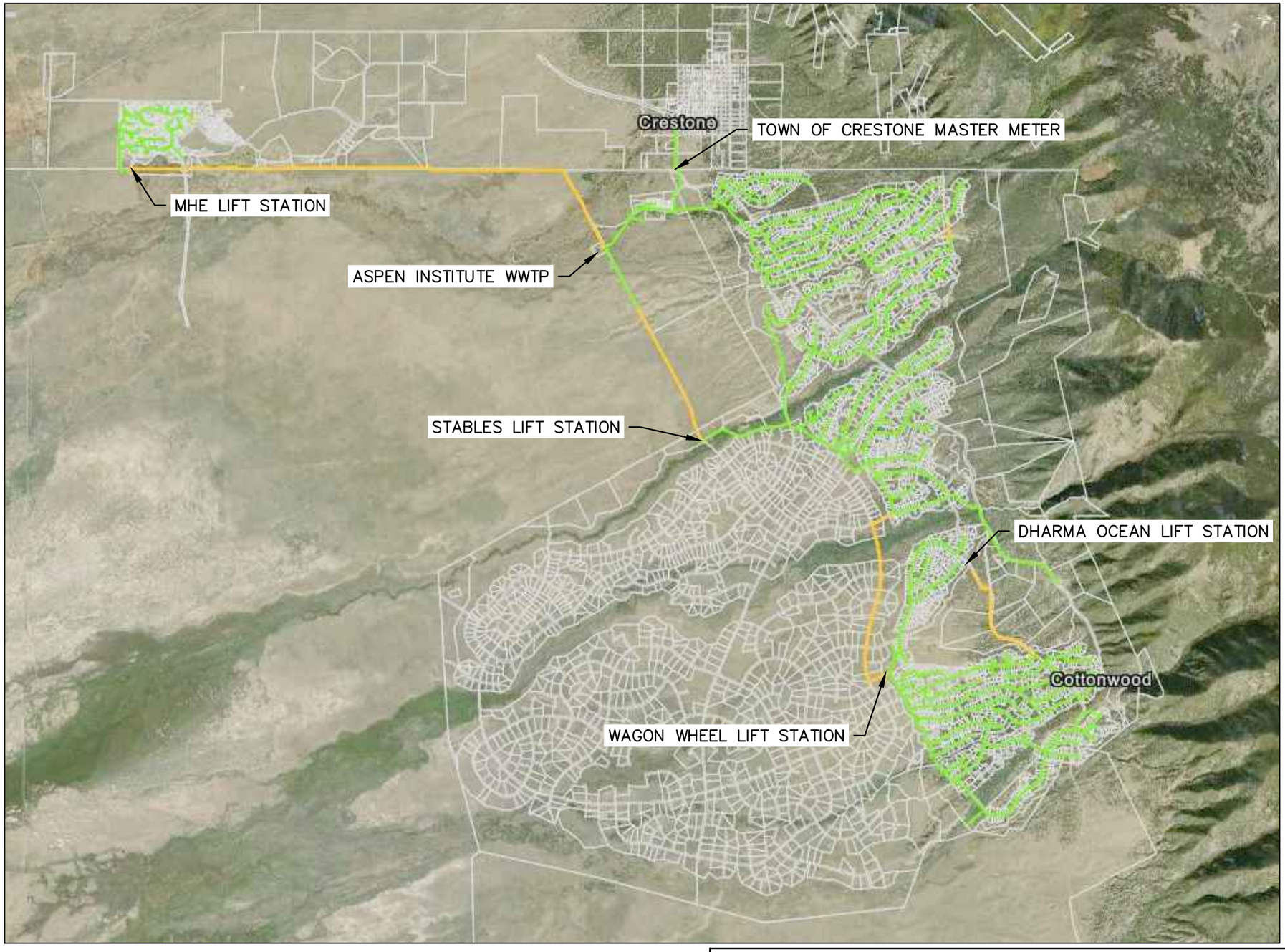
PINECONE BOOSTER STATION
- FF: 8,603 FEET
- PUMPS: 2
- PUMP TYPE: CENTRIFUGAL
- MAX TDH: 449 FEET
- MAX FLOW: 42 GPM
- SIZE: 7.5 HP

FALLEN TREE STATION
- FF: 8,195 FEET
- PUMPS: 2
- PUMP TYPE: CENTRIFUGAL
- MAX TDH: 170 FEET
- MAX FLOW: 250 GPM
- SIZE: 15 HP

MOONLIGHT BOOSTER STATION
- FF: 8,184 FEET
- PUMPS: 2
- PUMP TYPE: CENTRIFUGAL
- MAX TDH: 600 FEET
- MAX FLOW: ___ FEET
- SIZE: 10 HP

WELL 17/18 BOOSTER STATION
- FF: 7,811 FEET
- PUMPS: 2
- PUMP TYPE: CENTRIFUGAL
- MAX TDH: 279 FEET
- MAX FLOW: 237.75 FEET
- SIZE: 50 HP

RIDGEVIEW BOOSTER STATION
- FF: 8,400 FEET
- PUMPS: 2
- PUMP TYPE: CENTRIFUGAL
- MAX TDH: ___ FEET
- MAX FLOW: ___ FEET
- SIZE: 10 HP



N

FORCE MAIN

GRAVITY SEWER

BACA GRANDE – EXISTING WW COLLECTION

ELEMENT ENGINEERING LLC
12687 W. CEDAR DRIVE, SUITE 300
LAKEWOOD, CO 80228
720.749.4165
WWW.ELEMENTENGINEERING.NET

DATE
JANUARY 2021

JOB NUMBER
0098.0004

SCALE
NTS

APPENDIX B

CDPS DISCHARGE PERMIT AND FACT SHEET

STATE OF COLORADO

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
Water Quality Control Division

AUTHORIZATION TO DISCHARGE UNDER THE
COLORADO DISCHARGE PERMIT SYSTEM
PERMIT NUMBER CO0046914

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

Baca Grande Water and Sanitation District

is authorized to discharge from the facility's wastewater treatment plant located **County Road 70502, Crestone, CO 81131; at 37.980003° N and 105.712537° W**

to **Unnamed dry wash tributary to South Crestone Creek**

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 permittee may request an adjudicatory hearing within thirty (30) calendar days of the date of issuance of the final permit determination, under 5 CCR 1002-61 (Colorado Discharge Permit System Regulations), Regulation 61.7. Any request must comply with the Water Quality Control Act, 24-4-101, C.R.S., et seq. and the Water Quality Control Commission's regulations, including Regulation 61.7 and 5 CCR 1002-21 (Procedural Rules), Regulation 21.4(B). Failure to contest any term and condition of the permit in this request for an adjudicatory hearing constitutes consent to the condition by the permittee.

This permit and the authorization to discharge shall expire at midnight, November 30, 2024

Issued and Signed this 31st day of October, 2019

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Meg Parish

Meg Parish, Permits Section Manager
Water Quality Control Division

Signed and Issued October 31, 2019; Effective date December 1, 2019

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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):

001, following disinfection and prior to mixing with the receiving stream; 37.980003° N, 105.712537° W

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 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 effluent and influent flows will be used to monitor compliance with the effluent flow limitation and the hydraulic loading to the plant.

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). Sampling must be conducted in accordance with Part I.B.6.

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)	0.15		Report		Continuous	Recorder
00400	pH (su)			6.5-9.0		2 Days/Month	Grab
51040	*E. coli* (#/100 ml)	64	128			Monthly	Grab
50060	TRC (mg/l)	0.011		0.019		Weekly	Grab
00610	Total Ammonia as N (mg/l)					Monthly	Composite
	January	5.0		28		Monthly	Composite
	February	4.1		27		Monthly	Composite
	March	4.4		24		Monthly	Composite
	April	3.9		26		Monthly	Composite
	May	3.3		32		Monthly	Composite
	June	3.4		37		Monthly	Composite
	July	3.0		32		Monthly	Composite
	August	2.2		32		Monthly	Composite
	September	2.6		30		Monthly	Composite
	October	2.5		30		Monthly	Composite
	November	3.8		29		Monthly	Composite
	December	4.0		27		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		Weekly	Visual
03582	Oil and Grease (mg/l)			10		Contingent	Grab

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	Recorder
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

[1] The % capacity is to be reported against the listed capacities of 0.15 MGD for the hydraulic capacity and 300 lbs. for the organic capacities as noted in Site Approval 4687. The percentage should be calculated using the 30-day average values divided by the corresponding capacity, times 100.

B. **TERMS AND CONDITIONS**

1. Service Area

All wastewater flows contributed in the service area may be accepted by the Baca Grande Water and Sanitation District 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 **4687**, the design capacity of this domestic wastewater treatment works is **0.15 million gallons per day** (MGD) for hydraulic flow (30-day average) and **300 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, a significant 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 NPDES discharge permit to require the Permittee to develop and submit an approvable Pretreatment program under a compliance schedule, in accordance with procedures in 40 CFR 403.8(e). The modification of a POTW's NPDES Permit for the purposes of incorporating a POTW Pretreatment Program approved in accordance with the procedure in §403.11 shall be deemed a minor Permit modification subject to the procedures in 40 CFR 122.63(g); or,;

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. “Applicable water quality criterion (AWQC)” is the quantitation target level or goal. The AWQC may be one of the following:

Where an effluent limit has been established,
i. The AWQC is the effluent limit.

Where an effluent limit has not been established, the AWQC may be
i. An applicable technology based effluent limit (TBEL);
ii. Half of a water quality standard;
iii. Half of a water quality standard as assessed in the receiving water, or potential WQBEL; or

iv. Half of a potential antidegradation based effluent limitation, which can be an antidegradation based average concentration or a potential non-impact limit.

4. "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.

5. "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).

6. "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.

7. "Daily Maximum limitation" for all parameters (except temperature, pH, dissolved oxygen, and WET) 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. For WET, this means an 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. For WET, DMRs shall include the minimum of all instantaneous values within the reporting period. For pH and dissolved oxygen, the 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. For WET violation and failure descriptions, see Part I.B.5.

8. "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.

   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.

9. "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.

10. "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. <u>If the sampling frequency is monthly or less frequent:</u> 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.

<u>If the sampling frequency is more frequent than monthly:</u> 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.

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

12. “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.

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

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

15. “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.

16. “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

17. "Minimum level (ML)" means the lowest concentration of an analyte that can be accurately and precisely quantified using a given method, as determined by the laboratory.

18. "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.

19. "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.

20. "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.

21. "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.

22. "Recorder" requires the continuous operation of an automatic data retention device for providing required records such as a data logger, a chart and/or totalizer (or drinking water rotor meters or pump hour meters where previously approved.)

23. 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:

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

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.

24. "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).**

25. "Sufficiently sensitive test procedures":

    i. An analytical method is ''sufficiently sensitive'' when the method detects and accurately and precisely quantifies the amount of the analyte. In other words there is a valid positive result; or
    ii. An analytical method is "sufficiently sensitive" when the method accurately and precisely quantifies the result to the AWQC, as demonstrated by the ML is less than or equal to the AWQC. In other words, the level of precision is adequate to inform decision making; or
    iii. An analytical method is "sufficiently sensitive" when the method achieves the required level of accuracy and precision, as demonstrated by the ML is less than or equal to the PQL. In other words, the most sensitive method is being used and properly followed.

26. "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).**

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

28. "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).**

29. "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.

30. "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.

31. 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.

32. "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.

33. "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.

34. "Two (2) -Year Rolling Average" (Antidegradation limits)- the average of all monthly average data collected in a two year period. Reporting of two-year rolling average results should begin in the first DMR due once the reporting requirements has been in place for a two year period. 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 as long as the two year rolling average reporting and/or effluent limit applies (i.e., 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). Ongoing reporting is required across permit terms when data is available for a two year period.

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

36. "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. PERMIT SPECIFIC 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 via the division's NetDMR service unless a waiver is granted in compliance with 40 CFR 127. If a waiver is granted, monitoring results shall be reported on division approved discharge monitoring report (DMR) forms (EPA form 3320-1).

Reporting No Discharge:

If no discharge occurs during the reporting period, a DMR must still be submitted. However, "No Discharge" shall be reported on the paper DMR and if reporting electronically please use the No Data Code (NODI) "C" for No Discharge in NetDMR.

When submitting monitoring results via NetDMR, the Copy of Record shall reflect that the DMR was signed and submitted no later than the 28th day of the month following the reporting period. If submitting DMRs by mail, which is only allowed if a waiver has been granted, one copy of the DMR form shall be mailed to the division at the address provided below, so that the DMR is received no later than the 28th day of the month following the reporting period.

If mailing, the original signed copy of each 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 paper and electronic forms shall be filled out accurately and completely in accordance with the requirements of this permit and the instructions on the forms; and signed by an authorized person as identified in Part II.K.1.

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 electronically or to the following address if any one of below conditions applies to this facility:

1. design flow rate is equal to or greater than one million gallons per day,
2. serves 10,000 people or more, or
3. is required to have an approved pretreatment program.

EPA BIOSOLIDS CENTER
EPA REGION 7
WWPD/WENF
11201 RENNER BOULEVARD
LENEXA, KANSAS 66219

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.

The permittee may use an equivalent and acceptable alternative to an EPA-approved method without EPA review where the requirements of 40 CFR Part 136.6 are met and documented. The permittee may use an Alternative Test Procedure (ATP). An ATP is defined as a way in which an analyte is identified and quantified that is reviewed and approved by EPA in accordance with 40 CFR Part 136.4 for nationwide use, or a modification to a 40 CFR 136 approved method that is reviewed and approved by EPA in accordance with 40 CFR Part 136.5 for limited use.

a. The permittee must select a test procedure that is “sufficiently sensitive” for all monitoring conducted in accordance with this permit.

b. The PQLs for specific parameters are listed in the table below.

c. 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 final numeric effluent limit shall be considered the AWQC for the purpose of determining whether a test method is sufficiently sensitive.

d. When the analytical method which complies with the above requirements has an ML greater than the permit limit, and the permittee’s analytical result is less than the ML, the permittee shall report "BDL" on the DMR. Such reports will not be considered as violations of the permit limit, as long as the method is sufficiently sensitive. For parameters that have a report only limitation, and the permittee’s analytical result is less than the ML, (where X = the ML) “< X” shall be reported on the DMR.

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

   If all individual analytical results are less than the ML, the permittee shall report either “BDL” or “<X” (where X = the ML), following the guidance above.

