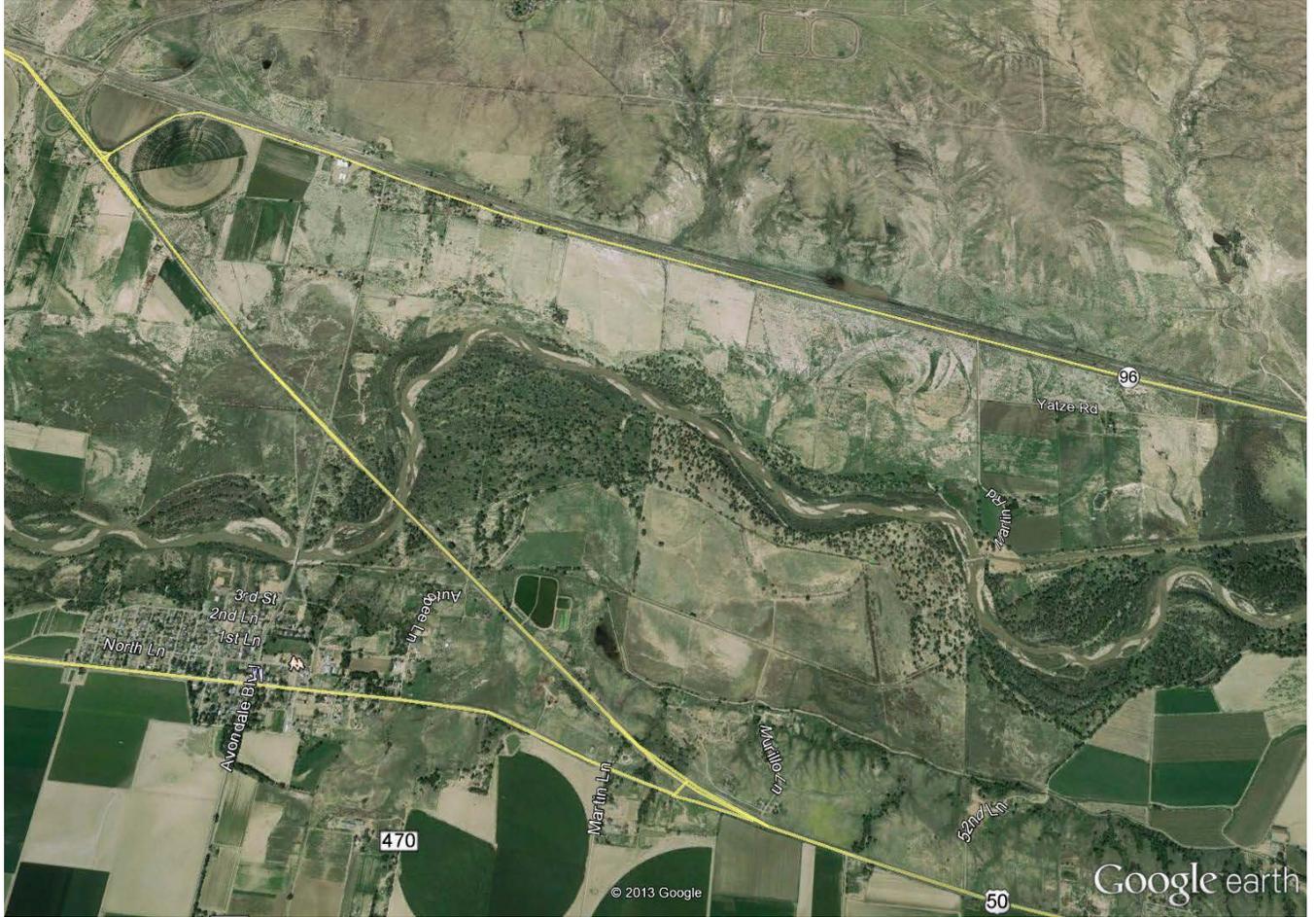


Avondale Wastewater Utility Plan

Avondale Water and Sanitation District
P.O. Box 188, 321 3rd Street
Avondale, CO 81022



Supplement for
Pueblo County and Pueblo Area Council of Governments
PACOG 2012 Water Quality Management Plan
Adopted December 2013

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***Avondale Water and Sanitation District Wastewater Utility
Approved by Board President***

February 13, 2015

This Wastewater Utility Plan is designed as a working document, which allows the Avondale Water and Sanitation District to modify or update this document as needed by the District to address wastewater management for the Avondale Water and Sanitation District. This utility plan is a stand-alone supplement to the PACOG 2012 Water Quality Management Plan (PACOG 2012 Guidance Plan, December 2012). The District certifies this Wastewater Utility Plan has been reviewed and found consistent with the PACOG 2012 Water Quality Management Plan.

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1 Facility Summary

The community of Avondale (Figure 1) is located in eastern Pueblo County, Colorado. It is predominately surrounded by farms and ranches with only local type business (small stores, cafe's) supporting its residents. The majority of Avondale residents commute back and forth to Pueblo to work. However, some remain and work locally on the farms and businesses. According to Census figures, the Town has had negative growth over the past 10 years.

Avondale Water and Sanitation is a special service district and governmental subdivision of the State of Colorado, formed to collect wastewater (and distribute potable water) for residents of Avondale, Colorado. The District serves approximately 1023 people in Avondale and Orchard Park (278 taps or 3.7 persons / household, 2000 Census numbers). The Avondale discharge permit includes two wastewater facilities: the Avondale lagoon treatment works and the Ft. Reynolds lagoon treatment works. The Ft. Reynolds treatment lagoon is a non-discharging lagoon in the Fort Reynolds area (1.5 miles east of Avondale lagoons). Outlying areas around Avondale that are not serviced by domestic wastewater taps and other dwellings within the area are utilizing on-site wastewater treatment systems.

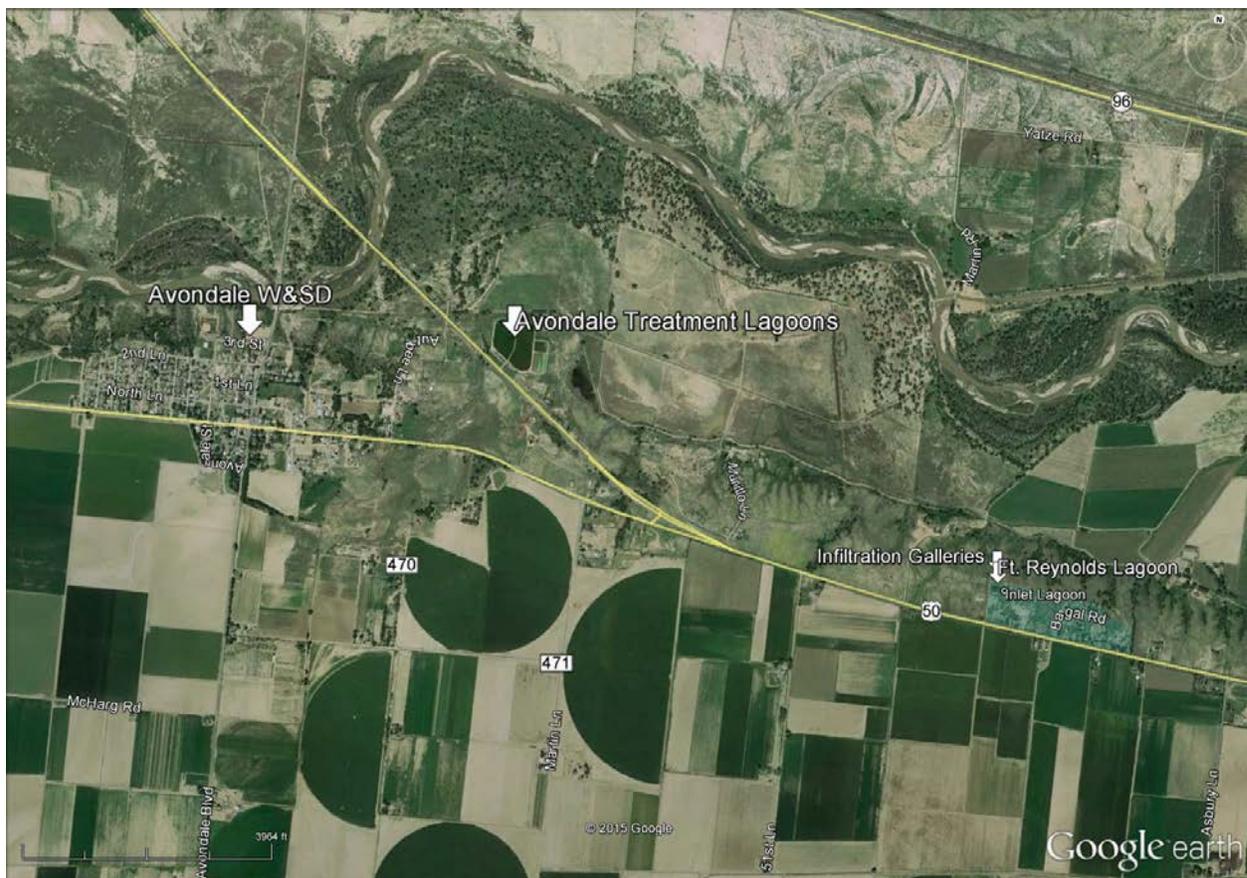


Figure 1 Avondale Community and Wastewater Treatment Works

The District is in need of a system upgrade that includes measures to improve effluent quality and system reliability. Presently, the Avondale wastewater treatment facility (lagoon system and wetland cells) is compliant with Colorado Department of Public Health and Environment (CDPHE) regulations; however, upgrades to the wastewater treatment facility as well as minor improvements to the collection system are needed, which will be elaborated upon throughout this report. The *Preliminary Engineering Report* (Anselmo Engineering, Inc. July 2011) describes the district planning area, existing treatment facilities, need for upgrades, and proposed upgrades, in particular for the Avondale wastewater treatment

lagoons. The Fort Reynolds facilities are noted; however recommendations for upgrades are not included in the *Preliminary Engineering Report*.