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

Table Practical quantitation limits – Metals, inorganics, nutrients, radiological parameters, and nonylphenol

Parameter	Reporting Units	PQL	Parameter	Reporting Units	PQL
Aluminum	µg/L[1]	15	Ammonia Nitrogen	mg/L[2] N	0.2
Antimony	µg/L	2	Nitrate+Nitrite Nitrogen	mg/L N	0.1
Arsenic	µg/L	1	Nitrate Nitrogen	mg/L N	0.1
Barium	µg/L	1	Nitrite Nitrogen	mg/L N	0.05
Beryllium	µg/L	2	Total Kjeldahl Nitrogen	mg/L N	0.5
Boron	µg/L	20	Total Nitrogen	mg/L N	0.5
Cadmium	µg/L	0.5	Total Inorganic Nitrogen	mg/L N	0.2
Calcium	µg/L	120	Phosphorus	mg/L P	0.05[3]
Chromium	µg/L	20	BOD/CBOD	mg/L	2
Chromium, Trivalent	µg/L	---	Chloride	mg/L	2
Chromium, Hexavalent	µg/L	20[3, 4]	Total Residual Chlorine, DPD	mg/L	0.5
Copper	µg/L	2	Total Residual Chlorine, Amperiometric	mg/L	0.05
Iron	µg/L	20[3]	Cyanide	µg/L	10[3]
Lead	µg/L	0.5	Fluoride	mg/L	0.5
Magnesium	µg/L	35	Phenols	µg/L	30
Manganese	µg/L	2	Sulfate	mg/L	2
Mercury	µg/L	0.2[3]	Sulfide	mg/L H_2S	0.1
Mercury, Low Level	µg/L	0.002	Total Dissolved Solids (TDS)	mg/L	10
Molybdenum	µg/L	0.5	Total Suspended Solids (TSS)	mg/L	5
Nickel	µg/L	1	Radium-226	pCi/L	1
Selenium	µg/ L	1[3]	Radium-228	pCi/L	1
Silver	µg/ L	0.5	Uranium	µg/ L	1
Sodium	µg/ L	150	Nonylphenol, ASTM D7065	µg/ L	10
Thallium	µg/ L	0.5			
Zinc	µg/ L	10			

[1] µg/L = micrograms per liter
[2] mg/L = milligrams per liter
[3] PQL established based on parameter specific evaluation
[4] For hexavalent chromium, samples must be unacidified so dissolved concentrations will be measured rather than potentially dissolved concentrations.

6. 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.

PART II

Part II contains standard conditions required by federal regulation to be included in all NPDES permits (see 40 C.F.R. 122.41). Part I contains permit specific requirements. To the extent that Part I conflicts with the standard terms and conditions of Part II, the requirements of Part I shall control.

A. DUTY TO COMPLY

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Colorado Water Quality Control Act and is grounds for: 1) enforcement action; 2) permit termination, revocation and reissuance, or modification; or 3) denial of a permit renewal application.
2. Federal Enforcement:
    a. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal (see 40 CFR 122.2) established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
    b. The Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The Clean Water Act provides that any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
    c. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

B. DUTY TO REAPPLY

If the permittee plans to continue an activity regulated by this permit after the expiration date of this permit, the permittee must submit a permit application at least 180 days before this permit expires as required by Regulations 61.4 and 61.10.

C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce

the permitted activity in order to maintain compliance with the conditions of this permit.

D. DUTY TO MITIGATE

The permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. PROPER OPERATION AND MAINTENANCE

The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit. See 40 C.F.R. §122.41(e).

F. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. Any request for modification, revocation, reissuance, or termination under this permit must comply with all terms and conditions of Regulation 61.8(8). See also 40 C.F.R. § 122.41(f).

G. PROPERTY RIGHTS

In accordance with 40 CFR §122.41(g) and Regulation 61.8(9):

1. 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.
2. 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.
3. Except for any toxic effluent standard or prohibition imposed under Section 307 of the Clean Water 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 Clean Water 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. See 61.8(9)(c).

H. 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 in accordance with 40 C.F.R. §122.41(h) and/or Regulation 61.8(3)(q).

I. INSPECTION AND ENTRY

The permittee shall allow the Division and the authorized representative, including U.S. EPA, and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials as required by law, to conduct inspections in accordance with 40 C.F.R. §122.41(i), Regulation 61.8(3), and Regulation 61.8(4):

1. To enter upon the permittee's premises where a regulated facility or activity is located or conducted in which any records are required to be kept under the terms and conditions of this permit;
2. 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 facilities, equipment (including monitoring and control equipment), practices, operations or monitoring method regulated or required in the permit;
3. To enter upon the permittee's premises in a reasonable manner and at a reasonable time to inspect or investigate, any actual, suspected, or potential source of water pollution, or to ascertain compliance or noncompliance with the Colorado Water Quality Control Act or any other applicable state or federal statute or regulation or any order promulgated by the Division, and;
4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

J. MONITORING AND RECORDS

1. Samples and measurements taken for the purpose of monitoring must be representative of the volume and nature of the monitored activity. See 40 C.F.R. § 122.41(j)(1).
2. Monitoring must be conducted according to test procedures approved under 40 C.F.R. part 136 for the analyses of pollutants unless another method is required under 40 C.F.R. subchapters N or O. In the case of pollutants for which there are no approved methods under 40 C.F.R. part 136 or otherwise required under 40 C.F.R. subchapters N or O, monitoring must be conducted according to a test procedure specified in this permit for such pollutants. See 40 C.F.R. § 122.41(j)(4); 122.44(i)(1)(iv)(A).
3. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. 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.
4. Records of monitoring information must include:
    a. The date, exact place, and time of sampling or measurements;
    b. The individual(s) who performed the sampling or measurements;
    c. The date(s) analyses were performed
    d. The individual(s) who performed the analyses;
    e. The analytical techniques or methods used; and
    f. The results of such analyses.
5. The permittee shall install, calibrate, use and maintain monitoring methods and equipment, including biological and indicated pollutant monitoring methods. See Regulation 61.8(4)(b)(iii). All sampling shall be performed by the permittee according to sufficiently sensitive test procedures required by 40 C.F.R. 122.44(i)(1)(iv) or methods approved by the Division, in the absence of a method specified in or approved pursuant to 40 C.F.R. Part 136.
6. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

K. SIGNATORY REQUIREMENTS

1. Authorization to Sign: All documents required to be submitted to the Division by the permit must be signed in accordance with 40 CFR §122.22, Regulation 61.4, and the following criteria:
    a. For a corporation: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
    b. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or
    c. For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief or principal executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency. (e.g., Regional Administrator of EPA). For purposes of this section, a principal executive officer has responsibility for the overall operation of the facility from which the discharge originates.
    d. By a duly authorized representative in accordance with 40 C.F.R. 122.22(b), only if:
        i. the authorization is made in writing by a person described in Part II.K.1.a, b, or c above;
        ii. 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,
        iii. The written authorization is submitted to the Division.

2. Any person(s) signing documents required for submittal to the Division must make the following certification:
    "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."

3. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both. See 40 C.F.R. §122.41(k)(2).

L. REPORTING REQUIREMENTS

1. Planned Changes: The permittee shall give advance notice to the Division, in writing, of any planned physical alterations or additions to the permitted facility in accordance with 40 CFR §122.41(l) and Regulation 61.8(5)(a) and Part II.O. of this permit. Notice is required only when:
    a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR §122.29(b); or

b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR §122.41(a)(1).
c. 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 during the permit application process or not reported pursuant to an approved land application plan. See 40 C.F.R. §122.41(l)(1)(iii).

2. Anticipated Non-Compliance: 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. The timing of notification requirements differs based on the type of non-compliance as described below.
3. 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. This permit is not transferable to any person except after notice to the Division. The Division may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. See Regulation 61.8(6); 40 C.F.R. §§ 122.41(l)(iii) and 122.61.
4. Monitoring reports: Monitoring results must be reported at the intervals specified in this permit.
    a. If the permittee monitors any pollutant at the approved monitoring locations listed in Part I more frequently than that required by this permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Division. See 40 CFR 122.41(l)(4).
    b. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Division in the permit.
5. Submission of Discharge Monitoring Reports (DMRs): DMRs shall be submitted electronically through NetDMR system unless the permittee requests and is granted a waiver of the electronic reporting requirement by the Division pursuant to Regulation 61.8(4)(d).
6. Compliance Schedules: 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.
7. Twenty-four hour reporting:
    a. In addition to the reports required elsewhere in this permit, 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 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; or
        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.
    b. The report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

c. For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports must include the data described above (with the exception of time of discovery) as well as the type of event (combined sewer overflows, sanitary sewer overflows, or bypass events), type of sewer overflow structure (e.g., manhole, combine sewer overflow outfall), discharge volumes untreated by the treatment works treating domestic sewage, types of human health and environmental impacts of the sewer overflow event, and whether the noncompliance was related to wet weather. See 40 CFR 122.41(l)(6)(i).
   i. As of December 21, 2020 all reports related to combined sewer overflows, sanitary sewer overflows, or bypass events submitted in compliance with this section must be submitted electronically by the permittee to the Director or initial recipient, as defined in 40 CFR 127.2(b), in compliance with 40 CFR part 3 (including, in all cases, subpart D to part 3), § 122.22, and 40 CFR part 127. See 40 CFR 122.41(l)(6)(i).

8. Other non-compliance: A permittee must report all instances of noncompliance at the time monitoring reports are due. These reports may be submitted annually in accordance with Regulation 61.8(4)(p) and/or 61.8(5)(f), but may be submitted at a more frequent interval.

M. BYPASS

1. Definitions:
   a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility in accordance with 40 CFR §122.41(m)(1)(i) and/or Regulation 61.2(12).
   b. Severe property damage means substantial physical damage to property, 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. See 40 CFR §122.41(m)(1)(ii).
2. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of 40 CFR 122.41(m)(3) and (m)(4). See 40 CFR §122.41(m)(2).
3. Notice of bypass:
   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, the permittee shall submit prior notice, if possible, at least ten (10) days before the date of the bypass. See 40 CFR §122.41(m)(3)(i) and/or Regulation 61.9(5)(c).
   b. Unanticipated bypass. You must submit notice of an unanticipated bypass as required in Part II.L.7. See also 40 CFR §122.41(m)(3)(ii).
4. Prohibition of Bypass: Bypasses are prohibited and the Division may take enforcement action against the permittee for bypass, unless:
   a. the bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;
   b. There were no feasible alternatives to the 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 backup 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
   c. Proper notices were submitted to the Division.
      i. The Division may approve an anticipated bypass, after considering its adverse effects, if the Division determines that it will meet the three conditions listed.

N. UPSET

1. Definition: "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based 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.
See 40 CFR §122.41(n) and Regulation 61.2(114),

2. Effect of an upset: An upset constitutes an affirmative defense to an action brought for noncompliance with permit effluent limitations if the requirements of section 3 are met. A determination made during administrative review of claims that noncompliance was caused by upset is final administrative action subject to judicial review in accordance with Regulation 61.8(3)(j).

   ***special note:** this provision is consistent with the definition of "Upset" as codified in Regulation 61.2(114). However, the Colorado regulatory definition of upset is less stringent than the federal code of regulations, which restricts the use of an upset defense to noncompliance with technology-based permit effluent limitations only. Colorado's regulatory definition of bypass is less stringent than the requirements of the federal Clean Water Act.*

3. Conditions necessary for demonstration of an 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:
   a. an upset occurred and the permittee can identify the cause(s) of the upset;
   b. the permitted facility was at the time being properly maintained; and
   c. the permittee submitted notice of the upset as required in Part II.L.7 (24-hour notice); and
   d. 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 reasonable likelihood of adversely affecting human health or the environment. See also 40 C.F.R. 122.41(n)(3)(i)-(iv).

   ***special note:** this provision is consistent with the definition of "Conditions necessary for demonstration of upset" as codified in Regulation 61.8(3)(j)(ii). However, the Colorado regulatory definition of upset is less stringent than the federal code of regulations, which restricts the use of an upset defense to demonstrate that a facility was properly operated and maintained. Colorado's regulatory definition of "Conditions necessary for demonstration of upset" is less stringent than the requirements of the federal Clean Water Act.*

4. 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.
5. Burden of Proof: In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

O. REOPENER CLAUSE

Procedures for modification or revocation. Permit modification or revocation of this permit or coverage under this permit will be conducted according to Regulation 61.8(8). This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one of the following events occurs, including but not limited to:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.
2. Wasteload Allocation: A wasteload allocation is developed and approved by the State of Colorado and/or EPA for incorporation in this permit.
3. Discharger-specific variance: A variance is adopted by the Water Quality Control Commission.

P. OTHER INFORMATION

When 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 or U.S. EPA, the Discharger shall promptly submit such facts or information. See 40 C.F.R. § 122.41(l)(8).

Q. SEVERABILITY

The provisions of this permit are severable. If any provisions or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances and the application of the remainder of this permit shall not be affected.

R. NOTIFICATION REQUIREMENTS

1. Notification to Parties: All notification requirements shall be directed as follows:
   a. Oral Notifications, during normal business hours shall be to:

      CDPHE-Emergency Reporting Line: 1-877-518-5608; or

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

      After hours notifications should be made to the CDPHE-Emergency Reporting Line: 1-877-518-5608.

   b. Written notification shall be to:
      Water Quality Protection Section – 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

S. RESPONSIBILITIES

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. 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.

T. OIL AND HAZARDOUS SUBSTANCES LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under Section 311 (Oil and Hazardous Substance Liability) of the Clean Water Act.

U. EMERGENCY POWERS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority granted by Section 510 of the Clean Water Act. Nothing in this permit shall be construed to prevent or limit application of any emergency power of the Division.

V. CONFIDENTIALITY

Any information relating to any secret process, method of manufacture or production, or sales or marketing data which has been declared confidential by the permittee, and which may be acquired, ascertained, or discovered, whether in any sampling investigation, emergency investigation, Colorado Open Records Act (CORA) request, or otherwise, shall not be publicly disclosed by any member, officer, or employee of the Water Quality Control Commission or the Division, but shall be kept confidential. Any person seeking to invoke the protection of this section shall bear the burden of proving its applicability. This section shall never be interpreted as preventing full disclosure of effluent data.

W. FEES

The permittee is required to submit payment of an annual fee as set forth in the 2016 amendments to the Water Quality Control Act. Section 25-8-502 (1.1) (b), and the Regulation 61.15 as amended. Failure to submit the required fee when due and payable is a violation of the permit and will result in enforcement action pursuant to Section 25-8-601 et. seq., C.R.S.1973 as amended.

X. DURATION OF PERMIT

The duration of a permit shall be for a fixed term and shall not exceed five (5) years. If the permittee desires to continue to discharge, a permit renewal application shall be submitted at least one hundred eighty (180) calendar days before this permit expires. Filing of a timely and complete application shall cause the expired permit to continue in force to the effective date of the new permit. The permit's duration may be extended only through administrative extensions and not through interim modifications. If the permittee anticipates there will be no discharge after the expiration date of this permit, the Division should be promptly notified so that it can terminate the permit in accordance with Regulation 61.

Y. 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 Clean Water 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.

PART III

Table I—Testing Requirements for Organic Toxic Pollutants by Industrial Category for Existing Dischargers

Industry Category	
Adhesives and sealants	Ore mining
Aluminum forming	Organic chemicals manufacturing
Auto and other laundries	Paint and ink formulation
Battery manufacturing	Pesticides
Coal mining	Petroleum refining
Coil coating	Pharmaceutical preparations
Copper forming	Photographic equipment and supplies
Electrical and electronic components	Plastics processing
Electroplating	Plastic and synthetic materials manufacturing
Explosives manufacturing	Porcelain enameling
Foundries	Printing and publishing
Gum and wood chemicals	Pulp and paper mills
Inorganic chemicals manufacturing	Rubber processing
Iron and steel manufacturing	Soap and detergent manufacturing
Leather tanning and finishing	Steam electric power plants
Mechanical products manufacturing	Textile mills
Nonferrous metals manufacturing	Timber products processing

Table II—Organic Toxic Pollutants in Each of Four Fractions in Analysis by Gas Chromatography/Mass

Volatiles	Acid Compounds	Base/Neutral	Pesticides
1V acrolein	1A 2-chlorophenol	1B acenaphthene	1P aldrin
2V acrylonitrile	2A 2,4-dichlorophenol	2B acenaphthylene	2P alpha-BHC
3V benzene	3A 2,4-dimethylphenol	3B anthracene	3P beta-BHC
5V bromoform	4A 4,6-dinitro-o-cresol	4B benzidine	4P gamma-BHC
6V carbon tetrachloride	5A 2,4-dinitrophenol	5B benzo(a)anthracene	5P delta-BHC
7V chlorobenzene	6A 2-nitrophenol	6B benzo(a)pyrene	6P chlordane
8V chlorodibromomethane	7A 4-nitrophenol	7B 3,4-benzofluoranthene	7P 4,4′-DDT
9V chloroethane	8A p-chloro-m-cresol	8B benzo(ghi)perylene	8P 4,4′-DDE
10V 2-chloroethylvinyl ether	9A pentachlorophenol	9B benzo(k)fluoranthene	9P 4,4′-DDD
11V chloroform	10A phenol	10B bis(2-chloroethoxy)methane	10P dieldrin
12V dichlorobromomethane	11A 2,4,6-trichlorophenol	11B bis(2-chloroethyl)ether	11P alpha-endosulfan
14V 1,1-dichloroethane		12B bis(2-chloroisopropyl)ether	12P beta-endosulfan
15V 1,2-dichloroethane		13B bis (2-ethylhexyl)phthalate	13P endosulfan sulfate
16V 1,1-dichloroethylene		14B 4-bromophenyl phenyl ether	14P endrin
17V 1,2-dichloropropane		15B butylbenzyl phthalate	15P endrin aldehyde
18V 1,3-dichloropropylene		16B 2-chloronaphthalene	16P heptachlor
19V ethylbenzene		17B 4-chlorophenyl phenyl ether	17P heptachlor epoxide
20V methyl bromide		18B chrysene	18P PCB-1242
21V methyl chloride		19B dibenzo(a,h)anthracene	19P PCB-1254
22V methylene chloride		20B 1,2-dichlorobenzene	20P PCB-1221
23V 1,1,2,2-tetrachloroethane		21B 1,3-dichlorobenzene	21P PCB-1232
24V tetrachloroethylene		22B 1,4-dichlorobenzene	22P PCB-1248
25V toluene		23B 3,3′-dichlorobenzidine	23P PCB-1260
26V 1,2-trans-dichloroethylene		24B diethyl phthalate	24P PCB-1016
27V 1,1,1-trichloroethane		25B dimethyl phthalate	25P toxaphene
28V 1,1,2-trichloroethane		26B di-n-butyl phthalate	
29V trichloroethylene		27B 2,4-dinitrotoluene	
31V vinyl chloride		28B 2,6-dinitrotoluene	
		29B di-n-octyl phthalate	
		30B 1,2-diphenylhydrazine (as azobenzene)	
		31B fluroranthene	
		32B fluorene	
		33B hexachlorobenzene	
		34B hexachlorobutadiene	
		35B hexachlorocyclopentadiene	
		36B hexachloroethane	
		37B indeno(1,2,3-cd)pyrene	
		38B isophorone	
		39B napthalene	
		40B nitrobenzene	
		41B N-nitrosodimethylamine	
		42B N-nitrosodi-n-propylamine	
		43B N-nitrosodiphenylamine	
		44B phenanthrene	
		45B pyrene	
		46B 1,2,4-trichlorobenzene	

Table III—Other Toxic Pollutants (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

Table IV—Conventional and Nonconventional Pollutants Required To Be Tested by Existing Dischargers if Expected to be Present

Bromide
Chlorine, Total Residual
Color
Fecal Coliform
Fluoride
Nitrate-Nitrite
Nitrogen, Total Organic
Oil and Grease
Phosphorus, Total
Radioactivity
Sulfate
Sulfide
Sulfite
Surfactants
Aluminum, Total
Barium, Total
Boron, Total
Cobalt, Total
Iron, Total
Magnesium, Total
Molybdenum, Total
Manganese, Total
Tin, Total
Titanium, Total

Table V—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
Dintrobenzene
Diquat
Disulfoton
Diuron
Epichlorohydrin
Ethion
Ethylene diamine
Ethylene dibromide
Formaldehyde
Furfural
Guthion
Isoprene
Isopropanolamine Dodecylbenzenesulfonate
Kelthane
Kepone
Malathion
Mercaptodimethur
Methoxychlor
Methyl mercaptan
Methyl methacrylate
Methyl parathion
Mevinphos
Mexacarbate
Monoethyl amine
Monomethyl amine
Naled
Napthenic acid
Nitrotoluene
Parathion
Phenolsulfanate
Phosgene
Propargite
Propylene oxide
Pyrethrins
Quinoline
Resorcinol
Strontium
Strychnine
Styrene
2,4,5-T (2,4,5-Trichlorophenoxy acetic acid)
TDE (Tetrachlorodiphenylethane)
2,4,5-TP [2-(2,4,5-Trichlorophenoxy) propanoic acid]
Trichlorofan
Triethanolamine dodecylbenzenesulfonate
Triethylamine
Trimethylamine
Uranium
Vanadium
Vinyl acetate
Xylene
Xylenol
Zirconium

COLORADO
Department of Public Health & Environment

Colorado Discharge Permit System (CDPS)
Fact Sheet to Permit Number CO0046914
BACA GRANDE AND SANITATION DISTRICT, ASPEN INSTITUTE WWTF, SAGUACHE COUNTY

Nathan Bradley
October 31, 2019

TABLE OF CONTENTS

I. TYPE OF PERMIT

A. Permit Type: Renewal

B. Discharge To: Surface Water

II. FACILITY INFORMATION

A. SIC Code: 4952 Sewerage Systems

B. Facility Location: County Road 70502, Crestone, CO 81131,
Latitude: 37.980003° W, Longitude: 105.712537° N

C. Permitted Feature: Outfall 001A, 37.980003° N, 105.712537° N

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.

D. Facility Flows: 0.15 MGD

E. Major Changes From Last Renewal:

4300 Cherry Creek Drive S., Denver, CO 80246-1530 P 303-692-2000 www.colorado.gov/cdphe/wqcd

- New numeric limitations for Daily Maximum Total Ammonia concentrations for the months of January, February, March, April, June, July, August, September, October, November and December.

III. RECEIVING STREAM

A. Waterbody Identification: CORGCB03, Unnamed dry wash tributary to South Crestone Creek

B. Water Quality Assessment:

An assessment of the stream standards, low flow data, and ambient stream data has been performed to determine the assimilative capacities for Unnamed dry was tributary to South Crestone Creek for potential pollutants of concern. This information, which is contained in the Water Quality Assessment (WQA) for this receiving stream(s), also includes an antidegradation review, where appropriate. The Division's Permits Section has reviewed the assimilative capacities to determine the appropriate water quality-based effluent limitations as well as potential limits based on the antidegradation evaluation, where applicable. The limitations based on the assessment and other evaluations conducted as part of this fact sheet can be found in Part I.A of the permit.

Permitted Feature 001A will be the authorized discharge point to the receiving stream.

IV. FACILITY DESCRIPTION

A. Collection System

The permittee operates a separate sewer system that conveys wastewater to the WWTF. Infiltration and inflow (I/I) into the collection system has been evaluated for this renewal.

Inflow is water, other than wastewater, that enters a sewer system from sources such as roof leaders, cellar drains, yard drains, area drains, foundation drains, drains from springs and swampy areas, manhole covers, cross sections between storm drains and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters or other drainage. Inflow does not include, and is distinguished from, infiltration. (40 CFR 35.2005 Definitions)

Infiltration is water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow. (40 CFR 35.2005 Definitions)

I/I is assessed by calculating the gallons per capita per day. Gallons per capita per day is calculated by using the daily average influent flows for the three maximum flow months during the past calendar year, reported in Part D of the facility's permit application. If the data on the application is outdated or not reported in the application, the three maximum 30-day average influent flows for the past calendar year may be used instead. The facility reports the total estimated flows for residential, industrial, commercial, and also the population of the service area in Part C of the permit application. The calculation to determine gallons per capita per day is:

$$gallons\ per\ capita\ per\ day = \frac{gal.per\ day}{population}\ X\ \%residential\ flows$$

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$$\%\, residential\ flows = \frac{residential\ flows}{residential + commercial\ + industrial\ flows}\ X\ 100\%$$

For this facility the average of the daily average influent flows for the maximum three flow months is 66333 gallons per day. Based on data submitted in the permit application, the facility's percent of residential flows is 100%. Based on the service area population of 1093, the estimated influent flow is 61 gallons per capita per day.

The facility does not exceed the 120 gallons per capita per day threshold used by the division to screen for excessive infiltration.

B. Lift Stations

Table IV-1 summarizes the information provided in the renewal application for the lift stations in the service area.

Table IV-1 – Lift Station Summary

Station Name/#	Firm Pump Capacity (gpm)	Peak Flows (gpd)	% Capacity (based on peak flow)
Dharma Ocean	2 @ 180 gpm	109,000	21
Wagon Wheel	2 @ 245 gpm	264,000	37
Stables	2 @ 180 gpm	156,000	30
Casita Park	2 @ 85 gpm	122,000	50

C. Chemical Usage

The permittee stated in the application that they utilize one chemical in their treatment process. The MSDS sheets have been reviewed and the following chemicals have been approved for use and are summarized in the following table.

Table IV-2 – Chemical Additives

Chemical Name	Purpose	Constituents of Concern
Magnesium Hydroxide	***Increase pH/alkalinity***	*pH*

Chemicals deemed acceptable for use in waters that will or may be discharged to waters of the State are acceptable only when used in accordance with all state and federal regulations, and in strict accordance with the manufacturer's site-specific instructions.

D. Treatment Facility, Facility Modifications and Capacities

The facility consists of an influent pump station, a sequencing batch reactor process and UV disinfection, and the facility recently added two sludge drying beds. The permittee has not performed any construction at this facility that would change the hydraulic capacity of 0.15 MGD or

the organic capacity of 300 lbs. BOD_5/day, which were specified in Site Approval 4687. That document should be referred to for any additional information.

E. Biosolids Treatment and Disposal

Operations staff manually pump sludge from the sludge holding pond to the sludge drying beds using a trash pump and flexible hose. Once sludge is dried, staff remove the sludge from the drying beds using a skid steer and load the solids in a dumpster bin for landfill disposal. In addition, the underdrain system is periodically flushed and the drying beds are inspected regularly for sand media quality and volume.

1. EPA Regulation

   The Facility is required under the Direct Enforceability provision of 40 CFR §503.3(b) to meet the applicable requirements of the regulation.

2. Biosolids Regulation (Regulation No. 64, Colorado Water Quality Control Commission)

   Colorado facilities that land apply biosolids must comply with requirements of Regulation No. 64, such as the submission of annual reports as discussed later in this fact sheet.

V. PERFORMANCE HISTORY

A. Monitoring Data

1. Discharge Monitoring Reports – The following tables summarize the effluent data reported on the Discharge Monitoring Reports (DMRs) for the previous permit term, from February 2014 to June 2019.

Table V-1 – Summary of DMR Data for Permitted Feature Outfall 001A

Parameter	*# Samples or Reporting Periods*	*Reported Average Concentrations Avg/Min/Max*	*Reported Maximum Concentrations Avg/Min/Max*	*AD 2-Year Average Avg/Min/Max*	*Previous Avg/Max/AD Permit Limit*	*Number of Limit Excursions*
Influent Flow (MGD)	*65*	*0.064/0.031/0.11*	*1.8/0.059/112*		*Report/Report*	
Effluent Flow (MGD)	*65*	*0.066/0.034/0.12*	*0.085/0.06/0.16*		*0.15/NA*	
pH (su)	*65*	*7/6.6/7.6*	*7.3/7/8.3*		*NA - NA*	
E. coli (#/100 ml)	*65*	*17//250*	*18//250*	*NA/NA/NA*	*64/252*	*3*
TRC (mg/l)	*17*	*0.012//0.1*	*0.023//0.24*	*NA/NA/NA*	*0.011/0.019*	*8*
NH3 as N, Tot (mg/l) Jan	*5*	*1.3/0.031/2.8*	*1.3/0.031/2.8*	*NA/NA/NA*	*5/29*	
NH3 as N, Tot (mg/l) Feb	*6*	*1.4/0.2/3.9*	*1.4/0.2/3.9*	*NA/NA/NA*	*4.1/30*	

NH3 as N, Tot (mg/l) Mar	*6*	*1.3/0.021/2.8*	*1.3/0.021/2.8*	*NA/NA/NA*	*4.4/29*	
NH3 as N, Tot (mg/l) Apr	*5*	*1.2/0.049/2.7*	*1.2/0.049/2.7*	*NA/NA/NA*	*3.9/24*	
NH3 as N, Tot (mg/l) May	*5*	*0.73/0.018/2.1*	*0.73/0.018/2.1*	*NA/NA/NA*	*3.3/32*	
NH3 as N, Tot (mg/l) Jun	*5*	*0.56/0.033/0.83*	*0.56/0.033/0.83*	*NA/NA/NA*	*3.4/29*	
NH3 as N, Tot (mg/l) Jul	*4*	*0.73/0.13/1.2*	*0.73/0.13/1.2*	*NA/NA/NA*	*3/29*	
NH3 as N, Tot (mg/l) Aug	*5*	*1.3/0.11/2.8*	*1.3/0.11/2.8*	*NA/NA/NA*	*2.2/26*	*1*
NH3 as N, Tot (mg/l) Sep	*5*	*0.96/0.09/2.1*	*0.96/0.09/2.1*	*NA/NA/NA*	*2.6/27*	
NH3 as N, Tot (mg/l) Oct	*5*	*0.56/0.08/1.1*	*0.56/0.08/1.1*	*NA/NA/NA*	*2.5/26*	
NH3 as N, Tot (mg/l) Nov	*5*	*1.1/0.037/2.4*	*1.1/0.037/2.4*	*NA/NA/NA*	*3.8/32*	
NH3 as N, Tot (mg/l) Dec	*5*	*0.65/0.01/1.5*	*0.65/0.01/1.5*	*NA/NA/NA*	*4/26*	
BOD5, influent (mg/l)	*22*	*268/21/591*	*284/21/591*		*NA/NA/*	
BOD5, influent (lbs/day)	*22*	*177/55/392*	*201/83/449*		*NA/NA/*	
BOD5, effluent (mg/l)	*64*	*11/1.2/40*	*11/1.2/54*		*30/45/*	*5*
BOD5 (% removal)	*64*	*96/85/99*	*NA/NA/NA*		*85/NA/*	
TSS, influent (mg/l)	*22*	*259/21/408*	*276/21/456*		*NA/NA/*	
TSS, effluent (mg/l)	*22*	*16/2/55*	*23/2/185*		*30/45/*	*4*
TSS (% removal)	*22*	*93/80/99*	*NA/NA/NA*		*85/NA/*	*2*
Oil and Grease (mg/l)	*14*	*NA/NA/NA*	*0//0*		*NA/10/*	

** Geometric mean
NV means No Visible Sheen

B. Compliance With Terms and Conditions of Previous Permit

1. Effluent Limitations – The data shown in the preceding table(s) indicate apparent violations of the permit:

   - E. coli (violations in April 2017, June 2017 and July 2017): These violations were caused by a variation of issues including the sludge wasting equipment working properly, the UV treatment bulbs nearing the ends of their service life and the sampling procedure for determining a 30-day geo-mean for the month of April. The facility has resolved those issues and does not represent a trend indicating future excursions.