Limited information and documents are available to produce the Avondale Wastewater Utility plan. As such the key referenced documents (Incorporated or attached as technical references) in this utility plan are:

- 1) Avondale Water & Sanitation District, Avondale, CO *Preliminary Engineering Report Wastewater Wetlands Upgrades*, July, 2011 Written by: Anselmo Engineering, Inc., 4732 Eagleridge Circle, Pueblo, CO 81008 (719) 545-6287 Office; (719) 545-6247 Fax; Email: anselmoeng.com
- 2) The *Water Quality Assessment* developed by the Colorado Department of Public Health and Environment, Water Quality Control Division Permit Unit as part of the CDPS Permit Number CO-0021075, August 5, 2005.
- 3) Additional information used in this Utility Plan is derived from the CDPS issued permit CO-0021075, issued on November 17, 2005 and expired on December 31, 2010. The permit is on administrative extension until a new discharge permit is issued by the Colorado Department of Public Health and Environment, Water Quality Control Division Permit Unit.
- 4) The PACOG 2012 Water Quality Management Plan, as adopted December 6, 2013. Wastewater Service area map of Avondale Water and sanitation District drafted by PACOG, August 19, 2011.

1.1 Utility Plan Document Purpose

The Avondale wastewater utility plan contains the type of information that may be used in the Colorado Site Application Process (Guidance Document for the Site Location and Design Approval Regulations, For Domestic Wastewater Treatment Works. Regulation Number 22, November 2007). This utility plan is a stand-alone supplement to the PACOG 2012 Water Quality Management Plan (*PACOG 2012 Guidance Plan, December 2012*).

The Avondale Wastewater Utility Plan addresses utility service area for the existing wastewater treatment works. This WWUP provides available basic information for the wastewater treatment works plan related to:

1. Treatment works information to assist in preparing *site application* amendments or discharge permits;
2. Available water quality data and assessments. Generally this information will mirror available water quality assessment reports developed by the Water Quality Control Division and may include, but is not limited to:
 - a. Preliminary Effluent Limits (PELs),
 - b. Copy of issued permit limits,
 - c. Summary of the WQCD Water Quality Assessment (WQA) analysis,
 - d. Low flow analysis,
 - e. Pollutants of concern,
 - f. 305(b) listings,
 - g. Monitoring and Evaluation listing,
 - h. Temporary modifications,
 - i. Recommended or adopted total maximum daily loads (TMDLs),
 - j. Local or PACOG studies and water quality analysis, and

- k. Permittee generated technical memorandums and recommendations.
3. Wastewater management strategies for a treatment works, including collection systems;
4. Facility information to assist in preparing total maximum daily loads, wasteload allocations and/or other watershed planning efforts, as appropriate or necessary;
5. Assurance that adjacent utility plans do not overlap and provides a regional consistency statement.
6. Existing demographic or updated population information.
7. Service area map and/or any expected future expansions of service area.

The Avondale Wastewater Utility Plans is referenced in the PACOG 2012 Water Quality Management Plan. The Avondale Wastewater Utility plan is maintained by the utility for planning and permitting purposes and can be amended at any time by utility as necessary and appropriate. As such, the PACOG 2012 Plan may not be updated when a utility plan is amended and the most current utility plan remains the controlling document for site application and permitting purpose as referenced. This process is intended to facilitate a timely processing of this utility plan.

A common table of contents has been established for all wastewater utility plans that are designated as supplements to the PACOG 2012 Water Quality Management Plan (December 2012). As such, there may not be any available information for a specific table of content topic and the utility plan will simply note that no information is available or in some cases un-necessary for a given topic.

This wastewater utility plan contains available information and engineering or other water quality documents, or summaries from the Colorado wastewater discharge permit. Not all information generally required for the site application process may be available in this document. The utility plan is designed to be updated and amended by the utility or community as necessary.

1.2 Certification of Consistency PACOG 2012 Water Quality Management Plan

The Avondale Wastewater Utility Plan has been reviewed and found consistent with the PACOG 2012 Water Quality Management Plan as approved by PACOG on December 6, 2012. The consistency review determined that the Avondale wastewater utility plan is not in conflict with any adjacent wastewater utility plans, service area and this document meets the intent of a 208 plan.

This wastewater treatment facility is not designated as a regional treatment works and there is no consideration for any future consolidation or regionalization through the planning horizon of 2035. There is no alternate local demographic information and the summary contained in the PACOG 2012 Water Quality Management Plan is appropriate and update.

1.3 Facility Name and Location

The Avondale Water and Sanitation District operates two wastewater treatment works, both of which are covered by the single permit CO-0021075: 1) the Avondale wastewater treatment plant (WWTP), located in Section 9, T21S, R62W; and 2) the Fort Reynolds WWTP, location in Section 11, T21S, R62W; approximately 1/4 mile east of Avondale, along Highway 50. The outfalls are identified as being in Section 9, T21S, R62W and in Section 11, T21S, R62W to the Green Arroyo and unclassified ground water in accordance with effluent limitations, monitoring requirements and other conditions set forth in Part I, and II of Colorado Discharge Permit No.: C0-0021075 in the county of Pueblo (Table 1).

The Avondale Water and Sanitation District offices and water treatment plant is located at 321 3rd Street, Avondale Co 81022. Latitude 38°14'25.51"N, Longitude 104°21'1.45"W (Figure 2)



Figure 2 Avondale Water and Sanitation District

Legal Contact:

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Avondale, CO 81022

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Richard Hayes, Operator
Avondale Water and Sanitation District
P.O. Box 188
321 3rd Street
Avondale, CO 81022

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(719) 947-0083 fax
Email: avondalewater@aol.com

The Avondale Lagoons (Table 1) are listed in the permit as: Latitude 38°14'29.36"N, Longitude 104°20'8.61"W (Figure 3). The measured onsite coordinates of the Avondale Lagoons are Latitude 38.24017°, Longitude W104.33628°.

The Ft. Reynolds Lagoon is located at: Latitude N38.23241° Longitude W104.307905°. Figure 4 is the location of the lagoon works as identified in the discharge permit. Figure 5 shows the Ft. Reynolds service area and the lagoon system. Figure 6 shows the Ft. Reynolds Lagoon and infiltration galleries, with the inlet location.