   - TRC (violations in February 2018, March 2018, April 2018 and May 2018): These violations were caused by malfunctioning de-chlorination equipment at the facility. The facility has resolved the issue and does not represent a trend indicating future excursions.

- Ammonia (violation in August 2017): This violation was caused by an improper sampling procedure for Ammonia. The facility has resolved the issue and does not represent a trend indicating future excursions.

- BOD5 (violations in July 2017, January 2018, February 2018 and March 2018): The violation in July 2017 was caused by the facility operating without an ORC. The violation in January 2018 was caused by a buildup on filamentous bacteria. The violations in February 2018 and March 2018 were caused by the construction of a new headworks building at the facility in January 2018, which took until April 2018 to be operating properly. The facility has resolved these issues and does not represent a trend indicating future excursions.

- TSS (violations in June 2017, September 2017 and March 2018): The violations in June 2017 and September 2017 were caused by the facility operating without an ORC. The March 2018 violation was caused by the construction of a new headworks building at the facility in January 2018, which took until April 2018 to be operating properly. The facility has resolved these issues and does not represent a trend indicating future excursions.

- TSS, percent removal (violations in September 2017 and March 2018): The violation in September 2017 was caused by the facility operating without an ORC. The March 2018 violation was caused by the construction of a new headworks building at the facility in January 2018, which took until April 2018 to be operating properly. The facility has resolved these issues and does not represent a trend indicating future excursions.

In accordance with 40 CFR Part 122.41(a), any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

2. Other Permit Requirements – The permittee has been in compliance with all other aspects of the previous permit.

VI. DISCUSSION OF EFFLUENT LIMITATIONS

A. Regulatory Basis for Limitations

1. Technology Based Limitations

   a. Federal Effluent Limitation Guidelines – The Federal Effluent Limitation Guidelines for domestic wastewater treatment facilities are the secondary treatment standards. These standards have been adopted into, and are applied out of, Regulation 62, the Regulations for Effluent Limitations.

   b. Regulation 62: Regulations for Effluent Limitations – These Regulations include effluent limitations that apply to all discharges of wastewater to State waters and are shown in Section VIII of the WQA. These regulations are applicable to the discharge from the Aspen Institute WWTF.

2. Numeric Water Quality Standards - The WQA contains the evaluation of pollutants limited by water quality standards. The mass balance equation shown in Section VI of the WQA was used for most pollutants to calculate the potential water quality based effluent limitations (WQBELs), M_2,

that could be discharged without causing the water quality standard to be violated. For ammonia, the AMMTOX Model was used to determine the maximum assimilative capacity of the receiving stream. A detailed discussion of the calculations for the maximum allowable concentrations for the relevant parameters of concern is provided in Section VI of the Water Quality Assessment developed for this permitting action.

The maximum allowable pollutant concentrations determined as part of these calculations represent the calculated effluent limits that would be protective of water quality. These are also known as the water quality-based effluent limits (WQBELs). Both acute and chronic WQBELs may be calculated based on acute and chronic standards, and these may be applied as daily maximum (acute) or 30-day average (chronic) limits.

3. Narrative Water Quality Standards - Section 31.11(1)(a)(iv) of The Basic Standards and Methodologies for Surface Waters (Regulation No. 31) includes the narrative standard that State surface waters shall be free of substances that are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life.

   a. Whole Effluent Toxicity - The Water Quality Control Division has established the use of WET testing as a method for identifying and controlling toxic discharges from wastewater treatment facilities. WET testing is being utilized as a means to ensure that there are no discharges of pollutants "in amounts, concentrations or combinations which are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life" as required by Section 31.11 (1) of the Basic Standards and Methodologies for Surface Waters. The requirements for WET testing are being implemented in accordance with Division policy, Implementation of the Narrative Standard for Toxicity in Discharge Permits Using Whole Effluent Toxicity (Sept 30, 2010).

4. Water Quality Regulations, Policies, and Guidance Documents

   a. Antidegradation - Since the receiving water is Undesignated, an antidegradation review is required pursuant to Section 31.8 of The Basic Standards and Methodologies for Surface Water. As set forth in Section VII of the WQA, an antidegradation evaluation was conducted for pollutants when water quality impacts occurred and when the impacts were significant. Based on the antidegradation requirements and the reasonable potential analysis discussed below, antidegradation-based average concentrations (ADBACs) may be applied.

   According to Division procedures, the facility has three options related to antidegradation-based effluent limits: (1) the facility may accept ADBACs as permit limits (see Section VII of the WQA); (2) the facility may select permit limits based on their non-impact limit (NIL), which would result in the facility not being subject to an antidegradation review and thus the antidegradation-based average concentrations would not apply (the NILs are also contained in Section VII of the WQA); or (3) the facility may complete an alternatives analysis as set forth in Section 31.8(3)(d) of the regulations which would result in alternative antidegradation-based effluent limitations.

   The effluent must not cause or contribute to an exceedance of a water quality standard and therefore the WQBEL must be selected if it is lower than the NIL. Where the WQBEL is not the most restrictive, the discharger may choose between the NIL or the ADBAC: the NIL results in no increased water quality impact; the ADBAC results in an “insignificant” increase in water quality impact. The ADBAC limits are imposed as two-year average limits.

b. Antibacksliding – As the receiving water is designated Reviewable or Outstanding, and the Division has performed an antidegradation evaluation, in accordance with the Antidegradation Guidance, the antibacksliding requirements in Regulation 61.10 have been met.

c. Determination of Total Maximum Daily Loads (TMDLs) – This stream segment is not on the State's 303(d) list, and therefore TMDLs do not apply

d. Colorado Mixing Zone Regulations – Pursuant to section 31.10 of The Basic Standards and Methodologies for Surface Water, a mixing zone determination is required for this permitting action. The Colorado Mixing Zone Implementation Guidance, dated April 2002, identifies the process for determining the meaningful limit on the area impacted by a discharge to surface water where standards may be exceeded (i.e., regulatory mixing zone). This guidance document provides for certain exclusions from further analysis under the regulation, based on site-specific conditions.

The guidance document provides a mandatory, stepwise decision-making process for determining if the permit limits will not be affected by this regulation. Exclusion, based on Extreme Mixing Ratios, may be granted if the ratio of the facility design flow to the chronic low flow (30E3) is greater than 2:1 or if the ratio of the chronic low flow to the design flow is greater than 20:1. Since the ratio of the chronic low flow to the design flow 0:1 the permittee is eligible for an exclusion from further analysis under the regulation.

e. Reasonable Potential Analysis – Using the assimilative capacities contained in the WQA, an analysis must be performed to determine whether to include the calculated assimilative capacities as WQBELs in the permit. This reasonable potential (RP) analysis is based on the Determination of the Requirement to Include Water Quality Standards-Based Limits in CDPS Permits Based on Reasonable Potential, dated December, 2002. This guidance document utilizes both quantitative and qualitative approaches to establish RP depending on the amount of available data.

A qualitative determination of RP may be made where ancillary and/or additional treatment technologies are employed to reduce the concentrations of certain pollutants. Because it may be anticipated that the limits for a parameter could not be met without treatment, and the treatment is not coincidental to the movement of water through the facility, limits may be included to assure that treatment is maintained.

A qualitative RP determination may also be made where a federal ELG exists for a parameter, and where the results of a quantitative analysis results in no RP. As the federal ELG is typically less stringent than a limitation based on the WQBELs, if the discharge was to contain concentrations at the ELG (above the WQBEL), the discharge may cause or contribute to an exceedance of a water quality standard.

To conduct a quantitative RP analysis, a minimum of 10 effluent data points from the previous 5 years, should be used. The equations set out in the guidance for normal and lognormal distribution, where applicable, are used to calculate the maximum estimated pollutant concentration (MEPC). For data sets with non-detect values, and where at least 30% of the data set was greater than the detection level, MDLWIN software is used consistent with Division guidance to generate the mean and standard deviation, which are then used to

establish the multipliers used to calculate the MEPC. If the MDLWIN program cannot be used the Division's guidance prescribes the use of best professional judgment.

For some parameters, recent effluent data or an appropriate number of data points may not be available, or collected data may be in the wrong form (dissolved vs total) and therefore may not be available for use in conducting an RP analysis. Thus, consistent with Division procedures, monitoring will be required to collect samples to support a RP analysis and subsequent decisions for a numeric limit. A compliance schedule may be added to the permit to require the request of an RP analysis once the appropriate data have been collected.

For other parameters, effluent data may be available to conduct a quantitative analysis, and therefore an RP analysis will be conducted to determine if there is RP for the effluent discharge to cause or contribute to exceedances of ambient water quality standards. The guidance specifies that if the MEPC exceeds the maximum allowable pollutant concentration (MAPC), limits must be established and where the MEPC is greater than half the MAPC (but less than the MAPC), monitoring must be established. Table VI-1 contains the calculated MEPC compared to the corresponding MAPC, and the results of the reasonable potential evaluation, for those parameters that met the data requirements. The RP determination is discussed for each parameter in the text below.

B. Parameter Evaluation

BOD_5 - The BOD_5 concentrations in Reg 62 are the most stringent effluent limits and are therefore applied. These limitations are the same as those contained in the previous permit and are imposed upon the effective date of this permit.

Total Suspended Solids - The TSS concentrations in Reg 62 are the most stringent effluent limits and are therefore applied. These limitations are the same as those contained in the previous permit and are imposed upon the effective date of this permit.

Oil and Grease – The oil and grease limitations from the Regulations for Effluent Limitations are applied as they are the most stringent limitations. This limitation is the same as those contained in the previous permit and is imposed upon the effective date of this permit.

pH - This parameter is limited by the water quality standards of 6.5-9.0 s.u., as this range is more stringent than other applicable standards. This limitation is the same as that contained in the previous permit and is imposed upon the effective date of this permit.

E. Coli – The limitation for E. Coli is based upon the NIL as described in the WQA. A qualitative determination of RP has been made as the treatment facility has been designed to treat specifically for this parameter. Previous monitoring as shown in Table V-1 indicate that this limitation can be met and is therefore imposed upon the effective date of the permit. Although there were E. coli exceedances in the previous permit, the exceedances were due to facility malfunctions. The permittee has made necessary repairs to the facility, therefore the E. coli limits are imposed upon the effective date of this permit.

Total Residual Chlorine (TRC) - The limitation for TRC is based upon the WQBEL as described in the WQA. A qualitative determination of RP has been made as chlorine may be used in the treatment process. Although there were TRC exceedances in the previous permit, the exceedances were due to

facility malfunctions. The permittee has made necessary repairs to the facility, therefore the TRC limits are imposed upon the effective date of this permit.

Ammonia - The limitation for ammonia is based upon the NIL as described in the WQA. A qualitative determination of RP has been made as the treatment facility has been designed to treat specifically for this parameter. Previous monitoring as shown in Table V-1 indicate that this limitation can be met and is therefore effective immediately. Although there was an Ammonia exceedance in the previous permit, the exceedance was due to an operator error. The permittee has ensured proper sampling procedures are used in the future, therefore the Ammonia limits are imposed upon the effective date of this permit.

Temperature - Based on the information presented in the WQA, this facility is exempt from the temperature requirements based on the discharge being to an effluent dependent stream.

Whole Effluent Toxicity (WET) Testing – For this facility, acute WET testing has been determined to be applicable based on the instream waste concentrations calculated in the WQA. WET testing is not required as this is a domestic minor facility with a design flow of 0.15 MGD. Additionally, the Aspen Institute WWTF is not expected to receive a significant volume of toxic or industrial wastes. Aquatic life toxicity parameters (TRC, Ammonia) are expected to be controlled by the effluent limitations.

The permittee should read the WET testing section of Part I of the permit carefully, as this information has been updated in accordance with the Division's updated policy, Implementation of the Narrative Standard for Toxicity in Discharge Permits Using Whole Effluent Toxicity (Sept 30, 2010) . The permit outlines the test requirements and the required follow-up actions the permittee must take to resolve a toxicity incident. The permittee should also read the above mentioned policy which is available on the Permit Section website. The permittee should be aware that some of the conditions outlined above may be subject to change if the facility experiences a change in discharge, as outlined in Part II.A.2. of the permit. Such changes shall be reported to the Division immediately.

VII. ADDITIONAL TERMS AND CONDITIONS

A. Monitoring

Effluent Monitoring – Effluent monitoring will be required as shown in the permit document. Refer to the permit for locations of monitoring points. Monitoring requirements have been established in accordance with the frequencies and sample types set forth in the Baseline Monitoring Frequency, Sample Type, and Reduced Monitoring Frequency Policy for Industrial and Domestic Wastewater Treatment Facilities. This policy includes the methods for reduced monitoring frequencies based upon facility compliance as well as for considerations given in exchange for instream monitoring programs initiated by the permittee. Table VII-1 shows the results of the reduced monitoring frequency analysis for Permitted Feature Outfall 001A, based upon compliance with the previous permit.

Table VII-1 – Monitoring Reduction Evaluation

Parameter	*Proposed Permit Limit*	*Average of 30-Day (or Daily Max) Average Conc.*	*Standard Deviation*	*Long Term Characterization (LTC)*	*Reduction Potential*
pH (su) Minimum	*min 6.5*	*7.1*	*0.25*	*6.6*	*1 Step*
pH (su) Maximum	*max 9.0*	*7.5*	*0.32*	*8.14*	
Oil and Grease (mg/l)	*10*	*0*	*0*	*0*	*3 Levels*

*Although oil & grease shows a 3-*level reduction, this will not be applied. Since only visual observation is required for oil & grease, the permit frequency will be* (weekly)*, which is the same frequency as the most frequently monitored parameter.*

B. Reporting

1. Discharge Monitoring Report – The permittee must submit Discharge Monitoring Reports (DMRs) on a monthly basis to the Division. These reports should contain the required summarization of the test results for all parameters and monitoring frequencies shown in Part I.A.2 of the permit. See the permit, Part I.D for details on such submission.

2. Special Reports – Special reports are required in the event of an upset, bypass, or other noncompliance. Please refer to Part II.A. of the permit for reporting requirements. As above, submittal of these reports to the US Environmental Protection Agency Region VIII is no longer required.

C. Signatory and Certification Requirements

Signatory and certification requirements for reports and submittals are discussed in Part I.D.8. of the permit.

D. Economic Reasonableness Evaluation

Section 25-8-503(8) of the revised (June 1985) Colorado Water Quality Control Act required the Division to "determine whether or not any or all of the water quality standard based effluent limitations are reasonably related to the economic, environmental, public health and energy impacts to the public and affected persons, and are in furtherance of the policies set forth in sections 25-8-192 and 25-8-104."

The Colorado Discharge Permit System Regulations, Regulation No. 61, further define this requirement under 61.11 and state: "Where economic, environmental, public health and energy impacts to the public and affected persons have been considered in the classifications and standards setting process, permits written to meet the standards may be presumed to have taken into consideration economic factors unless:

a. A new permit is issued where the discharge was not in existence at the time of the classification and standards rulemaking, or

b. In the case of a continuing discharge, additional information or factors have emerged that were not anticipated or considered at the time of the classification and standards rulemaking."

The evaluation for this permit shows that the Water Quality Control Commission, during their proceedings to adopt the Classifications and Numeric Standards for Rio Grande River Basin, considered economic reasonableness.

Furthermore, this is not a new discharger and no new information has been presented regarding the classifications and standards. Therefore, the water quality standard-based effluent limitations of this permit are determined to be reasonably related to the economic, environmental, public health and energy impacts to the public and affected persons and are in furtherance of the policies set forth in Sections 25-8-102 and 104.

VIII. REFERENCES

A. Colorado Department of Public Health and Environment, Water Quality Control Division Files, for Permit Number CO0046914.

B. "Design Criteria Considered in the Review of Wastewater Treatment Facilities", Policy 96-1, Colorado Department of Public Health and Environment, Water Quality Control Commission, April 2007.

C. Basic Standards and Methodologies for Surface Water, Regulation No. 31, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective January 31, 2018.

D. Classifications and Numeric Standards for Rio Grande Basin, Regulation No. 36, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective June 31, 2019.

E. Colorado Discharge Permit System Regulations, Regulation No. 61, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective December 31, 2018.

F. Regulations for Effluent Limitations, Regulation No. 62, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective July 30, 2012.

G. Pretreatment Regulations, Regulation No. 63, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective March 1, 2017.

H. Biosolids Regulation, Regulation No. 64, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective June 30, 2014.

I. Colorado River Salinity Standards, Regulation No. 39, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective May 9, 2007.

J. Section 303(d) List of Water Quality Limited Segments Requiring TMDLs, Regulation No 93, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective March 2, 2018.

K. Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List, Regulation No 93, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective March 2, 2018.

L. Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, Colorado Department of Public Health and Environment, Water Quality Control Division, effective December 2001.

M. Memorandum Re: First Update to (Antidegradation) Guidance Version 1.0, Colorado Department of Public Health and Environment, Water Quality Control Division, effective April 23, 2002.

N. Determination of the Requirement to Include Water Quality Standards-Based Limits in CDPS Permits Based on Reasonable Potential, Policy Number CW-1, Colorado Department of Public Health and Environment, Water Quality Control Division, effective November 18, 2013.

O. The Colorado Mixing Zone Implementation Guidance, Colorado Department of Public Health and Environment, Water Quality Control Division, effective April 2002.

P. Baseline Monitoring Frequency, Sample Type, and Reduced Monitoring Frequency Policy for Domestic and Industrial Wastewater Treatment Facilities, Water Quality Control Division Policy WQP-20, May 1, 2007.

Q. Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, Water Quality Control Division Policy WQP-24, March 10, 2008.

R. Implementing Narrative Standard for Toxicity in Discharge Permits Using Whole Effluent Toxicity (WET) Testing. Colorado Department of Public Health and Environment, Water Quality Control Division Policy Permits-1, September 30, 2010.

S. Policy for Conducting Assessments for Implementation of Temperature Standards in Discharge Permits, Colorado Department of Public Health and Environment, Water Quality Control Division, Policy Number WQP-23, effective July 3, 2008.

T. Permit Compliance Schedules, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number CW-3, effective March 4, 2014.

U. Procedural Regulations for Site Applications for Domestic Wastewater Treatment Works, Regulation No. 22, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective September 30, 2009.

V. Regulation Controlling discharges to Storm Sewers, Regulation No. 65, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective May 30, 2008.

W. Water and Wastewater Facility Operator Certification Requirements, Regulation No. 100, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective August 31, 2017.

IX. ATTACHMENTS

Attachment 1: Final Water Quality Assessment for Unnamed dry wash tributary to South Crestone Creek – CORGCB03 (10/31/2019).

X. PUBLIC NOTICE COMMENTS

The public notice period was from September 12, 2019 to October 14, 2019. No comments were received during the public notice period.

FOR DIVISION USE ONLY	
G04	Sewage Sludge/Biosolids Annual Program Reports
G07	Pretreatment Program Reports
G09	Sewer Overflow/Bypass Event Reports
G3A	DMRs: Regular Submission Frequency
G8B	SIU Compliance Reports (State is Control Authority)

4300 Cherry Creek Drive S., Denver, CO 80246-1530 P 303-692-2000 www.colorado.gov/cdphe/wqcd

Attachment 1
Water Quality Assessment
Unnamed Dry Wash Tributary to South Crestone Creek
Baca Grande Water and Sanitation District, Aspen Institute WWTF
Nathan Bradley
October 31, 2019

Table of Contents

I. Water Quality Assessment Summary

Table A-1 includes summary information related to this WQA. This summary table includes key regulatory starting points used in development of the WQA such as: receiving stream information; threatened and endangered species; 303(d) and Monitoring and Evaluation listings; low flow and facility flow summaries; and a list of parameters evaluated.

Table A-1
WQA Summary

Facility Information			
Facility Name	**Permit Number**	**Design Flow (max 30-day ave, MGD)**	**Design Flow (max 30-day ave, CFS)**
Aspen Institute WWTF	CO0046914	0.15	0.23

Receiving Stream Information			
Receiving Stream Name	**Segment ID**	**Designation**	**Classification(s)**
Unnamed dry wash tributary to South Crestone Creek	CORGCB03	Reviewable	Aquatic Life Warm 1, Recreation Class E, Agriculture, Water Supply

Low Flows (cfs)				
Receiving Stream Name	**1E3 (1-day)**	**7E3 (7-day)**	**30E3 (30-day)**	**Ratio of 30E3 to the Design Flow (cfs)**
Unnamed dry wash tributary to South Crestone Creek	0	0	0	0:1

Regulatory Information					
T&E Species	**303(d) (Reg 93)**	**Monitor and Eval (Reg 93)**	**Existing TMDL**	**Temporary Modification(s)**	**Control Regulation**
No	No	No	No	Arsenic (chronic) = hybrid Expires 12/31/2021	Regulation 85

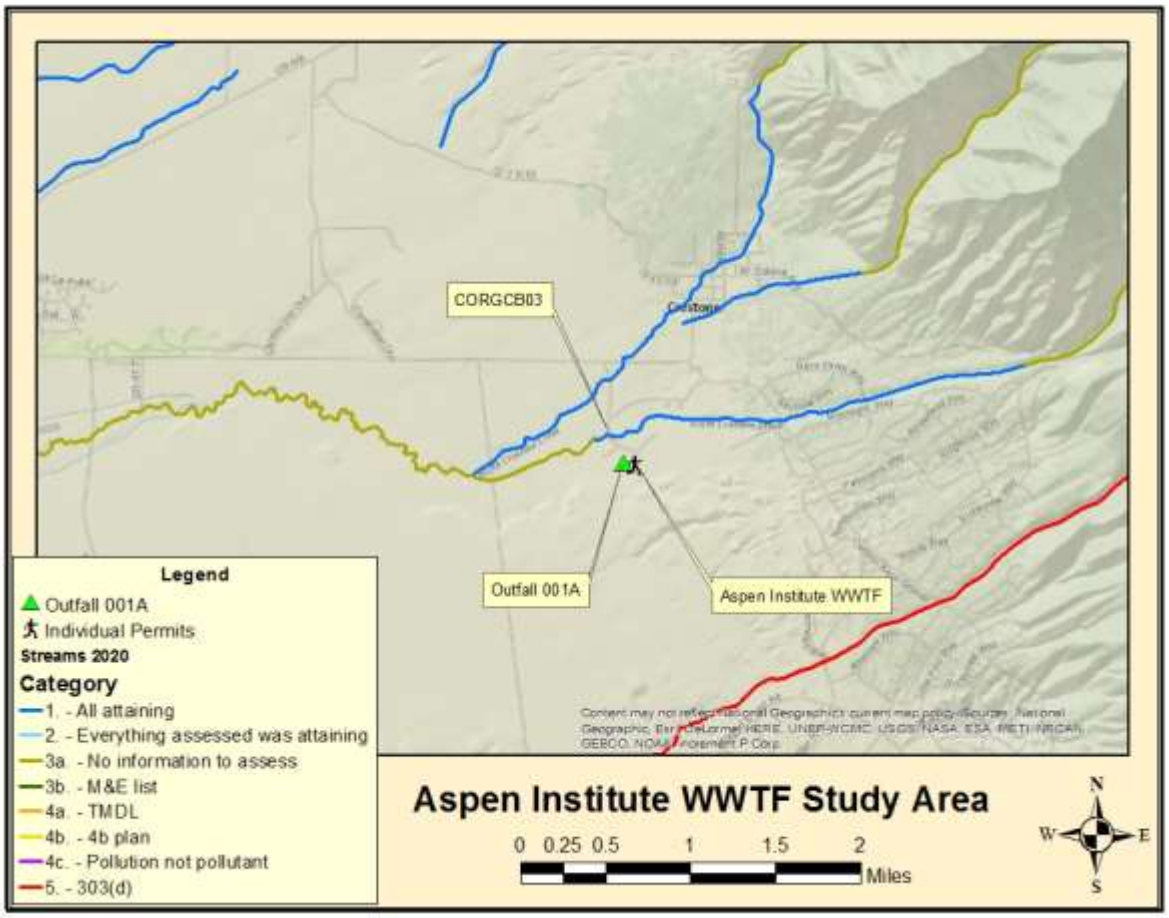
Pollutants Evaluated
Ammonia, E. Coli, TRC, TIN, Nutrients

II. Introduction

The water quality assessment (WQA) of unnamed dry wash tributary to South Crestone Creek near the Aspen Institute Waste Water Treatment Facility (WWTF), located in Saguache County, is intended to determine the assimilative capacities available for pollutants found to be of concern. This WQA describes how the water quality based effluent limits (WQBELs) are developed. These parameters may or may not appear in the permit with limitations or monitoring requirements, subject to other determinations such as reasonable potential analysis, evaluation of federal effluent limitation guidelines, implementation of state-based technology based

limits, mixing zone analyses, 303(d) listings, threatened and endangered species listing, or other requirements as discussed in the permit rationale. Figure A-1 contains a map of the study area evaluated as part of this WQA.

FIGURE A-1



The Aspen Institute WWTF discharges to an unnamed dry wash tributary to South Crestone Creek, which is stream segment CORGCB03. This means the Rio Grande Basin, Closed Basin – San Luis Valley Sub-basin, Stream Segment 03. This segment is composed of the "All tributaries to the Closed Basin excluding the listings in segments 1, 2a, 2b, 2c, and 4 through 13". Stream segment CORGCB03 is classified for Aquatic Life Warm 1, Recreation Class E, Water Supply and Agriculture. The unnamed dry wash tributary to South Crestone Creek flows through the arid lowlands at the foot of the Sangre de Cristo Mountain Range, in South Central Colorado.

Information used in this assessment includes data gathered from the Aspen Institute WWTF, the Division, the Colorado Division of Water Resources (DWR), the U.S. Environmental Protection Agency (EPA) and the U.S. Geological Survey (USGS). The data used in the assessment consist of the best information available at the time of preparation of this WQA analysis.

III. Water Quality Standards

Narrative Standards

Narrative Statewide Basic Standards have been developed in Section 31.11(1) of the regulations, and apply to any pollutant of concern, even where there is no numeric standard for that pollutant. Waters of the state shall

be free from substances attributable to human-caused point source or nonpoint source discharges in amounts, concentrations or combinations which:

for all surface waters except wetlands;

(i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludge, mine slurry or tailings, silt, or mud; or (ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or (iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or (iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or (v) produce a predominance of undesirable aquatic life; or (vi) cause a film on the surface or produce a deposit on shorelines; and

for surface waters in wetlands;

(i) produce color, odor, changes in pH, or other conditions in such a degree as to create a nuisance or harm water quality dependent functions or impart any undesirable taste to significant edible aquatic species of the wetland; or (ii) are toxic to humans, animals, plants, or aquatic life of the wetland.

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for any parameter of concern could be put in CDPS discharge permits.

Standards for Organic Parameters and Radionuclides

Radionuclides: Statewide Basic Standards have been developed in Section 31.11(2) and (3) of The Basic Standards and Methodologies for Surface Water to protect the waters of the state from radionuclides and organic chemicals.

In no case shall radioactive materials in surface waters be increased by any cause attributable to municipal, industrial, or agricultural practices or discharges to as to exceed the following levels, unless alternative site-specific standards have been adopted. Standards for radionuclides are shown in Table A-2.

Table A-2
Radionuclide Standards

Parameter	Picocuries per Liter
Americium 241*	0.15
Cesium 134	80
Plutonium 239, and 240*	0.15
Radium 226 and 228*	5
Strontium 90*	8
Thorium 230 and 232*	60
Tritium	20,000

*Samples for these materials should be analyzed using unfiltered (total) samples. These Human Health based standards are 30-day average values.

Organics: The organic pollutant standards contained in the Basic Standards for Organic Chemicals Table are applicable to all surface waters of the state for the corresponding use classifications, unless alternative site-specific standards have been adopted. These standards have been adopted as "interim standards" and will remain in effect until alternative permanent standards are adopted by the Commission. These interim

standards shall not be considered final or permanent standards subject to antibacksliding or downgrading restrictions. Although not reproduced in this WQA, the specific standards for organic chemicals can be found in Regulation 31.11(3).

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for radionuclides, organics, or any other parameter of concern could be put in CDPS discharge permits.

The aquatic life standards for organics apply to all stream segments that are classified for aquatic life. The water supply standards apply only to those segments that are classified for water supply. The water + fish standards apply to those segments that have a Class 1 aquatic life and a water supply classification. The fish ingestion standards apply to Class 1 aquatic life segments that do not have a water supply designation. The water + fish and the fish ingestion standards may also apply to Class 2 aquatic life segments, where the Water Quality Control Commission has made such determination.

Because the unnamed dry wash tributary to South Crestone Creek is classified for Aquatic Life Warm 1, with a water supply designation, water + fish aquatic life standards apply to this discharge.

Nutrients

Phosphorus and Total Inorganic Nitrogen: Regulation 85, the *Nutrients Management Control Regulation* has been adopted by the Water Quality Control Commission and became effective September 30, 2012. This regulation contains requirements for phosphorus and Total Inorganic Nitrogen (TIN) concentrations for some point source dischargers. Limitations for phosphorus and TIN may be applied in accordance with this regulation.

Temperature

Temperature shall maintain a normal pattern of diurnal and seasonal fluctuations with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deemed deleterious to the resident aquatic life. This standard shall not be interpreted or applied in a manner inconsistent with section 25-8-104, C.R.S.

Segment Specific Numeric Standards

Numeric standards are developed on a basin-specific basis and are adopted for particular stream segments by the Water Quality Control Commission. The standards in Table A-3 have been assigned to stream segment CORGCB03 in accordance with the *Classifications and Numeric Standards for Rio Grande River Basin*.