Figure 3 Avondale Wastewater Treatment Lagoons

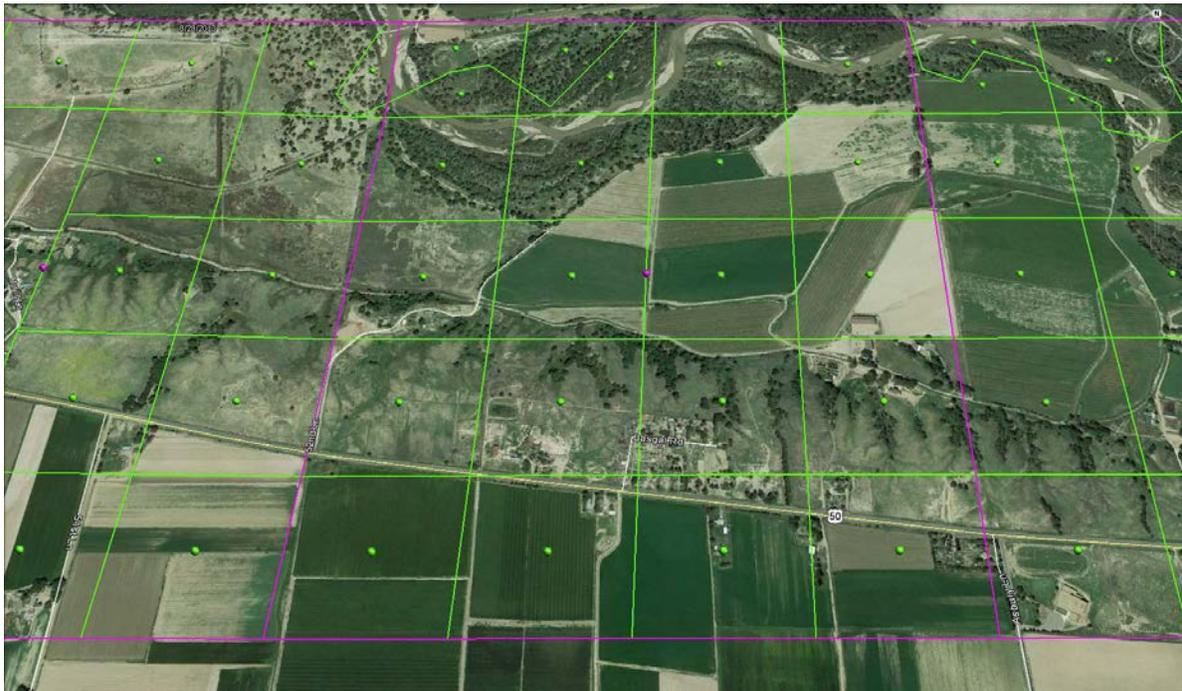


Figure 4 Section 11 T21S R62W Location Area for Ft. Reynolds lagoon



Figure 5 Ft. Reynolds Lagoon and Service Area

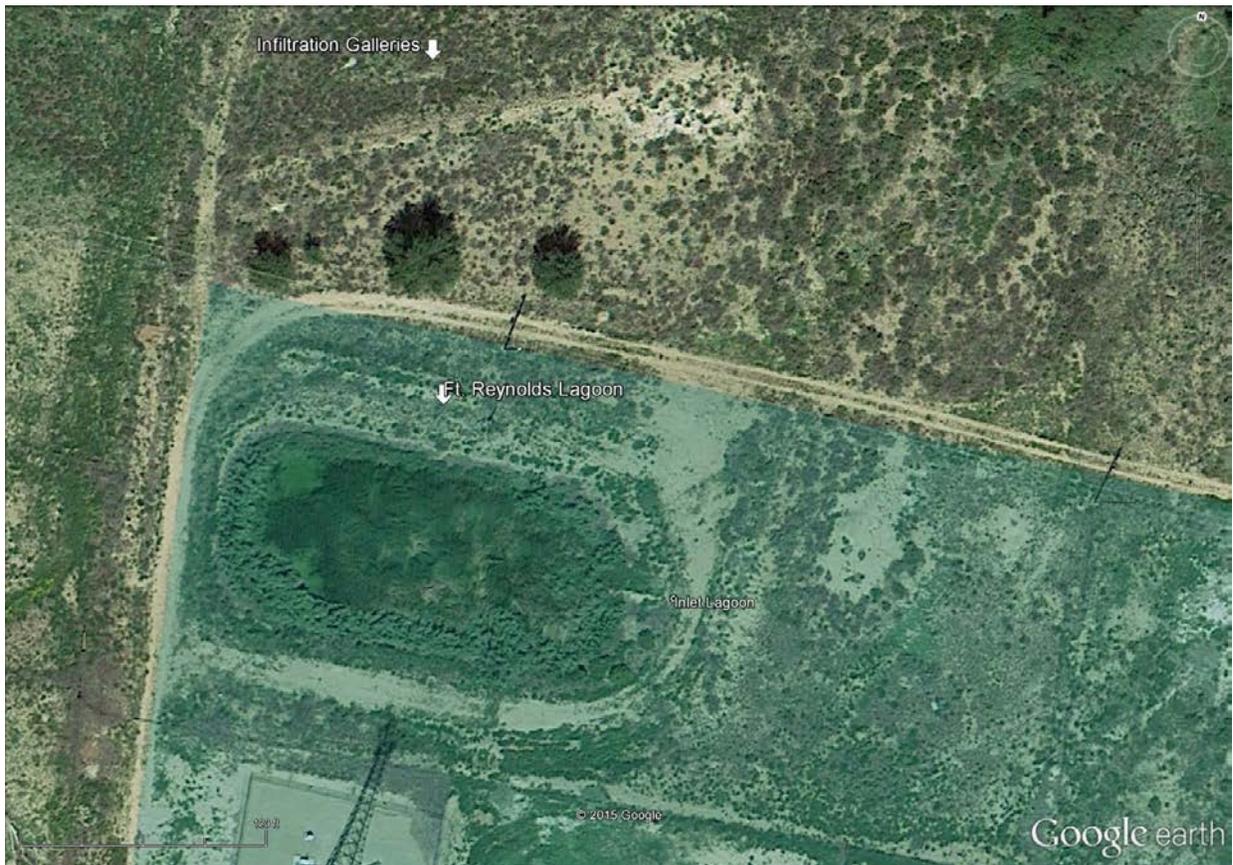


Figure 6 Ft. Reynolds Lagoon, Infiltration Galleries, and Inlet.

Table 1 Avondale Permit

Discharger	2011 Permit	Permit Type
Domestic Wastewater Treatment Dischargers, Pueblo County		
Avondale Water and Sanitation District WWTF	CO-0021075	Domestic - Minor Municipal, Lagoon System
Ft Reynolds Lagoon		Domestic - Minor Municipal, Lagoon System

1.4 Summary Table from PACOG 2012 Water Quality Management Plan

Table 2 is from the PACOG 2012 Water Quality management Plan and provides an over-view summary of information on the Avondale Water and Sanitation District.

Table 2 Avondale Permit Summary

Avondale Water and Sanitation District	
TYPE OF PERMIT	Domestic - Minor Municipal, Lagoon System
Permit Number:	CO-0021075
Permit Issue Date	17-Nov-05
Permit Expire Date	31-Dec-10
Facility Address:	Avondale Water and Sanitation District, P.O. Box 188, Avondale, CO 81022
SIC Code:	4952 Sewerage Systems
Avondale Facility Classification:	Class D
Facility Hydraulic Capacity:	0.1146 MGD
Facility Organic Capacity:	211 lbs BOD5/day
Treatment Works:	Influent Flow Measuring Device and Recorder; Aerated Lagoons; Wetland Cells; Chlorine Contact Chamber
Lift Stations:	1 (not used)
2010 Average Daily Effluent Treated:	0.09 MGD
Ft. Reynolds Facility Classification:	Class D
Facility Hydraulic Capacity:	0.016 MGD
Facility Organic Capacity:	44.7 lbs BOD5/day
Treatment Works:	Influent Flow Measuring Device and Recorder; non-Aerated Lagoon; two infiltration cells
Lift Stations:	1 @ 4,000 average peak flow gpd
2010 Average Daily Effluent Treated:	0.004 MGD
Service Areas:	Existing district boundaries (no future expansion expected)
Plant Expansion:	Neither plant expected to expand by 2035
2010 Service Area Population Estimate:	674
2035 Service Area Population Estimate:	708
Biosolids Disposal:	none
Avondale Discharge Point:	001A and 001B, Green Arroyo into the Collier Ditch. Green Arroyo is a dry/zero low flow tributary to the Arkansas River.

Avondale Water and Sanitation District	
Waterbody Identification:	COARMA04d (Arkansas River Basin, Middle Arkansas Sub-basin, Stream Segment 04d: All tributaries, including wetlands, to the Arkansas River and Pueblo Reservoir from the inlet to Pueblo Reservoir to the Colorado Canal headgate, except for specific listings in the Fountain Creek Subbasin and in Segments 4a, 4b, 4c, 5 through 18.)
Receiving Water Designation:	Use Protected
Receiving Water Classification:	Aquatic Life Warm 2, Recreation 1a, Agriculture
Ft. Reynolds Discharge Point:	002A, Discharge to “infiltration lagoons” located in the alluvium of unnamed dry/zero low flow tributaries of the Arkansas River.
Waterbody Identification:	COARLA02a (All tributaries to the Arkansas River, including wetlands, all lakes and reservoirs, from the Colorado Canal headgate to the Colorado/Kansas border except for specific listings in segments 2b, 3 through 13, and Middle Arkansas Basin listings.)
Receiving Water Designation:	Use Protected
Receiving Water Classification:	Aquatic Life Warm 2, Recreation N, Agriculture
303(d) Listing Regulation #93	none
Water Quality Pollutants of Concern	Fecal Coliform, Escherichia coli

1.5 Existing Wastewater Treatment System

1.5.1 Ft. Reynolds Lagoon System

The Ft. Reynolds treatment works (Figure 7) consists of the following treatment components and unit processes as listed in the discharge permit:

- 1) One sewage lift station and associated force main.
- 2) A continuous influent flow measuring device and recorder,
- 3) A single un-aerated lagoon,
- 4) Two infiltration ponds,
- 5) A continuous effluent flow measuring device and recorder, and
- 6) Three groundwater monitoring well lysimeters.

The Ft. Reynolds Lagoon system is not correctly located in the discharge permit. The correct coordinates for the Ft. Reynolds Lagoon are: Latitude N38.23241° Longitude W104.307905°. The site visit to the Ft. Reynolds lagoon system showed a poorly maintain lagoon pond as evident in Figure 7. There was no on-site indication of continuous influent or effluent flow devices. There is no active discharge from the lagoon system, which acts as an evaporation lagoon. The two infiltration galleries/ponds are not in use and there is no indication that these galleries ever were in operation over the last 15 years (1999 imagery) . The discharge permit identifies the discharge point as “002A, Discharge to “infiltration lagoons” located in the alluvium of unnamed dry/zero low flow tributaries of the Arkansas River”. The infiltration gallery/pond sites are not located in the alluvium of a dry/zero low flow tributary (See Figure 6); there is no direct tributary flow from the lagoon system that could reach the Arkansas River. There are no onsite structures and recording devices. The three groundwater monitoring well lysimeters were not functional during the site inspection. This wastewater lagoon needs maintenance and upgrades (Figure 8 and Figure 9). There are only about 16 residences and one commercial property connection to the lagoon system.



Figure 7 Ft. Reynolds Lagoon and Inlet Location (8-8-2013)



Figure 8 Ft. Reynolds Lagoon looking Toward Residences (4-23-2014).



Figure 9 The Dark Green Area In The Bottom Is Accumulated Sewage Sludge.

Table 3 list the permitted discharge location for Ft. Reynolds Lagoon as contained in the discharge permit. Figure 10 shows the Ft. Reynolds Lagoon in relation to the Arkansas River. There is no direct connection with potential flow from the lagoon system with the Arkansas River. The river is about 0.6 miles north of the lagoon system. Drainage from the lagoon area flows into a downstream ditch system. The Ft. Reynolds Lagoon facility schematic (Figures 11) is taken from the permit and is shown below as depicted in the permit.

Table 3 Ft. Reynolds Discharge Location

Ft. Reynolds Treatment Works	
CDPS Number	CO-0021075
WBID - Stream Segment	All tributaries to the Arkansas River, including wetlands, all lakes and reservoirs, from the Colorado Canal headgate to the Colorado/Kansas border except for specific listings in segments 2b, 3 through 13, and Middle Arkansas Basin listings. COARLA02a
Classifications	Aquatic Life Warm 2, Recreation 2, and Agriculture
Designation	Use Protected



Figure 10 Ft. Reynolds lagoon in Relation to the Arkansas River

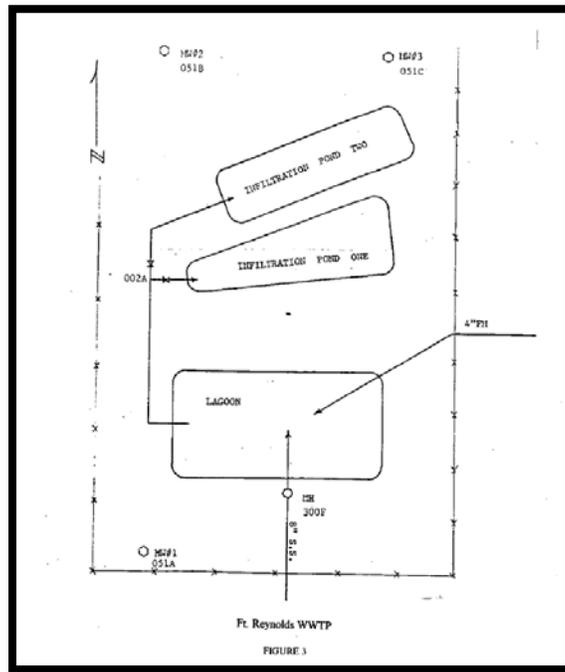


Figure 11 Schematic of the Ft. Reynolds Lagoon System (See Figure 6 and Figure 7)

The Ft Reynolds lagoon treatment works has a designated outfall 002A as part of the infiltration ponds. Three groundwater-monitoring wells are located around the perimeter of the Ft. Reynolds facility to monitor groundwater quality. These groundwater monitoring systems are not functional.

1.5.2 Avondale Lagoon System

Avondale’s wastewater discharge permit is for two separate treatment facilities operating under the same permit: Avondale and Ft. Reynolds. Both wastewater treatment works are minor municipal lagoon systems. The Avondale treatment works consists of the following treatment components and unit processes:

- 1) Two sewage lift stations and associated force main,
- 2) A continuous influent flow measuring device and recorder,
- 3) Three un-aerated lagoons,
- 4) Three wetland cells,
- 5) A chlorine contact chamber, and
- 6) A continuous effluent flow measuring device and recorder.

Table 4 list the permitted discharge location for Avondale. The facility schematic (Figures 12 and 13) is taken from the permit and is shown below as depicted in the permit. The service area map for Avondale is contained in section 2.4 of this utility plan.

Table 4 Avondale Discharge Location

Avondale Treatment Works	
CDPS Number	CO-0021075
WBID - Stream Segment	Arkansas River Basin, Middle Arkansas Sub-basin, Stream Segment 04d: All tributaries, including wetlands, to the Arkansas River and Pueblo Reservoir from the inlet to Pueblo Reservoir to the Colorado Canal headgate, except for specific listings in the Fountain Creek Subbasin and in Segments 4a, 4b, 4c, 5 through 18. COARMA04d
Classifications	Aquatic Life Warm 2, Recreation 1a, and Agriculture
Designation	Use Protected

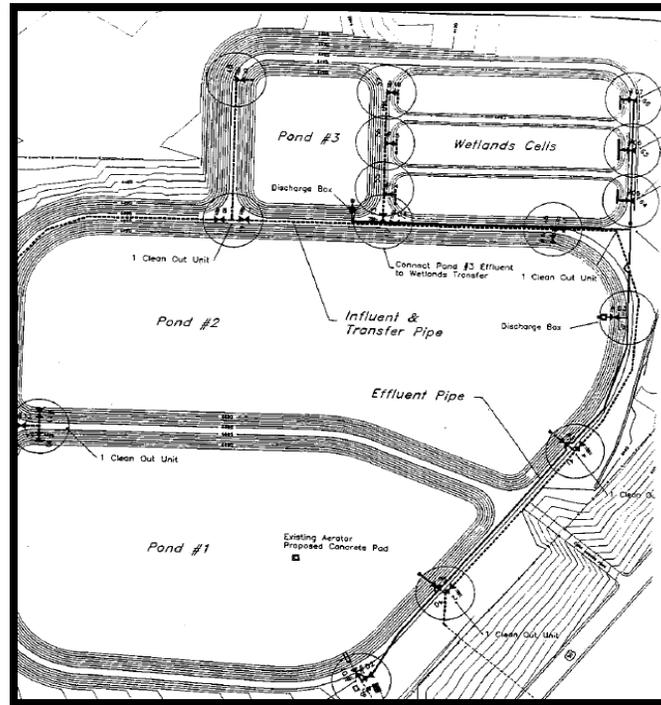


Figure 12 Schematic of the Avondale Lagoon System (See also Figure 3 and Figure 11)



Figure 13 Avondale Lagoon from Entrance

The Avondale permit has effluent limits for two wastewater treatment lagoon systems with three permitted discharge outfall points. The lagoon systems are not aerated. The lagoons rely on detention time to process the influent wastewater. The Avondale treatment works includes discharge through a 3-pond lagoon system with treated effluent polished in a 3-cell wetlands processing unit (outfall 001A) that contributes flow to Green Arroyo, and a land application (outfall 001B), when appropriate. Four

groundwater-monitoring wells are located around the perimeter of the Avondale facility to monitor groundwater quality.

The Water Quality Control Division permit unit section conducted an assessment of the stream standards, low flow data, and ambient stream data and performed a determination of the assimilative capacities for the Green Arroyo for potential pollutants of concern. This information includes an antidegradation review. The Division's permits unit 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 Avondale Water and Sanitation District facility is capable of treating a hydraulic capacity of 0.1146 MGD and an organic capacity of 211 lbs. BOD₅/day. The major hydraulic capacity limiting factor for this lagoon system is detention time. Based upon the detention time of 180 days, and taking evaporation and pond seepage into account, the hydraulic capacity was set by the WQCD permit unit at 0.1146 MGD. The organic loading capacity of 211 lbs. BOD₅/day was set using the State design criteria of 0.5 lbs. BOD₅/day per 1,000 ft² of surface area. The Fort Reynolds facility has a hydraulic capacity of 0.016 MGD with the organic capacity set at 44.7 lbs. BOD₅/day.

The Avondale treatment works discharges to Green Arroyo which then empties into the Collier Ditch. Green Arroyo is a dry/zero low flow tributary to the Arkansas River (Figure 14). From the point of discharge into Green Arroyo and where the Collier Ditch empties into the Arkansas River is approximately 2 miles. Because of the low discharge volume and distance no flow from the WWTF makes it to the Arkansas River. The permit indicates that the discharge from Ft. Reynolds treatment works is to *infiltration lagoons* located in the alluvium of unnamed dry/zero low flow tributaries of the Arkansas River. There is no discharge from the primary lagoon, which serves as an evaporative system. The infiltration lagoons are not functional and there is no historic indication that they were ever operational. Because of the low discharge volume and distance, no flow from the lagoon system makes it to the Arkansas River.

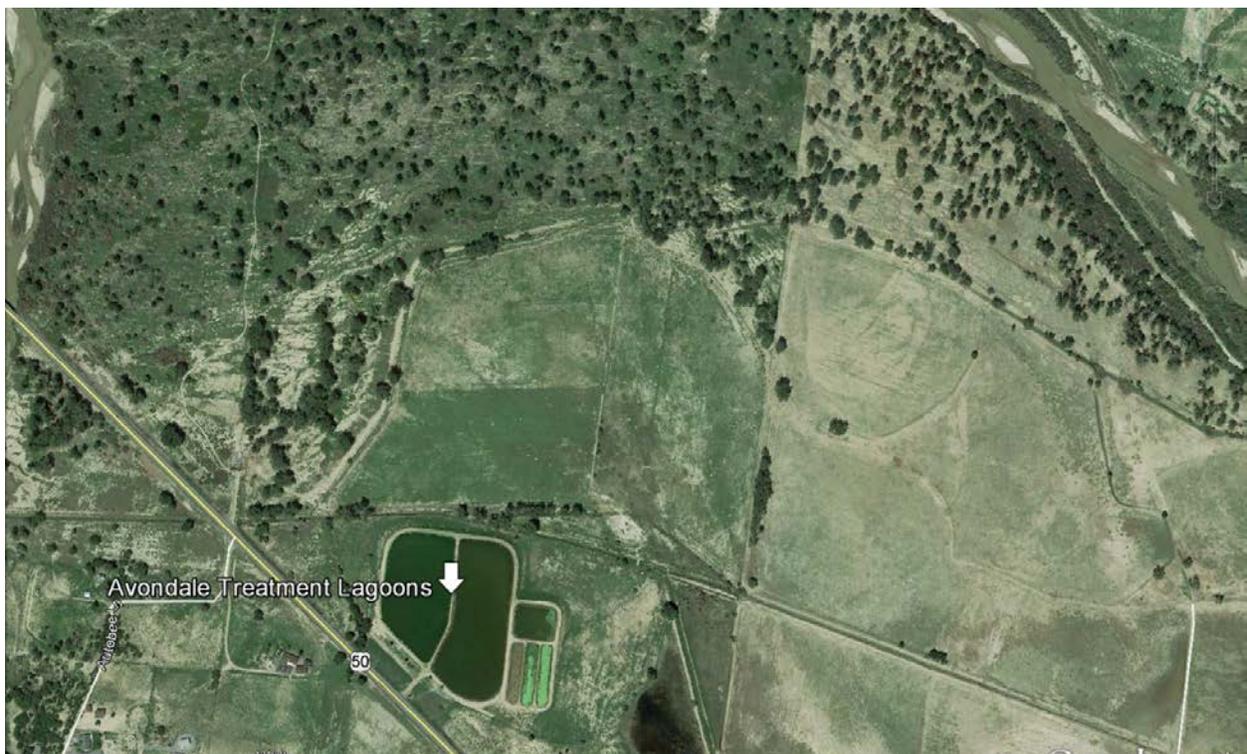


Figure 14 Avondale Lagoon in Relation to Arkansas River Collier Ditch

Both discharge segments are designated *Use Protected*. The ratio of the low flows of both Green Arroyo and unnamed tributaries to the Avondale Water and Sanitation District's lagoon systems design flows are 0:1. The nearest upstream and downstream facilities have no impact on the assimilative capacities available to either the Avondale or Ft. Reynolds treatment works. The Avondale lagoon system is the sole known point source contributor to Green Arroyo. Thus, the findings of the WQCD permit unit assessment indicate that there is no dilution, no other sources of pollutants of concern, and that assimilative capacities are equal to the in-stream standards applied to the Avondale effluent discharge.