Table A-3 **In-stream Standards for Stream Segment CORGCB03**
Physical and Biological
Dissolved Oxygen (DO) = 5 mg/l, minimum
pH 6.5- 9.0
E. coli chronic = 126 colonies/100 ml
Chlorophyll a chronic = 150 m/m^2
Temperature March-Nov = 27.5° C MWAT and 28.6° C DM
Temperature Dec-Feb = 13.8° C MWAT and 25.2° C DM
Inorganic
Total Ammonia acute and chronic = TVS
Chlorine acute = 0.019 mg/l

Chlorine chronic = 0.011 mg/l
Free Cyanide acute = 0.005 mg/l
Sulfide chronic = 0.002 mg/l
Boron chronic = 0.75 mg/l
Nitrite acute = 0.05 mg/l
Nitrate acute = 10 mg/l
Chloride chronic = 250 mg/l
Sulfate chronic WS = The greater of ambient water quality as of January 1, 2000 or 250 mg/l
Metals
Dissolved Arsenic acute = 340 µg/l
Total Recoverable Arsenic chronic = 0.02 µg/l
Temp Modification: Arsenic (chronic) = hybrid, Expiration Date of 12/31/2021
Dissolved Cadmium acute and chronic = TVS
Total Recoverable Cadmium acute = 5 µg/l
Total Recoverable Trivalent Chromium acute = 50 µg/l
Dissolved Trivalent Chromium chronic = TVS
Dissolved Hexavalent Chromium acute and chronic = TVS
Dissolved Copper acute and chronic = TVS
Dissolved Iron chronic WS = The greater of ambient water quality as of January 1, 2000, or 300 µg/l
Total Recoverable Iron chronic = 1000 µg/l
Dissolved Lead acute and chronic = TVS
Total Recoverable Lead acute = 50 µg/l
Dissolved Manganese chronic WS = The greater of ambient water quality as of January 1, 2000, or 50 µg/l
Dissolved Manganese acute and chronic = TVS
Total Recoverable Molybdenum chronic = 150 µg/l
Total Mercury chronic = 0.01 µg/l
Dissolved Nickel acute and chronic = TVS
Total Recoverable Nickel chronic = 100 µg/l
Dissolved Selenium acute and chronic = TVS
Dissolved Silver acute and chronic = TVS
Dissolved Uranium acute and chronic = varies*
Dissolved Zinc acute and chronic = TVS
Nonylphenol acute = 28 µg/l
Nonylphenol chronic = 6.6 µg/l

*Uranium (acute and chronic): For more information, see 36.5(3)

Note that the temporary modification for chronic arsenic is specificied 'hybrid', which applies "current condition" to discharges existing on or before 6/1/2013. This is further described in the Statement of Basis and Purpose, Regulation No. 36, December, 2018.

Table Value Standards and Hardness Calculations

As metals with standards specified as TVS are not included as parameters of concern for this facility, the hardness value of the receiving water and the subsequent calculation of the TVS equations is inconsequential and is therefore omitted from this WQA.

IV. Receiving Stream Information

Low Flow Analysis

The Colorado Regulations specify the use of low flow conditions when establishing water quality based effluent limitations, specifically the acute and chronic low flows. The acute low flow, referred to as 1E3, represents the one-day low flow recurring in a three-year interval, and is used in developing limitations based on an acute standard. The 7-day average low flow, 7E3, represents the seven-day average low flow recurring in a 3 year interval, and is used in developing limitations based on a Maximum Weekly Average Temperature standard (MWAT). The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval, and is used in developing limitations based on a chronic standard.

Although there is periodic flow in the unnamed dry wash tributary to South Crestone Creek upstream of the Aspen Institute WWTF, the 1E3 and 30E3 monthly low flows are set at zero by the division based on information provided by the local Water Commissioner. For this analysis, low flows are summarized in **Error! Reference source not found.**4.

Table A-4

Low Flows for an unnamed dry wash tributary to South Crestone Creek at the Aspen Institute WWTF

Low Flow (cfs)	*Annual*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
1E3 Acute	0	0	0	0	0	0	0	0	0	0	0	0	0
7E3 Chronic	0	0	0	0	0	0	0	0	0	0	0	0	0
30E3 Chronic	0	0	0	0	0	0	0	0	0	0	0	0	0

The ratio of the low flow of an unnamed dry wash tributary to South Crestone Creek to the Aspen Institute WWTF design flow is 0:1

Note that since the low flow has been determined to be zero, the ambient water quality discussion is unnecessary and has therefore been deleted in this WQA. This is explained in more detail under the Technical Information discussion in Section VI.

Mixing Zones

The amount of the available assimilative capacity (dilution) that may be used by the permittee for the purposes of calculating the WQBELs may be limited in a permitting action based upon a mixing zone analysis or other factor. These other factors that may reduce the amount of assimilative capacity available in a permit are: presence of other dischargers in the vicinity; the presence of a water diversion downstream of the discharge (in the mixing zone); the need to provide a zone of passage for aquatic life; the likelihood of bioaccumulation of toxins in fish or wildlife; habitat considerations such as fish spawning or nursery areas; the presence of threatened and endangered species; potential for human exposure through drinking water or recreation; the possibility that aquatic life will be attracted to the effluent plume; the potential for adverse effects on groundwater; and the toxicity or persistence of the substance discharged.

Unless a facility has performed a mixing zone study during the course of the previous permit, and a decision has been made regarding the amount of the assimilative capacity that can be used by the facility, the Division assumes that the full assimilative capacity can be allocated. Note that the review of mixing study considerations, exemptions and perhaps performing a new mixing study (due to changes in low flow, change in facility design flow, channel geomorphology or other reason) is evaluated in every permit and permit renewal.

If a mixing zone study has been performed and a decision regarding the amount of available assimilative capacity has been made, the Division may calculate the water quality based effluent limitations (WQBELs) based on this available capacity. In addition, the amount of assimilative capacity may be reduced by T&E implications.

Since the receiving stream has a zero low flow as calculated above, the WQBELs would be equal to the WQS, and therefore consideration of full or reduced assimilative capacity is inconsequential.

Ambient Water Quality

The Division evaluates ambient water quality based on a variety of statistical methods as prescribed in Section 31.8(2)(a)(i) and 31.8(2)(b)(i)(B) of the *Colorado Department of Public Health and Environment Water Quality Control Commission Regulation No. 31*, and as outlined in the Division's Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits (WQP-19). The ambient water quality was not assessed for an unnamed dry wash tributary to South Crestone Creek because the background in-stream low flow condition is zero.

V. Facility Information and Pollutants Evaluated

Facility Information

The Aspen Institute WWTF is located south of the town of Crestone in the Luis Maria Baca Grant No.4, approximately 0.5 miles south of Section 12, T43N, R11E, NMPM (there is not official Township and Range Designation associated with the Aspen Institute WWTF site); Latitude: 37.980003°N, Longitude: 105.712537°W in Saguache County. The current design capacity of the facility is 0.15 MGD (0.23 cfs). Wastewater treatment is accomplished using a mechanical wastewater treatment process. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

The Aspen Institute WWTF is the sole known point source contributor to the unnamed dry wash tributary to South Crestone Creek. Additionally, due to the in-stream low flow of zero, the assimilative capacities during times of low flow are not affected by nearby contributions. Therefore, modeling nearby facilities in conjunction with this facility was not necessary.

Pollutants of Concern

Pollutants of concern may be determined by one or more of the following: facility type; effluent characteristics and chemistry; effluent water quality data; receiving water quality; presence of federal effluent limitation guidelines; or other information. Parameters evaluated in this WQA may or may not appear in a permit with limitations or monitoring requirements, subject to other determinations such as a reasonable potential analysis, mixing zone analyses, 303(d) listings, threatened and endangered species listings or other requirement as discussed in a permit rationale.

There are no site-specific in-stream water quality standards for BOD_5 or $CBOD_5$, TSS, percent removal, and oil and grease for this receiving stream. Thus, assimilative capacities were not determined for these parameters. The applicable limitations for these pollutants can be found in Regulation No. 62 and will be

applied in the permit for the WWTF.

The following parameters were identified by the Division as pollutants to be evaluated for this facility:

- Total Residual Chlorine
- *E. coli*
- Total Inorganic Nitrogen
- Ammonia
- Temperature
- Nutrients

Based upon the size of the discharge, the lack of industrial contributors, dilution provided by the receiving stream and the fact that no unusually high metals concentrations are expected to be found in the wastewater effluent, metals are not evaluated further in this water quality assessment.

An evaluation of the Division of Water Resources Colorado's Decision Support System indicates that there are no surface intakes and no wells expected to be supplied by hydrologically connected groundwater in the downstream receiving water area evaluated for this discharge.

Note that as currently written, Regulation 31 would not require implementation of a nitrate water supply standard of 10 mg/l (as Total Inorganic Nitrogen), for the reason described above. However, effective December 31, 2022, the nitrate water supply standard of 10 mg/l (as Total Inorganic Nitrogen) will be implemented in segment CORGCB03, regardless of the presence or the location of domestic water supply wells within the segment. This is based on the results of the June 2016 Water Quality Control Commission (WQCC) hearing, during which the WQCC repealed footnote 4 to Table II (Inorganic Parameters) of Regulation 31 with an effective date of December 31, 2022. The removal of footnote 4 will result in a requirement to calculate permit limits to implement the nitrate water supply standard of 10 mg/l for any discharge to a segment designated as water supply, and to apply the standard either at the point of discharge or, where a mixing zone is allowable, at the end of the mixing zone. The WQCC chose the delayed effective date to allow time to thoroughly evaluate the receiving water below outfalls to determine whether there is an actual existing Water Supply use and to propose modifications of the segments or standards if warranted. Absent changes to the segments or standards, a nitrate water supply standard of 10 mg/l (as Total Inorganic Nitrogen) will be implemented in the segment just after the sunset date of December 31, 2022.

During assessment of the facility, nearby facilities, and receiving stream water quality, no additional parameters were identified as pollutants of concern.

VI. Determination of Water Quality Based Effluent Limitations (WQBELs)

Technical Information

Note that the WQBELs developed in the following paragraphs, are calculations of what an effluent limitation may be in a permit. The WQBELs for any given parameter, will be compared to other potential limitations (federal effluent limitations guidelines, state effluent limitations, or other applicable limitation) and typically the more stringent limit is incorporated into a permit. If the WQBEL is the more stringent limitation, incorporation into a permit is dependent upon a reasonable potential analysis.

In-stream background data and low flows evaluated in Sections II and III are used to determine the assimilative capacity of the unnamed dry wash tributary to South Crestone Creek near the Aspen Institute WWTF for pollutants of concern, and to calculate the WQBELs. For all parameters except ammonia, it is the Division's approach to calculate the WQBELs using the lowest of the monthly low flows (referred to as the annual low

flow) as determined in the low flow analysis. For ammonia, it is the standard procedure of the Division to determine monthly WQBELs using the monthly low flows, as the regulations allow the use of seasonal flows.

The Division's standard analysis consists of steady-state, mass-balance calculations for most pollutants and modeling for pollutants such as ammonia. The mass-balance equation is used by the Division to calculate the WQBELs, and accounts for the upstream concentration of a pollutant at the existing quality, critical low flow (minimal dilution), effluent flow and the water quality standard. The mass-balance equation is expressed as:

$$M_2 = \frac{M_3 Q_3 - M_1 Q_1}{Q_2}$$

Where,

Q_1 = Upstream low flow (1E3 or 30E3)
Q_2 = Average daily effluent flow (design capacity for domestic wastewater treatment facilities)
Q_3 = Downstream flow (Q_1 + Q_2)
M_1 = In-stream background pollutant concentrations at the existing quality
M_2 = Calculated WQBEL
M_3 = Water Quality Standard, or other maximum allowable pollutant concentration

When Q_1 equals zero, Q_2 equals Q_3, and the following results:

$$M_2 = M_3$$

Because the low flow (Q_1) for the unnamed dry wash tributary to South Crestone Creek is zero, the WQBELs for the unnamed dry wash tributary to South Crestone Creek for the pollutants of concern are equal to the in-stream water quality standards.

A more detailed discussion of the technical analysis is provided in the pages that follow.

Calculation of WQBELs

Using the mass-balance equation provided in the beginning of Section VI, the acute and chronic low flows set out in Section IV, ambient water quality as discussed in Section IV, and the in-stream standards shown in Section III, the WQBELs were calculated. The data used and the resulting WQBELs, M_2, are set forth in Table A-5a for the chronic WQBELs and A-5b for the acute WQBELs.

Where a WQBEL is calculated to be a negative number and interpreted to be zero the Division standard procedure is to allocate the water quality standard to prevent further degradation of the receiving waters.

Chlorine: There are no point sources discharging total residual chlorine within one mile of the Aspen Institute WWTF. Because chlorine is rapidly oxidized, in-stream levels of residual chlorine are detected only for a short distance below a source. Ambient chlorine was therefore assumed to be zero.

***E. coli*:** There are no point sources discharging E. coli within one mile of the Aspen Institute WWTF. Thus, WQBELs were evaluated separately. For *E. coli*, the Division establishes the 7-day geometric mean limit as two times the 30-day geometric mean WQBEL and also includes maximum limits of 2,000 colonies per 100 ml (30-day geometric mean) and 4,000 colonies per 100 ml (7-day geometric mean). This 2000 colony limitation also applies to discharges to ditches.

Temperature: The 7E3 low flow is 0 in all twelve months, and the receiving water is an effluent dependent stream (ephemeral stream without the presence of wastewater), therefore in accordance with Regulation 31.14(14), no temperature limitations are required.

Nitrate / Total Inorganic Nitrogen (T.I.N.): An acute nitrate standard of 10 mg/l is assigned to this segment. Because nitrite and ammonia can also form nitrate, compliance with the nitrate standard is achieved through implementation of a Total Inorganic Nitrogen (T.I.N.) limit. T.I.N. effectively measures nitrate and its precursors including nitrite and ammonia.

To determine the background concentration for Total Inorganic Nitrogen for use in the mass balance equation, same day samples of the ambient data for ammonia, nitrite and nitrate (or nitrite + nitrate) were added together to calculate the T.I.N. The 85th percentile of this summed data was calculated and used as the ambient water quality for T.I.N.

Table A-7b contains the calculation of TIN effluent limits based on the 10 mg/l standard. These effluent limits do not apply at this time, and are only provided for informational purposes. The 10 mg/l standard upon which this calculation is based would only be applicable after December 31, 2022, in the event that the WQCC takes no additional action in this matter.

Table A-5a

Chronic WQBELs for the Aspen Institute WWTF at an unnamed dry wash tributary to South Crestone Creek

Parameter	Q_1 *(cfs)*	Q_2 *(cfs)*	Q_3 *(cfs)*	M_1	M_3	M_2
E. coli (#/100 ml)	0	0.23	0.23	1	126	***126***
TRC (mg/l)	0	0.23	0.23	0	0.011	***0.011***

Table A-5b

Acute WQBELs for the Aspen Institute WWTF at an unnamed dry wash tributary to South Crestone Creek

Parameter	Q_1 *(cfs)*	Q_2 *(cfs)*	Q_3 *(cfs)*	M_1	M_3	M_2
E. coli (#/100 ml)	chronic X 2 = acute					***252***
TRC (mg/l)	0	0.23	0.23	0	0.019	***0.019***
Total Inorganic Nitrogen as N (mg/l)*	0	0.23	0.23	0	10	***10***

*Limits for Total Inorganic Nitrogen will be implemented in permit actions after the sunset date of December 31, 2022 as previously explained.

Ammonia: The Ammonia Toxicity Model (AMMTOX) is a software program designed to project the downstream effects of ammonia and the ammonia assimilative capacities available to each discharger based on upstream water quality and effluent discharges. To develop data for the AMMTOX model, an in-stream water quality study should be conducted of the upstream receiving water conditions, particularly the pH and corresponding temperature, over a period of at least one year.