1.6 20-year capacity

Avondale Water and Sanitation District has two permitted domestic wastewater treatment works (Table 5). These municipal lagoon systems are classified as minor facilities. The combined wastewater treatment system has a design capacity of 0.1306 million gallons per day (MGD) (130,600 gallons per day) and is expected to function without any increase in the permitted design capacity within the planning horizon (Table 6). Wastewater utility service areas for minor treatment works are defined as serving fewer than 200 residential equivalents. Although the combined design capacity for the Avondale wastewater facilities exceeds the threshold for a minor system, the lagoons are defined in permit as minor treatment lagoon systems.

Table 5 Avondale Minor Wastewater Treatment Works

Discharger	2011 Permit	Permit Type
Avondale Water and Sanitation District WWTF	CO-0021075	Domestic - Minor Municipal, Lagoon System
Ft Reynolds Lagoon		Domestic - Minor Municipal, Lagoon System

Table 6 Expected Wastewater Treatment Facility Expansions Through 2035.

Domestic Wastewater Treatment Dischargers, Pueblo County					
Discharger	2011 Permit	Design Capacity (MGD)	2010 Flow (MGD)	% of Capacity	Plant Expansion
Avondale Water and Sanitation District WWTF	CO-0021075	0.1146	0.016	14%	None anticipated through 2035
Ft Reynolds Lagoon		0.016	0.004	25%	None anticipated through 2035

2 General Planning

2.1 Management agency

Pueblo County is the management agency designated by the governor to implement the PACOG 2012 Plan. The Avondale Water and Sanitation District, including Ft. Reynolds facility, is an operating agency.

2.2 Regional WQ policies

The expectations of operating agencies are defined in the SWQMP, July 2011 and the Colorado Continuing Planning Process.

1. Implement federal and state requirements, as appropriate, including discharge limitations, operation and maintenance procedures, user charges, industrial cost recovery, industrial pretreatment, within its service area.
2. Operate and manage wastewater treatment works and related facilities within its defined wastewater service area.

3. Design and construct new wastewater treatment facilities within its service area.
4. Accept and utilize financial assistance for wastewater treatment works within its service area.
5. Raise revenues and incur indebtedness as provided by Colorado statutes.
6. Provide assistance for operation of the management agency, as determined by PACOG.
7. Submit to PACOG information related to projects for which federal or other funds may be solicited.
8. Submit to PACOG information affecting its service area relative to the extension of water and wastewater transmission lines and the addition of new areas within the boundary of the operating agency.
9. Consider the implementation of any water quality plan or proposal agreed upon by the management agency. However, the adoption and enforcement of any regulation needed to comply with any such plan or proposal shall remain within the sole discretion and jurisdiction of each operating agency.

2.3 Population and demographics

Table 7 lists the adopted wastewater service area projections for the Avondale Water and Sanitation District.

Table 7 Population Estimates for Avondale Water and Sanitation District

Wastewater Providers	DOLA/ U.S. Census Estimates				PACOG Estimates				
	1990	2000	2005	2010	2015	2020	2025	2030	2035
Avondale	1,278	754	715	674	687	701	715	730	744

2.4 Service Area designation

The service area designated for Avondale is shown in Figure 15. The facility locations as shown in the discharge permit are shown in Figure 16.

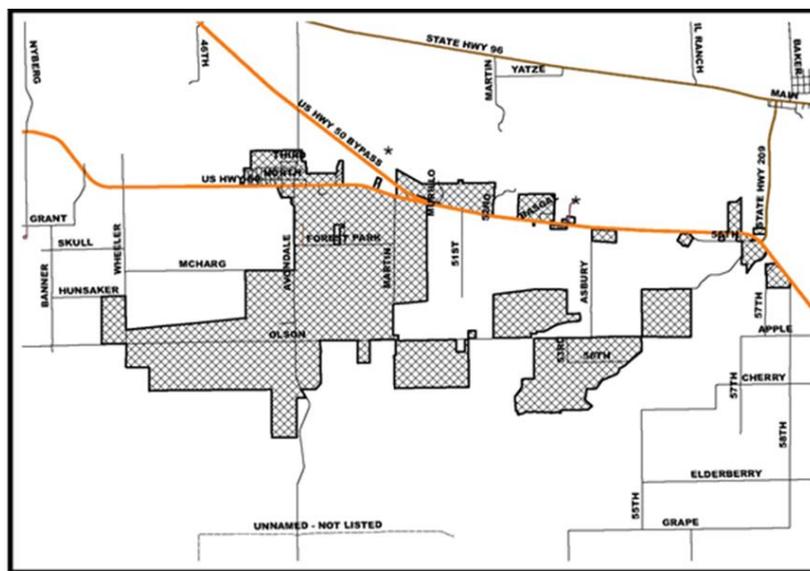


Figure 15 Avondale and Ft Reynolds Wastewater Service Area Boundaries



Figure 16 WQCD Location Maps of the Avondale and Ft Reynolds Lagoon Systems

The 2010 Census estimate for the community of Avondale reported a population of 674. Avondale Water and Sanitation serves the community of Avondale, some outlying areas and Fort Reynolds. Fort Reynolds discharges to a lagoon system separate from the "Avondale proper" lagoon system. The 2000 U.S. Census reported a population of 754 for Avondale CDP translating to an 11% decrease in population. The actual user population appears to be at approximately 1023 people, compared to the number used in 1993 of 1365 people (reflecting the -11%). The population trend appears to be on the receding limb of the growth curve indicating the movement of people from rural life to urban areas and to areas of job growth and potent

The 2000 U.S. Census reported a median household income of \$31,071 for Avondale and \$41,994 for the National average, respectively. The U.S. Census Bureau reported the 2003-2004 Colorado median household income to be \$52,792. Avondale's median household income is notably lower than both the Colorado and National 2000 averages.

2.5 Preferred Wastewater Service and strategies

There is no reuse for the Avondale Water and Sanitation District. There are no environmental components available.

3 Wastewater Characterization

Avondale Water and Sanitation District wastewater treatment system was reconstructed in 1994 from a single cell system to a three-stage stabilization pond system including 3-cell wetlands to improve performance of the system. The system has a capacity of 0.11 mgd and its main lagoons can be mechanically aerated. The system discharges under NPDES Permit # CO- 0021075 and consists of a 3.9-acre land application area and chlorine disinfection system. The lagoons are lined with a layer of bentonite clay to prevent leaching of untreated wastewater to groundwater and are monitored by a series of wells that surround the lagoon and wetland area.

The system does not discharge 5-7 months out of the year due to low flows and when the system does discharge; its rate is approximately 0.08 mgd. This is approximately 73% of the rated capacity. Discharge calculations are confirmed and can be found in Appendix B. AWS primary wastewater treatment system

is in need of several upgrades that directly influence the quality of effluent, capacity, and spill potential (age of collection system piping).

3.1 Historical Data EPA ECHO website

http://echo.epa.gov/detailed_facility_report?fid=110022551521

3.2 Wastewater Flow Projections

The design capacity of the Avondale wastewater treatment works is 0.1146 million gallons per day (MGD) for hydraulic flow (30-day average) and 211lbs. BODs per day for organic loading (30-day average).

The design capacity of the Ft. Reynolds wastewater treatment works is 0.016 million gallons per day (MGD) for hydraulic flow (30-day average) and 44.7 lbs. BODs per day for organic loading (30-day average).

3.3 Wastewater Self Monitoring

Table 8 Self-Monitoring Results for outfall 300A (Avondale WWTP)

Parameter	# Samples or Reporting Periods	Reported Concentrations			Previous Permit Limit	No. of Limit Excursions
		Average/Minimum/Maximum				
Influent Flow, MGD	24	0.09	0.08	0.12	0.11*	1
Influent BOD ₅ , mg/l	24	168	136	266	Report	0
Influent BOD ₅ , lbs/day	24	127	87	221	211*	1
Influent TSS, mg/l	24	149	112	185	Report	0

*This is a facility capacity and not a permit limit.

Table 9 Self-Monitoring Results for outfall 300F (Fort Reynolds WWTP)

Parameter	# Samples or Reporting Periods	Reported Concentrations			Previous Permit Limit	No. of Limit Excursions
		Average/Minimum/Maximum				
Influent Flow, MGD	23	0.004	0.004	0.004	0.016*	0
Influent BOD ₅ , mg/l	23	243	210	296	Report	0
Influent BOD ₅ , lbs/day	23	7.9	6.5	9.9	44.7*	0
Influent TSS, mg/l	23	211	169	296	Report	0

*This is a facility capacity and not a permit limit.

Table 10 Self-Monitoring Results for outfall 001A (discharge to the Green Arroyo)

Parameter	# Samples or Reporting Periods	Reported Concentrations			Previous Permit Limit	No. of Limit Excursions
		Average/Minimum/Maximum				
Effluent Flow, MGD	19	0.06	0.014	0.086	0.11	0
Effluent CBOD ₅ , mg/l	19	21.6	16	25	30	0
BOD ₅ Removal, %	18	86.6	84	91	85	1
Effluent TSS, mg/l	19	54.1	18	90	105	0
Fecal Coliform, #/100 ml	19	2,219	219	5,900	6,000	0
Total Residual Chlorine, mg/l	19	NA	NA	NA*	0.5	0
Oil & Grease, mg/l	19	0	0	0	<10	0
pH, s.u.	19	8.1	7.6	8.5	6.5-9.0	0

*Did not chlorinate during permit cycle.