There were no pH or temperature data available for the unnamed dry wash tributary to South Crestone Creek or temperature data for the Aspen Institute WWTF that could be used as adequate input data for the AMMTOX

model. Therefore, the Division standard procedure is to rely on statistically-based, regionalized data for pH and temperature compiled from similar facilities and receiving waters. There were effluent pH data available through the facility's DMR submissions which were used to establish average facility pH contributions in the AMMTOX model.

The AMMTOX model may be calibrated for a number of variables in addition to the data discussed above. The values used for the other variables in the model are listed below:

- Stream velocity = $0.3Q^{0.4d}$
- Default ammonia loss rate = 6/day
- pH amplitude was assumed to be medium
- Default times for pH maximum, temperature maximum, and time of day of occurrence
- pH rebound was set at the default value of 0.2 su per mile
- Temperature rebound was set at the default value of 0.7 degrees C per mile.

The results of the ammonia analyses for the Aspen Institute WWTF are presented in Table A-6.

Table A-6

AMMTOX Results for unnamed dry wash tributary to South Crestone Creek at the Aspen Institute WWTF

Design of 0.15 MGD (0.23 cfs)

Month	*Total Ammonia Chronic (mg/l)*	*Total Ammonia Acute (mg/l)*
January	5.3	28
February	5.4	27
March	4.6	24
April	4.5	26
May	4.4	32
June	4.0	37
July	3.3	32
August	3.2	32
September	3.4	30
October	3.8	30
November	4.6	29
December	5.0	27

Whole Effluent Toxicity (WET) Testing:

The Water Quality Control Division has established the use of WET testing as a method for identifying and controlling toxic discharges from wastewater treatment facilities. WET testing is being utilized as a means to ensure that there are no discharges of pollutants "in amounts, concentrations or combinations which are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life" as required by Section 31.11 (1) of the Basic Standards and Methodologies for Surface Waters. The requirements for WET testing are being implemented in accordance with Division policy, Implementation of the Narrative Standard for Toxicity in Discharge Permits Using Whole Effluent Toxicity (Sept 30, 2010). Note that this policy has recently been updated and the permittee should refer to this document for additional information regarding WET.

In-Stream Waste Concentration (IWC) – Where monitoring or limitations for WET are deemed appropriate by

the Division, the chronic in-stream dilution is critical in determining whether acute or chronic conditions shall apply. In accordance with Division policy, for those discharges where the chronic IWC is greater than 9.1% and the receiving stream has a Class 1 Aquatic Life use or Class 2 Aquatic Life use with all of the appropriate aquatic life numeric standards, chronic conditions will normally apply. Where the chronic IWC is less than or equal to 9.1, or the stream is not classified as described above, acute conditions will normally apply. The chronic IWC is determined using the following equation:

IWC = [Facility Flow (FF)/(Stream Chronic Low Flow (annual) + FF)] X 100%

The flows and corresponding IWC for the appropriate discharge point are:

Permitted Feature	Chronic Low Flow, 30E3 (cfs)	Facility Design Flow (cfs)	IWC, (%)
001A	0	0.23	100

The IWC for this permit is 100%, which represents a wastewater concentration of 100% effluent to 100% receiving stream. This IWC correlates to chronic WET testing. The fact sheet and the permit will contain additional information regarding the type of WET testing applicable to this facility.

VII. Antidegradation Evaluation

As set out in *The Basic Standards and Methodologies for Surface Water*, Section 31.8(2)(b), an antidegradation analysis is required except in cases where the receiving water is designated as "Use Protected." Note that "Use Protected" waters are waters "that the Commission has determined do not warrant the special protection provided by the outstanding waters designation or the antidegradation review process" as set out in Section 31.8(2)(b). The antidegradation section of the regulation became effective in December 2000, and therefore antidegradation considerations are applicable to this WQA analysis.

According to the *Classifications and Numeric Standards for Rio Grande Basin*, stream segment CORGCB03 is Reviewable. Thus, an antidegradation review is required for this segment if new or increased impacts are found to occur.

Introduction to the Antidegradation Process

The antidegradation process conducted as part of this water quality assessment is designed to determine if an antidegradation review is necessary and if necessary, to complete the required calculations to determine the limits that can be selected as the antidegradation-based effluent limit (ADBEL), absent further analyses that must be conducted by the facility.

As outlined in the *Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance* (AD Guidance), the first consideration of an antidegradation evaluation is to determine if new or increased impacts are expected to occur. This is determined by a comparison of the newly calculated WQBELs verses the existing permit limitations in place as of September 30, 2000, or the reviewable date, and is described in more detail in the analysis. Note that the AD Guidance refers to the permit limitations as of September 30, 2000 as the existing limits.

If a new or increased impact is found to occur, then the next step of the antidegradation process is to go through the significance determination tests. These tests include: 1) bioaccumulative toxic pollutant test; 2) temporary impacts test; 3) dilution test (100:1 dilution at low flow) and; 4) a concentration test.

As the determination of new or increased impacts, and the bioaccumulative and concentration significance determination tests require more extensive calculations, the Division will begin the antidegradation evaluation with the dilution and temporary impact significance determination tests. These two significance tests may exempt a facility from further AD review without the additional calculations.

Note that the antidegradation requirements outlined in *The Basic Standards and Methodologies for Surface Water* specify that chronic numeric standards should be used in the antidegradation review; however, where there is only an acute standard, the acute standard should be used. The appropriate standards are used in the following antidegradation analysis.

Significance Tests for Temporary Impacts and Dilution

The ratio of the chronic (30E3) low flow to the design flow is 0:1, and is less than the 100:1 significance criteria. Therefore this facility is not exempt from an AD evaluation based on the dilution significance determination test, and the AD evaluation must continue.

For the determination of a new or increased impact and for the remaining significance determination tests, additional calculations are necessary. Therefore, at this point in the antidegradation evaluation, the Division will go back to the new or increased impacts test. If there is a new or increased impact, the last two significance tests will be evaluated.

New or Increased Impact and Non Impact Limitations (NILs)

To determine if there is a new or increased impact to the receiving water, a comparison of the new WQBEL concentrations and loadings verses the concentrations and loadings as of December 31, 2013 (the date the segment became reviewable), needs to occur. If either the new concentration or loading is greater than the December 31, 2013 concentration or loading, then a new or increased impact is determined. If this is a new facility (commencement of discharge after December 31, 2013) it is automatically considered a new or increased impact.

Note that the AD Guidance document includes a step in the New or Increased Impact Test that calculates the Non-Impact Limit (NIL). The permittee may choose to retain a NIL if certain conditions are met, and therefore the AD evaluation for that parameter would be complete. As the NIL is typically greater than the ADBAC, and is therefore the chosen limit, the Division will typically conclude the AD evaluation after determining the NIL. Where the NILs are very stringent, or upon request of a permittee, the Division will calculate both the NIL and the AD limitation so that the limitations can be compared and the permittee can determine which of the two limits they would prefer, one which does not allow any increased impact (NIL), or the other which allows an insignificant impact (AD limit).

The non impact limit (NIL) is defined as the limit which results in no increased water quality impact (no increase in load or limit over the December 2013 load or limit). The NIL is calculated as the December 2013 loading, divided by the new design flow, and divided by a conversion factor of 8.34. If there is no change in design flow, then the NIL is equal to the December 2013 permit limitation.

If the facility was in place, but did not have a limitation for a particular parameter in the December 2013 permit, the Division may substitute an implicit limitation. Consistent with the First Update to the AD Guidance of April 2002, an implicit limit is determined based on the approach that specifies that the implicit limit is the maximum concentration of the effluent from January 2011 to December 2013. If this data is unavailable, the Division may substitute more recent representative data, if appropriate, on a case by case basis. Note that the AD requirements specify that chronic values should be used in the AD review; however, where there is only an acute standard, the acute value should be used. Thus, for determining implicit limitations for chronic standards, the 30 day average effluent values are used, while for acute standards, the daily maximum values

are used. Note that if there is a change in design flow, the implicit limit/loading is subject to recalculation based on the new design flow. For parameters that are undisclosed by the permittee, and unknown to the Division to be present, an implicit limitation may not be recognized.

This facility was in place as a discharger prior to December 31, 2013, and therefore the new or increased impacts test must be conducted. As the design flow for this facility is the same as it was in December 2013, the NILs are equal to the permit limitations as of December 31, 2013. The previous permit became effective on December 31, 2013.

For total ammonia, the limitations as of December 31, 2013 were used in the evaluation of new or increased impacts. For E. coli, in accordance with Division practice, where permit limitations prior to December 31, 2013 are based on fecal coliform, E. coli limits will be estimated as 0.32 x fecal coliform limits. For TRC, the existing permit prior to December 31, 2013 did not contain TRC limitations due to the use of UV disinfection. However, previous permits for the facility have included a daily maximum limitation of 0.5 mg/l, which will be used in this assessment.

For Total Inorganic Nitrogen, data prior to 2013 were not available. Submitted Regulation 85 data from August 2013 through August 2015 were determined to be adequate and were used to determine the implicit limitations.

Calculation of Loadings for New or Increased Impact Test

The equations for the loading calculations are given below. Note that the AD requirements outlined in *The Basic Standards and Methodologies for Surface Water* specify that chronic numeric standards should be used in the AD review; however, where there is only an acute standard, the acute standard should be used. Thus, the chronic low flows will be used later in this AD evaluation for all parameters with a chronic standard, and the acute low flows will be used for those parameters with only an acute standard.

$$\text{Previous permit load} = M_{permitted}\,(mg/l) \times Q_{permitted}\,(mgd) \times 8.34$$
$$\text{New WQBELs load} = M_2\,(mg/l) \times Q_2\,(mgd) \times 8.34$$

Where,

$M_{permitted}$ = December 2013 permit limit (or implicit limit) **(mg/l)**
$Q_{permitted}$ = design flow as of December 2013 **(mgd)**
Q_2 = current design flow (same as used in the WQBEL calculations)
M_2 = new WQBEL concentration **(mg/l)**
8.34 = unit conversion factor

Table A-10 shows the results of these calculations and the determination of a new or increased impact.

Calculation of Non-Impact Limitations

The design flow of this facility as of December 31, 2013 was 0.15 MGD. The new design flow of this facility is 0.15 MGD. To determine if new or increased impacts are to occur, the December 2013 permit concentrations need to be adjusted for this new design flow. The equations are shown below.

$$\text{December 2013 permit load} = M_{permitted} \times Q_{permitted} \times 8.34$$
$$\text{Non Impact Limit (NIL)} = \text{September 2000 permitted load} \div \text{New Design Flow} \div 8.34$$

Where,

$M_{permitted}$ = December 2013 permit limit or implicit limit **(mg/l)**
$Q_{permitted}$ = December 2013 design flow **(mgd)**
Q_2 = new or current design flow **(mgd)**
8.34 = Unit conversion factor

Table A-7 shows the results of these calculations and the determination of a new or increased impact.

Table A-7

Determination of New or Increased Impacts

Pollutant	*Dec 2013 Permit Limit*	*Dec 2013 Permit Load (lbs/day)*	*NIL*	*New WQBEL*	*New WQBEL Load (lbs/day)*	*New or Increased Impact*
E. coli (#/100 ml)	64	80	64	126	158	Yes
TRC (mg/l)	0.5	0.63	0.5	0.011	0.014	No
Total Inorganic Nitrogen as N (mg/l)	18.5	23	18.5	10	13	No
NH_3, Tot as N (mg/l), Jan	5.0	6.3	5.0	5.3	6.6	Yes
NH_3, Tot as N (mg/l), Feb	4.1	5.1	4.1	5.4	6.8	Yes
NH_3, Tot as N\(mg/l) Mar	4.4	5.5	4.4	4.6	5.8	Yes
NH_3, Tot as N (mg/l) Apr	3.9	4.9	3.9	4.5	5.6	Yes
NH_3, Tot as N (mg/l) May	3.3	4.1	3.3	4.4	5.5	Yes
NH_3, Tot as N (mg/l) Jun	3.4	4.3	3.4	4	5	Yes
NH_3, Tot as N (mg/l) Jul	3.0	3.8	3.0	3.3	4.1	Yes
NH_3, Tot as N (mg/l) Aug	2.2	2.8	2.2	3.2	4	Yes
NH_3, Tot as N (mg/l) Sep	2.6	3.3	2.6	3.4	4.3	Yes
NH_3, Tot as N (mg/l) Oct	2.5	3.1	2.5	3.8	4.8	Yes
NH_3, Tot as N (mg/l) Nov	3.8	4.8	3.8	4.6	5.8	Yes
NH_3, Tot as N (mg/l) Dec	4.0	5	4.0	5	6.3	Yes
Note that loading for E. coli cannot be calculated; but, for comparison purposes, the approach is sufficient.						

As shown in Table A-7, there are no new or increased impacts to the receiving stream based on the new WQBELS for TRC and TIN and for these parameters the AD evaluation is complete and the WQBELs are the final result of this WQA.

For Ammonia (all months) and E. coli there are new or increased impacts and in accordance with regulation, the permittee has the option of choosing either the NILs or ADBACs. Because the ADBACs are generally more stringent than NILs, the Division assumes that the permittee will choose NILs rather than ADBACs, and therefore the Division will stop the AD evaluation at this point and assign the NILs to the permit. For those parameters where there is not a NIL (either implicit or explicit) the AD Guidance allows for the collection of data to determine an implicit limitation. Therefore, the permittee will be required to conduct "monitoring only" for those parameters. The permittee may request ADBAC limits. If the permittee does request ADBAC limits, the Division will proceed with the completion of this Antidegradation Analysis.

Alternatives Analysis

If the permittee does not want to accept an effluent limitation that results in no increased impact (NIL) or in insignificant degradation (ADBAC), the applicant may conduct an alternatives analysis (AA). The AA examines alternatives that may result in no degradation or less degradation, and are economically, environmentally, and technologically reasonable. If the proposed activity is determined to be important economic or social development, a determination shall be made whether the degradation that would result from such regulated activity is necessary to accommodate that development. The result of an AA may be an alternate limitation between the ADBEL and the WQBEL, and therefore the ADBEL would not being applied. This option can be further explored with the Division. See Regulation 31.8 (3)(d), and the Antidegradation Guidance for more information regarding an alternatives analysis.

VIII. Technology Based Limitations

Federal Effluent Limitation Guidelines

The Federal Effluent Limitation Guidelines for domestic wastewater treatment facilities are the secondary treatment standards. These standards have been adopted into, and are applied out of, Regulation 62, the Regulations for Effluent Limitations.

Regulations for Effluent Limitations

Regulation No. 62, the Regulations for Effluent Limitations, includes effluent limitations that apply to all discharges of wastewater to State waters, with the exception of storm water and agricultural return flows. These regulations are applicable to the discharge from the proposed discharge.
Table A-8 contains a summary of the applicable limitations for pollutants of concern at this facility.