3.4 Existing collection system

The collection system has been in place since the early 1970's. The pipe material is for the most part VCP with occasional pieces of PVC. 8" pipe was installed throughout the system. 10" VCP crosses underneath U.S. Highway 50 to the lagoons. VCP has a greater potential for infiltration and inflow (I/I) than newer sewer materials like PVC. It is estimated that 28,500 gallons or .028 mgd of I/I enter the AWS lagoon

system each day accounting for 35.63% of the inflow. 2 - 8" main lines converge on the south side of U.S. Highway 50, Line "A" and Line "B". Line "A" traverses through swamp area and next to small ponds. There is no map of the collection system.

3.5 Effluent Limits

The Avondale permit has effluent limits for three discharge outfall points (Tables 11, 12, and 13).

Table 11 Effluent Limits for outfall 001A (Avondale WWTP)

Parameter	Limit	Rationale
Flow, MGD	0.1146 ^a	Design Capacity
BOD ₅ , mg/l	30/45 ^b	State Effluent Regulations
TSS, mg/l	105/160 ^b	State Effluent Regulations
Fecal Coliform, no/100 ml – through 6/30/06	6,000/12,000 ^c	Interim Limit
Fecal Coliform, no/100 ml – beginning 7/1/06	200/400	Fecal Coliform Policy
Total Residual Chlorine, mg/l	0.5 ^c	State Effluent Limitations
pH, s.u.	6.5-9.0 ^d	Water Quality Standards
Oil and Grease, mg/l	10 ^c	State Effluent Regulations

^a 30-day average, ^b 30-day average/7-day average, ^c Daily Maximum

^d Minimum/Maximum, ^e 30-day geometric mean/7-day geometric mean

Table 12 Effluent Limits for outfall 001B (Avondale WWTP Land Application)

Parameter	Limit	Rationale
Flow, MGD	Report ^a	Land Application Condition

^a 30-day average

Table 13 Effluent Limits for outfall 002A (Ft. Reynolds WWTP)

Parameter	Limit	Rationale
Flow, MGD	0.016 ^a	Design Capacity
BOD ₅ , mg/l	30/45 ^b	State Effluent Regulations
Total Suspended Solids, mg/l	105/160 ^b	State Effluent Regulations
Fecal Coliform, no/100 ml	2,000/4,000 ^c	Fecal Coliform Policy
Total Residual Chlorine, mg/l	0.5 ^c	State Effluent Limitations
pH, s.u.	6.5-9.0 ^d	Water Quality Standards
Oil and Grease, mg/l	10 ^c	State Effluent Regulations

^a 30-day average, ^b 30-day average/7-day average, ^c Daily Maximum

^d Minimum/ Maximum, ^e 30-day geometric mean/7-day geometric mean

3.5.1 Three Year Compliance Status by Quarter

The Avondale facilities are listed as having 12 non-compliance violations over the last 12 quarters (Table 14) for problems with the submittal of DMRs, including parameter listing values. These compliance violations were listed as not significant orange category II, so no enforcement action was taken. Eleven of the compliance issues are listed as resolved.

EPA defines permit violations as non-compliance with one or more legally enforceable obligations by a regulated entity, as determined by a responsible authority. Included in this category are violations of legally enforceable obligations under pre-existing Final Orders (e.g., violations of compliance schedules included in enforcement orders). **SNC/RNC History** (Significant Non-compliance/Reportable Non-compliance Status) for major facilities (or Facility Status for minor facilities). **R** = RNC/Category II - **R**

= Resolved - the facility has returned to compliance with its permit conditions, either with or without issuance of an enforcement action.

Table 14 Compliance Issues

Statute	Program/Pollutant/Violation Type	QTR 1 (2011Q1)	QTR 2 (2011Q2)	QTR 3 (2011Q3)
	CWA (Source ID: CO0021075)	01/01-03/31 2011	04/01-06/30 2011	07/01-09/30 2011
	Facility-Level Status	In Viol- (R(Resolved))	In Viol- (R(Resolved))	In Viol- (R(Resolved))
Statute	Program/Pollutant/Violation Type	QTR 4 (2011Q4)	QTR 5 (2012Q1)	QTR 6 (2012Q2)
	CWA (Source ID: CO0021075)	10/01-12/31 2011	01/01-03/31 2012	04/01-06/30 2012
	Facility-Level Status	In Viol- (R(Resolved))	In Viol- (R(Resolved))	In Viol- (R(Resolved))
Statute	Program/Pollutant/Violation Type	QTR 7 (2012Q3)	QTR 8 (2012Q4)	QTR 9 (2013Q1)
	CWA (Source ID: CO0021075)	07/01-09/30 2012	10/01-12/31 2012	01/01-03/31 2013
	Facility-Level Status	In Viol- (R(Resolved))	In Viol- (R(Resolved))	In Viol- (R(Resolved))
Statute	Program/Pollutant/Violation Type	QTR 10 (2013Q2)	QTR 11 (2013Q3)	QTR 12 (2013Q4)
	CWA (Source ID: CO0021075)	04/01-06/30 2013	07/01-09/30 2013	10/01-12/31 2013
	Facility-Level Status	In Viol- (R(Resolved))	In Viol- (R(Resolved))	In Viol- (N report)

3.6 Proposed System Upgrades, if appropriate

There are no proposed system upgrades. However, the Ft. Reynolds Lagoon system is in need of maintenance.

3.7 Treatment Process

Lagoon: A three-stage stabilization pond system including 3-cell wetlands. The system has a capacity of 0.11 mgd and its main lagoons can be mechanically aerate

Wetlands: As stated above, the system contains a 3-cell wetlands system originally designed to improve system performance and effluent discharge. Since their construction, the man made wetland cells have been degraded to virtually additional holding cells due to rodents eating the vegetation. The wetland system is classified as a free water surface (FWS) system and should contain the needed aquatic plants necessary for additional nutrient removal.

3.8 Biosolids Handling

There is no biosolids handling requirements for the Avondale or Ft. Reynolds lagoon systems.

3.9 Odor Control

There is no odor control necessary for the Avondale or Ft. Reynolds lagoon systems.

4 Water Quality Characterization

The Water Quality Control Division completed a water quality assessment Green Arroyo and Unnamed Tributaries and Avondale Water and Sanitation District WWTF's (WQCD CO-0021075), which attached as a technical appendix. The WQA was prepared to facilitate issuance of the Colorado Discharge Permit System (CDPS) permit for the Avondale Water and Sanitation District's Avondale, and Ft. Reynolds WWTF's, CDPS Permit No. CO-0021075, and is intended to determine the assimilative capacities available to both facilities for pollutants of concern.

An assessment of the stream standards, low flow data, and ambient stream data has been performed to determine the assimilative capacities for the Green Arroyo for potential pollutants of concern. Since the receiving water is Use Protected, an antidegradation review is not required pursuant to section 31.8(2)(b) of The Basic Standards and Methodologies for Surface Water.

Ground Water Monitoring – Due to the fact that the following compliance item was not completed during the course of the previous permit period in violation of the permit conditions, a continuation of this compliance schedule will be included in this permitting cycle. It is expected that the Permittee will make every effort to complete this item in the time allotted. The Permittee will develop a sampling protocol for the ground water monitoring wells as outlined in the following table.

Code	Event	Permit Citation	Due Date
14099	The permittee must develop and implement a sampling protocol for the monitoring wells. The permittee is to use the outline found in the permit in Part I.C. as a guide to formulate the sampling protocol. Once the protocol is written, the document is to be submitted to the Division for review and approval. The approved document is to be implemented each time ground water samples are taken.	Part I.A.8.	08/31/06

Meet Final Fecal Coliform Limits - A compliance schedule will be required for the Avondale facility to meet final fecal coliform limits.

Code	Event	Permit Citation	Due Date
05699	The Permittee must instigate the use of the previously installed chlorine disinfection equipment at the facility in order to meet fecal coliform limits at Outfall 001A.	Part I.A.8.	06/30/06

5 Management & Financial Plans

Avondale is a Special Service District and governmental subdivision of the State of Colorado, which entitles them to borrow money and incur debt and to issue bonds. In addition, the District has the power to collect "ad valorem" taxes on and against all taxable property within the District. Bond debt is incurred in the water general fund as well as loan debt. The complete AWS general fund budget and water enterprise budget can be seen in Appendix. The district has three full time employees and a Class C wastewater treatment operator employed part time.

Avondale's monthly wastewater fee is \$19.33 per service, which is 24% higher than that of the statewide average (statewide average provided by Department of Local Affairs, or DOLA). The Colorado statewide monthly average is \$15.55 per service. Presently, AWS bills 278 active taps. Avondale is proactive in recognizing the need for the recommended system upgrades, however, they are unable to fund the associated capital expenses. Therefore, the Town is will actively pursuing funding assistance.

6 References

- 1) Avondale Water & Sanitation District, Avondale, CO *Preliminary Engineering Report Wastewater Wetlands Upgrades*, July, 2011 Written by: Anselmo Engineering, Inc., 4732 Eagleridge Circle, Pueblo, CO 81008 (719) 545-6287 Office; (719) 545-6247 Fax; Email: anselmoeng.com
- 2) The *Water Quality Assessment* developed by the Colorado Department of Public Health and Environment, Water Quality Control Division Permit Unit as part of the CDPS Permit Number CO-0021075, August 5, 2005.
- 3) Additional information used in this Utility Plan is derived from the CDPS issued permit CO-0021075, issued on November 17, 2005 and expired on December 31, 2010. The permit is on administrative extension until a new discharge permit is issued by the Colorado Department of Public Health and Environment, Water Quality Control Division Permit Unit.
- 4) The PACOG 2012 Water Quality Management Plan, as adopted December 6, 2013. Wastewater Service area map of Avondale Water and sanitation District drafted by PACOG, August 19, 2011.

7 Technical Support Appendices

7.1 Avondale Preliminary Engineering Report Wastewater Wetlands Upgrade July 2011

Attached PDF document

7.2 WQA by Water Quality Control Division

Attached PDF document

7.3 Discharge Permit, November 2005

Attached PDF document

**Avondale Water & Sanitation District
Avondale, Colorado**

**PRELIMINARY ENGINEERING REPORT
Wastewater Wetlands Upgrades**

July, 2011



4732 Eagleridge Circle
Pueblo, CO 81008
719-545-6287, Fax: 719-545-6247, stevea@anselmoeng.com

I. INTRODUCTION

The community of Avondale is located in eastern Pueblo County, Colorado. It is predominately surrounded by farms and ranches with only local type business (small stores, cafe's) supporting its residents. The majority of Avondale residents commute back and forth to Pueblo to work. However, some remain and work locally on the farms and businesses. According to Census figures, the Town has had negative growth over the past 10 years. Avondale Water and Sanitation is a special service district and governmental subdivision of the State of Colorado, formed to collect wastewater (and distribute potable water) for residents of Avondale, Colorado. The District serves approximately 1023 people in Avondale and Orchard Park (278 taps or 3.7 persons / household, 2000 Census numbers) with the Avondale lagoon facility. The District also operates a non-discharging lagoon in the Fort Reynolds area (1.5 miles east of Avondale lagoons). Outlying areas around Avondale that are not serviced by domestic wastewater taps and other dwellings within the area are utilizing ISDS treatment. The District is in need of system upgrades that include measures to improve effluent quality and system reliability.

Presently, the wastewater treatment facility (lagoon system and wetland cells) is compliant with Colorado Department of Public Health and Environment (CDPHE) regulations; however, upgrades to the wastewater treatment facility

as well as minor improvements to the collection system are needed which will be elaborated upon throughout this report.

This Preliminary Engineering Report (PER) describes the planning area, existing facilities, need for the project, and proposed upgrades, in particular for the Avondale lagoons. Fort Reynolds facilities will be mentioned, however at this point of time will not be included in the report.

II. PROJECT PLANNING AREA

A. Location

Avondale is located in Pueblo County, roughly 15 miles east of Pueblo on U.S. Highway 50 (refer to Appendix A for a vicinity map). The Town sits at an elevation of roughly 4500 feet. Project limits are within and outside of Avondale proper.

B. Environmental Resources Present

The community of Avondale is located in rural Pueblo County. Most of the construction alternatives in this report do not infringe upon areas of environmental significance, as all the potential improvement areas have been previously disturbed. Manmade wetlands (3 cells) are utilized as the final treatment option of wastewater effluent; however, the full benefits of wetlands

are not possible due to lack of vegetation. Waterfowl frequent the waters of the entire lagoon system. As is typical to any riparian system, flora and fauna specific to the lower reaches of the Arkansas River surround the area. Currently, the project lies in the Zone X designation of Pueblo County Community Panel 0801470400B and is outside the limits of the 100 year floodplain (refer to Appendix C for the Flood Insurance Rate Map). Treated wastewater effluent is discharged to Green Arroyo then the Collier Ditch and ultimately the Arkansas River. Construction alternatives discuss the rebuilding of the wetlands, as they presently do not contain the typical wetland plants due to rodents eating the plantings at their roots. It is anticipated that rebuilding the wetlands will further the enhancement of effluent quality, and provide typical environments to animals not currently residing in the wetland ponds.

Water Quality Data Under Pueblo Counties Section 208 Water Quality Management Plan ⁽¹⁾:

WQCD Stream Segment Description: *Lower Arkansas River No.1*

Adopted Stream Segment Classification: *Agriculture, Domestic Water Supply, Recreation – Class 2, Warm Water Aquatic Life – Class 2, Use Protected*

C. Growth Areas and Population Trends

The 2010 Census estimate for the community of Avondale reported a population of 674. Avondale Water and Sanitation serves the community of Avondale, some outlying areas and Fort Reynolds. Fort Reynolds discharges to a lagoon system separate from the “Avondale proper” lagoon system. The 2000 U.S. Census reported a population of 754 for Avondale CDP translating to an 11% decrease in population. The actual user population appears to be at approximately 1023 people, compared to the number used in 1993 of 1365 people (reflecting the -11%). The population trend appears to be on the receding limb of the growth curve indicating the movement of people from rural life to urban areas and to areas of job growth and potential.

D. Economic Demographics:

The 2000 U.S. Census reported a median household income of \$31,071 for Avondale and \$41,994 for the National average, respectively. The U.S. Census Bureau reported the 2003-2004 Colorado median household income to be \$52,792. Avondale’s median household income is notably lower than both the Colorado and National 2000 averages.

III. Technical, Managerial and Financial Capacity

A. Technical Capacity

Avondale Water and Sanitation District wastewater treatment system was reconstructed in 1994 from a single cell system to a three-stage stabilization pond system including 3-cell wetlands to improve performance of the system. The system has a capacity of 0.11 mgd and its main lagoons can be mechanically aerated. The system discharges under NPDES Permit # CO-0021075 and consists of a 3.9-acre land application area and chlorine disinfection system. The lagoons are lined with a layer of bentonite clay to prevent leaching of untreated wastewater to groundwater and is monitored by a series of wells that surround the lagoon and wetland area. The system does not discharge 5-7 months out of the year due to low flows and when the system does discharge; its rate is approximately 0.08 mgd. This is approximately 73% of the rated capacity. Discharge calculations are confirmed and can be found in Appendix B. AWS primary wastewater treatment system is in need of several upgrades that directly influence the quality of effluent, capacity, and spill potential (age of collection system piping).

Wetlands: As stated above, the system contains a 3-cell wetlands system originally designed to improve system performance and effluent discharge. Since their construction, the man made wetland cells have been degraded to virtually additional holding cells due to rodents eating the vegetation. The wetland system is classified as a free water surface (FWS) system and should contain the needed aquatic plants necessary for additional nutrient removal.

Collection System: The collection system has been in place since the early 1970's. The pipe material is for the most part VCP with occasional pieces of PVC. 8" pipe was installed throughout the system. 10" VCP crosses underneath U.S. Highway 50 to the lagoons. VCP has a greater potential for infiltration and inflow (I/I) than newer sewer materials like PVC. It is estimated that 28,500 gallons or .028 mgd of I/I enter the AWS lagoon system each day accounting for 35.63% of the inflow. 2 - 8" main lines converge on the south side of U.S. Highway 50, Line "A" and Line "B". Line "A" traverses through swamp area and next to small ponds.

B. Managerial and Financial Capacity

AWS is a Special Service District and governmental subdivision of the State of Colorado, which entitles them to borrow money and incur debt and to issue bonds. In addition, the District has the power to collect “ad valorem” taxes on and against all taxable property within the District. Bond debt is incurred in the water general fund as well as loan debt. The complete AWS general fund budget and water enterprise budget can be seen in Appendix D. The district has three full time employees and a Class C wastewater treatment operator employed part time.

Wastewater Rates:

Avondale’s monthly wastewater fee is \$19.33 per service, which is 24% higher than that of the statewide average (statewide average provided by Department of Local Affairs, or DOLA). The Colorado statewide monthly average is \$15.55 per service. Presently, AWS bills 278 active taps.

Avondale is proactive in recognizing the need for the recommended system upgrades, however, they are unable to fund the associated capital expenses. Therefore, the Town is will actively pursuing funding assistance.

III. NEED FOR THE PROJECT

A. Growth

As previously addressed, the lagoon system was re-vamped in 1994 from a single one cell lagoon to a 3-cell system with additional secondary treatment in the form of a 3-cell (in series) wetlands. The system is at 73% capacity of the design capacity of 0.11 mgd. The system has not changed substantially the past 15 years probably due to the stagnant growth in the area. Growth in the area is projected to decrease within the next 20 years unless a significant factor such as a major employer would locate to the Avondale area. For the purpose of the PER it will be assumed that the 2 large lagoons and quiescent pond are functioning as intended and are not in need of upgrade. Past studies have shown the capacity of the lagoon hovering around 80% and up to 90%, however, decreases in population have brought that number down below the 80% threshold for re-design. Any growth in the Avondale area should be examined to determine the effects on the lagoons. The additional intended treatment of the wetlands can be utilized to increase the lagoon capacity if flow could be directed between lagoons and the wetlands, thereby decreasing the detention time of the lagoons. Table 1 (Appendix E) of the CDPHE 96-01 recommends 40-15 Acres/mgd for basic treatment.

Given: .02 mgd wastewater influent diverted after 2.5/days detention time (by use of valving and gates).

.02 mgd x an average of 28 Acres/mgd = 0.56 Acres. The current wetland cell configuration contains 1.24 surface acres. The basic additional treatment contributed by the subsurface wetland cells would translate into an increase of capacity for the system as a whole of 50% or .17 mgd. Secondary treatment in the wetlands system would require a surface area of 15 Acres/mgd or .02mgd x 15 = 0.30 Acres.

B. Health

Presently no health concerns exist. The modification of the lagoon wetland system has no effect on human health, only those inherent dangers that exist for maintenance personnel. The lagoons and wetlands are fenced around the perimeter. The lagoons are also located out of the 100 year flood zone.

C. System Operation and Maintenance (O&M)

Operation and maintenance costs for wetlands are comparable to those of lagoon systems. The time consuming aspects include muskrat, mosquito and invasive plant control. According to the Constructed Wetlands Treatment of Municipal Waters (EPA, 2000), maintenance costs range from \$.04 to \$.08 per 1000 gallons of treated water. Utilizing an average of \$0.06/day at 0.08 MGD or 80,000 gal/day, maintenance costs amount to \$4.80/day or approximately

\$150.00/month or \$1800.00/year. Estimated expenditures would have to increase by this amount, which would be recorded in the Sanitation General Fund.