Table A-8

Regulation 62 Based Limitations

Parameter	*30-Day Average*	*7-Day Average*	*Instantaneous Maximum*
BOD_5	30 mg/l	45 mg/l	NA
BOD_5 Percent Removal	85%	NA	NA
TSS, mechanical plant	30 mg/l	45 mg/l	NA
TSS Percent Removal	85%	NA	NA
Total Residual Chlorine	NA	NA	0.5 mg/l
pH	NA	NA	6.0-9.0 s.u.
Oil and Grease	NA	NA	10 mg/l

Nutrient Effluent Limitation Considerations

WQCC Regulation No. 85, the new *Nutrients Management Control Regulation*, includes technology based effluent limitations for total inorganic nitrogen and total phosphorus that currently, or will in the future, apply to many domestic wastewater discharges to State surface waters. These effluent limits for dischargers are to start being implemented in permitting actions as of July 1, 2013, and are shown in the two tables below:

Effluent Limitations Table at 85.5(1)(a)(iii)
For all Domestic Wastewater Treatment Works not identified in subsections (a)(i) or (ii) above(in Reg. 85) *and discharging prior to May 31, 2012 or for which a complete request for preliminary effluent limits has been submitted to the Division prior to May 31, 2012, the following numeric limits shall apply:*

Parameter	*Parameter Limitations*	
	Annual Median [1]	*95th Percentile [2]*
Total Phosphorus	*1.0 mg/l*	*2.5 mg/l*

Total Inorganic Nitrogen[3]	*15 mg/l*	*20 mg/l*

1 Running Annual Median: The median of all samples taken in the most recent 12 calendar months.
2 The 95th percentile of all samples taken in the most recent 12 calendar months.
3 Determined as the sum of nitrate as N, nitrite as N, and ammonia as N.

Effluent Limitations Table at 85.5(1)(b)

For New Domestic Wastewater Treatment Works which submit a complete request for preliminary effluent limits to the Division on or after May 31, 2012, the following numeric limits shall apply:

Parameter	***Parameter Limitations***	
	Annual Median [1]	*95th Percentile [2]*
Total Phosphorus	*0.7 mg/l*	*1.75 mg/l*
Total Inorganic Nitrogen[3]	*7 mg/l*	*14 mg/l*

1 Running Annual Median: The median of all samples taken in the most recent 12 calendar months.
2 The 95th percentile of all samples taken in the most recent 12 calendar months.
3 Determined as the sum of nitrate as N, nitrite as N, and ammonia as N.

Requirements in Reg. 85 also apply to non-domestic wastewater for industries in the Standard Industrial Class 'Major Group 20,' and any other non-domestic wastewater where the facility is expected, without treatment, to discharge total inorganic nitrogen or total phosphorus concentrations in excess of the numeric limits listed in 85.5 (1)(a)(iii). The facility must investigate, with the Division's approval, whether different considerations should apply.

All permit actions based on this WQA will occur after the July 1, 2013 permit implementation date of Reg. 85. Therefore, total inorganic nitrogen and total phosphorus effluent limitations potentially imposed because of Reg. 85 must be considered. However, also based on Reg. 85, there are direct exemptions from these limitations for smaller domestic facilities that discharge less than or equal to 1 million gallons per day (MGD), or are a domestic facility owned by a disadvantaged community.

Delayed implementation (until 12/31/2027) is also specified in Reg. 85 to occur for domestic WWTFs that discharge more than 1 MGD, and less than or equal to 2.0 MGD, or have an existing watershed control regulations (such as WQCC Reg.'s 71-74), or where the discharge is to waters in a low-priority 8-digit HUC.

For all other larger domestic WWTFs, the nutrient effluent limitations from the two tables above will apply, unless other considerations allowed by Reg. 85 at 85.5(3) are utilized to show compliance with exceptions or variances to these limitations.

The Division will consider this proposed WWTF to be an existing WWTF, as the previous facility was discharging and permitted prior to May 31, 2012. Also, since the design capacity of the Aspen Institute WWTF is 0.15 MGD, the facility is not currently required to address the new technology based effluent limits as of 7/1/2013.

However, the Division does not intend these results to discourage the Aspen Institute WWTF from working on nutrient control with the other dischargers within the Rio Grande watershed. These dischargers upstream and downstream of the Aspen Institute WWTF have the potential to create future nutrient issues in the unnamed dry was tributary to South Crestone Creek. The Division encourages these entities to all work together to create the most efficient and cost effective solutions for nutrient control in the Rio Grande watershed.

IX. References

Regulations:

The Basic Standards and Methodologies for Surface Water, Regulation 31, Colorado Department Public Health and Environment, Water Quality Control Commission, effective January 1, 2018.

Classifications and Numeric Standards for Rio Grande Basin, Regulation No. 36, Colorado Department Public Health and Environment, Water Quality Control Commission, effective June 30, 2019.

Regulations for Effluent Limitations, Regulation 62, CDPHE, WQCC, July 30, 2012.

Nutrients Management Control Regulation, Regulation 85, Colorado Department Public Health and Environment, Water Quality Control Commission, effective December 30, 2017.

Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List, Regulation 93, Colorado Department Public Health and Environment, Water Quality Control Commission, effective March 2, 2018.

Policy and Guidance Documents:

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, December 2001.

Memorandum Re: First Update to (Antidegradation) Guidance Version 1.0, Colorado Department Public Health and Environment, Water Quality Control Division, April 23, 2002.

Rationale for Classifications, Standards and Designations of Segments of the Rio Grande River, Colorado Department Public Health and Environment, Water Quality Control Division, effective June 10, 2013.

Policy Concerning Escherichia coli versus Fecal Coliform, CDPHE, WQCD, July 20, 2005.

Colorado Mixing Zone Implementation Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, effective April 2002.

Policy for Conducting Assessments for Implementation of Temperature Standards in Discharge Permits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-23, effective July 3, 2008.

Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-24, effective March 10, 2008.

Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-19, effective May 2002.

APPENDIX C

DISCHARGE MONITORING REPORT DATA

Baca Grande Water Sanitation District
Discharge Monitoring Report Data

	Influent								Effluent															
	Flow		BOD				TSS		BOD		BOD % Removal	TSS		TSS % Removal	E. coli		pH		Ammonia		Oil & Grease	Chlorine TR	
	MGD		mg/L		lbs/day		mg/L		mg/L		%	mg/L		%	#/100 mL		su		mg/L		mg/L	mg/L	mg/L
	30-DA	DM	30-DA	7-DA	30-DA	7-DA	30-DA	7-DA	30-DA	7-DA	MO AV MN	30-DA	7-DA	MO AV MN	30-DA	7-DA	Min	Max	30-DA	DM	DM	30- DA	IM
Permit Limit	0.15 0.14 0.12				300 285 240				30	45	85	30	45	85	64	128	6.5	9	See Permit	See Permit	10	0.011	0.019
Jan-18	0.050	0.060							40.0	54.0	87				15	15	6.9	7.7	0.2	0.2			
Feb-18	0.060	0.070							32.0	32.0	88				8	8	7.4	8.3	3.9	3.9		0.102	0.240
Mar-18	0.050	0.060	373	541	202	239	257	383	23.0	48.0	90	55	185	80	10	10	7.6	8.2	2.0	2.0		0.026	0.060
Apr-18	0.050	0.070							8.0	8.0	98				12	12	7.4	7.9	0.6	0.6		0.030	0.030
May-18	0.060	0.070							16.0	16.0	95				46	46	7.0	7.4	0.1	0.1	0	0.043	0.050
Jun-18	0.062	0.076	392	148	392	418	339	442	5.9	5.9	98	19	19	94	49	49	6.7	7.1	0.7	0.7	0	0.000	0.000
Jul-18	0.062	0.076							10.1	10.1	97				41	41	6.7	7.1	0.1	0.1	0	0	0
Aug-18	0.067	0.074							20.7	20.7	97				48	48	7.3	7.3	0.1	0.1	0	0	0
Sep-18	0.063	0.085	341	341	190	190	21	21	6.5	3.1	97	14	14	93	37	37	7.3	7.3	0.1	0.1	0	0	0
Oct-18	0.066	0.075							4.3	4.3	98				1	2	6.9	7.5	0.1	0.1	0	0	0
Nov-18	0.066	0.077							2.9	2.9	99				2	2	7.1	7.1	0.0	0.0	0	0	0
Dec-18	0.061	0.070	303	324	164	164	332	352	3.0	3.0	99	5	9	99	2	2	7.6	7.7	0.0	0.0	0	0	0
Jan-19	0.058	0.071							3.1	3.1	99				12	12	6.9	7.6	0.0	0.0	0	0	0
Feb-19	0.063	0.092							7.7	7.7	98				0	0	7.1	7.1	0.8	0.8	0	0	0
Mar-19	0.060	0.123	230	246	238	238	317	456	8.1	8.1	97	24	24	92	1	1	7.2	7.7	0.0	0.0	0	0	0
Apr-19	0.070	0.990							7.3	7.3	98				24	24	7.3	7.3	0.0	0.0	0	0	0
May-19	0.078	0.092							6.4	6.4	99				2	2	7.2	7.3	0.0	0.0	0	0	0
Jun-19	0.089	0.140	374	374	374	449	284	284	4.9	4.9	98	24	24	92	1	1	7.2	7.2	0.0	0.0	0	0	0
Jul-19	0.090	0.113							3.8	3.8	99				7	7	7.6	8.0	0.1	0.1	0	0	0
Aug-19	0.084	0.095							4.8	4.8	98				60	60	7.2	7.2	0.9	0.9	0	0	0
Sep-19	0.073	0.094	255	255	254	312	331	424	4.3	4.8	98	11	11	97	14	22	6.9	8.4	0.1	0.4	0	0	0
Oct-19	0.066	0.080							4.0	4.0	98				2	2	6.5	6.9	0.9	0.9			
Nov-19	0.064	0.079							5.5	6.0	98				158	1986	7.2	7.2	0.1	0.1			
Dec-19	0.069	0.079	218	218	113	113	234	234	5.0	5.0	98	2	2	99	2	2	6.7	7.2	0.0	0.0			
Jan-20	0.074	0.092	370	370	302	302	512	512	8.0	8.0	98	22	22	96	5	5	6.8	7.2	0.0	0.0	0		
Feb-20	0.075	0.084	452	452	283	283	656	656	7.1	7.1	98	14	14	98	2	2	6.9	7.1	0.4	0.7	0		
Mar-20	0.069	0.079	309	309	178	178	446	446	3.5	3.5	99	4	4	99	2	2	7.0	7.0	0.8	0.8	0	0	0
Apr-20	0.069	0.076	332	332	191	191	848	848	8.3	8.3	98	17	17	98	5	5	7.1	7.1	1.2	1.2	0	0	0
May-20	0.070	0.084	396	396	211	211	540	540	8.0	8.0	98	9	9	98	72	72	7.4	7.4	11.3	29.6	0	0	0
Jun-20	0.071	0.075	364	364	212	212	693	693	5.3	5.3	99	6	6	99	7	7	7.2	7.2	1.2	1.2	0	0	0
Jul-20	0.072	0.086	432	432	238	238	656	656	12.5	12.5	97	29	29	96	58	58	7.2	7.3	1.4	1.4	0	0	0
Aug-20	0.080	0.073	104	104	63	63	330	330	3.5	3.5	97	6	6	98	12	12	6.9	7.3	0.5	0.5	0	0	0
Sep-20	0.074	0.081	286	286	172	172	286	286	2.6	2.6	99	16	16	96	7	7	6.7	7.8	0.1	0.1	0	0	0
Oct-20	0.075	0.080	207	207	121	121	198	198	3.5	3.5	98	1	1	99	10	10	7.2	7.4	0.6	0.6	0	0	0
Nov-20	0.071	0.081	216	216	130	130	546	546	3.8	3.9	98	12	12	98	3	3	7.2	7.6	0.2	0.2	0	0	0
Dec-20	0.079	0.084	290	338	174	220	497	648	13.5	17.8	95	19	20	96	20	20	7.2	7.4	0.1	0.1	0	0	0
Jan-21	0.082	0.097	295	327	202	205	363	434	19.8	48.8	93	13	16	96	2	2	6.9	6.9	2.2	2.2	0	0	0
Feb-21	0.074	0.090	382	375	156	225	382	982	17.0	24.9	94	25	30	88	17	17	6.8	6.9	2.2	2.3	0	0	0
Mar-21	0.066	0.103	289	367	159	193	616	955	6.9	14.6	98	15	41	96	9	15	6.8	7.2	1.2	1.7	0	0	0
Apr-21	0.067	0.076	179	198	97	111	262	300	5.3	6.1	97	11	11	96	12	12	7.1	7.7	1.9	2.6	0	0	0
May-21	0.069	0.076	332	468	186	285	418	697	11.3	14.9	97	28	40	93	12	12	6.9	7.3	1.4	2.2	0	0	0
Jun-21	0.091	0.110	326	628	231	456	564	1240	8.1	12.6	93	23	41	89	2	2	6.4	7.5	0.1	1.7	0	0	0
Jul-21	0.083	0.101	380	393	232	246	430	506	6.6	11.0	98	21	32	95	5	5	6.9	7.4	0.2	0.6	0	0	0
Aug-21	0.090	0.103	272	333	200	233	626	1208	6.4	12.3	98	13	46	97	3	3	6.7	7.4	0.0	0.1	0	0	0
Sep-21	0.091	0.100	279	382	193	210	466	604	12.7	31.2	95	11	14	98	2	2	7.0	7.4	0.1	0.1	0	0	0
Oct-21	0.099	0.106	199	199	164	164	401	460	5.0	5.0	98	25	30	94	3	3	6.9	7.3	0.0	0.0	0	0	0
Nov-21	0.102	0.114	238	317	183	256	324	460	5.6	6.2	98	18	21	94	17	17	7.0	7.4	0.0	0.0	0	0	0
Dec-21	0.065	0.082	284	395	152	211	315	485	8.8	14.4	97	21	26	93	37	37	7.0	7.8	0.0	0.0	0	0	0
Jan-22	0.065	0.076	465	676	238	361	467	740	8.8	14.0	98	22	27	95	13	13	7.2	7.8	0.0	0.0	0	0	0
Feb-22	0.064	0.073	422	422	218	218	386	497	4.8	4.8	99	10	12	97	8	8	7.1	7.5	0.0	0.3	0	0	0
Mar-22	0.063	0.077	486	576	238	302	671	965	3.2	4.8	99	6	8	99	3	3	6.5	7.3	0.0	0.1	0	0	0
Apr-22	0.064	0.091	438	530	198	283	558	729	7.8	8.3	98	16	21	97	10	10	6.7	7.2	0.0	0.0	0	0	0
May-22	0.067	0.079	513	635	273	318	1202	3460	2.5	2.9	100	6	8	99	5	5	6.9	7.3	0.0	0.1	0	0	0
Average	**0.071**	**0.103**	**325**	**364**	**203**	**236**	**453**	**640**	**8.6**	**11.2**	**97**	**16**	**23**	**96**	**17**	**52**	**7.0**	**7.4**	**0.7**	**1.2**	**0**	**0**	**0**
Maximum	**0.102**	**0.990**	**513**	**676**	**392**	**456**	**1202**	**3460**	**40.0**	**54.0**	**100**	**55**	**185**	**99**	**158**	**1986**	**7.6**	**8.4**	**11.3**	**29.6**	**0**	**0**	**0**

Source: Baca Grande Water & Sanitation District Discharge Monitoring Reports. Permit Number CO-0046914.

Exceedance of Permitted Limit

Exceedance of 95% Permitted Limit (Influent Flow and Organic Loading Only)

Exceedance of 80% Permitted Limit (Influent Flow and Organic Loading Only)