IV. Selective Alternative

The subsurface flow (SF) wetland is specifically designed for the treatment or polishing of some type of wastewater and are typically constructed as a bed or channel containing appropriate media. Coarse rock, gravel, sand and other soils are used, but a gravel medium is most common. The medium is typically planted with the same types of emergent vegetation present in marshes, and the water surface is designed to remain below the top surface of the medium. The main advantages of this subsurface water level are prevention of mosquitoes and odors, and elimination of the risk of public contact with the partially treated wastewater. In contrast, the water surface in natural marshes and free water surface (FWS) constructed wetlands is exposed to the atmosphere with the attendant risk of mosquitoes and public access. Physical, chemical, and biochemical reactions all contribute to water quality improvement in these wetland systems. The biological reactions are believed due to the activity of microorganisms attached to the available submerged substrate surfaces. In the case of FWS wetlands, these substrates are the submerged portion of the living plants, the plant litter, and the benthic soil layer.

In SF wetlands, the available submerged substrate includes the plant roots growing in the media, and the surfaces of the media themselves. Since the media surface area in a SF wetland can far exceed the available substrate in a FWS wetland, the microbial reaction rates in a SF wetland can be higher than a FWS wetland for most contaminants. As a result, a SF wetland can be smaller than the FWS type for the same flow rate and most effluent water quality goals. The depth of the media in these SF wetlands has ranged from 0.3 to 0.9 meters (1 to 3 feet) with 0.6 meters (2 feet) being most common. The size of the media in use in the U.S. ranges from fine gravel (≥ 0.6 centimeters or ≥ 0.25 in.) to large crushed rock (≥ 15.2 centimeters or ≥ 6 in.); A combination of sizes from 1.3 centimeters to 3.8 centimeters (0.5 to 1.5 inches) are most typically used. This gravel medium should be clean, hard, durable stone capable of retaining its shape and the permeability of the wetland bed over the long term. The most commonly used emergent vegetation in SF wetlands include cattail (*Typha* spp.), bulrush (*Scirpus* spp.), and reeds (*Phragmites* spp.) In areas where muskrat or nutria are found, experience has shown that these animals, using the plants for food and nesting material, can completely destroy a stand of cattails or bulrush planted in a constructed wetland. The vegetation on a SF wetland bed is not a major factor in nutrient removal by the system and does not require harvesting. In cold climates, the accumulating plant litter on top of the gravel bed provides useful thermal insulation during the winter months.

The submerged plant roots do provide substrate for microbial processes and since most emergent macrophytes can transmit oxygen from the leaves to their roots, there are aerobic microsites on the rhizome and root surfaces. The remainder of the submerged environment in the SF wetland tends to be devoid of oxygen. This general lack of available oxygen limits the biological removal of ammonia nitrogen ($\text{NH}_3/\text{NH}_4 - \text{N}$) via nitrification in these SF wetlands, but the system is still very effective for removal of BOD, TSS, metals, and some priority pollutant organics since their treatment can occur under either aerobic or anoxic conditions.

In addition to the reconfiguration or refurbishment of the existing wetland ponds from a free water surface configuration to a subsurface flow type configuration, effluent piping leading from the wetland flow control pits and effluent piping from the polishing pond will need to be “jet-out” due to accumulation of deposited bio-mass materials. Depending on survey data and elevations of flow control devices, new slide gate flow control may have to be installed at the devices. See Appendix G and H for additional diagrams.

V. ALTERNATIVES

Additional alternatives were examined throughout the PER process to ascertain any contribution to district growth, health and O&M costs. Alternatives examined included:

A. Do Nothing

The “do - nothing” alternative exposes Avondale Water and Sanitation District to potential non compliance issues with CDPHE, in particular, any increase in district growth that would trigger the design capacity upgrade. The existing system is not performing as was designed with the addition of the polishing pond and three-wetland system. The current system is performing as ponds in parallel, adding some additional capacity to the existing lagoons, however, it is unlikely the system is realizing the full benefit of contaminate removal including heavy metals, and possibly ammonia.

B. Re-Vegetate Existing Wetlands

Under this alternative, the existing free water surface wetland cells would be re-planted with species typical of wetlands, cattails and reeds. This system of wetlands proved to be somewhat problematic in the past due to muskrats eating the vegetation roots. It is believed that keeping the plants at the surface will discourage muskrat population.

VI. FINAL RECOMMENDATION

The final recommendation for the wastewater treatment system is to convert the existing free water surface wetland system to a surface flow system. The following are key benefits to this recommendation:

- Relatively low improvement capital costs
- Low O&M, resulting in minimal need for fee adjustment

This recommendation will prove to be beneficial, not only in operational and maintenance aspects, but also most importantly, to allow growth and confidence in the treatment of wastewater from the residents of Avondale.

Cost analysis of alternatives found in Appendix F.

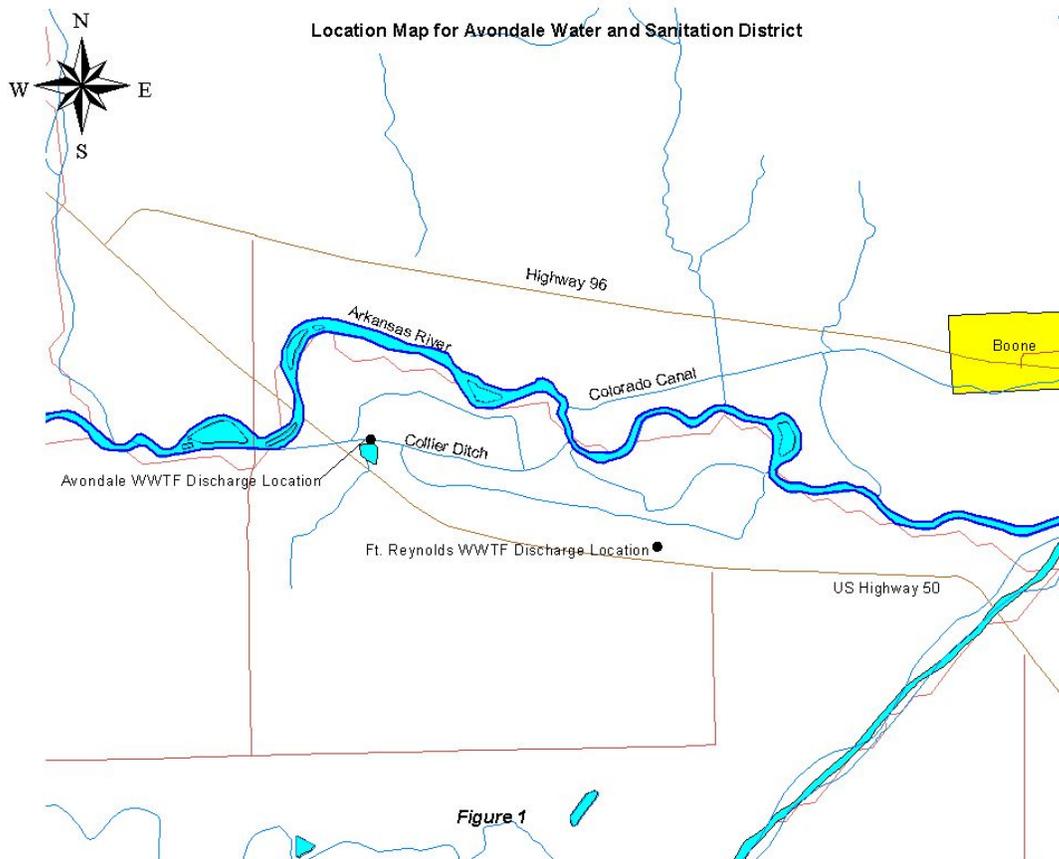
**WATER QUALITY ASSESSMENT
GREEN ARROYO AND UNNAMED TRIBUTARIES
AVONDALE WATER AND SANITATION DISTRICT WWTF'S**

Table 1 Assessment Summary-Avondale WWTF	
Name of Facility	Avondale Water and Sanitation District Avondale WWTF
CDPS Number	CO-0021075
WBID - Stream Segment	Arkansas River Basin, Middle Arkansas Sub-basin, Stream Segment 04d: All tributaries, including wetlands, to the Arkansas River and Pueblo Reservoir from the inlet to Pueblo Reservoir to the Colorado Canal headgate, except for specific listings in the Fountain Creek Subbasin and in Segments 4a, 4b, 4c, 5 through 18. COARMA04d
Classifications	Aquatic Life Warm 2 Recreation 1a Agriculture
Designation	Use Protected

Table 2 Assessment Summary-Ft. Reynolds WWTF	
Name of Facility	Avondale Water and Sanitation District Fort Reynolds WWTF
CDPS Number	CO-0021075
WBID - Stream Segment	All tributaries to the Arkansas River, including wetlands, all lakes and reservoirs, from the Colorado Canal headgate to the Colorado/Kansas border except for specific listings in segments 2b, 3 through 13, and Middle Arkansas Basin listings. COARLA02a
Classifications	Aquatic Life Warm 2 Recreation 2 Agriculture
Designation	Use Protected

I. Introduction

The Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) developed the water quality assessment (WQA) of Green Arroyo and unnamed tributaries near the Avondale Water and Sanitation District's Avondale, and Ft. Reynolds Wastewater Treatment Facilities (WWTF). The WQA was prepared to facilitate issuance of the Colorado Discharge Permit System (CDPS) permit for the Avondale Water and Sanitation District's Avondale, and Ft. Reynolds WWTF's, CDPS Permit No. CO-0021075, and is intended to determine the assimilative capacities available to both facilities for pollutants of concern. Figure 1 contains a map of the study area evaluated as part of this WQA.



The Avondale WWTF discharges to Green Arroyo which then empties into the Collier Ditch. Green Arroyo is a dry/zero low flow tributary to the Arkansas River. From the point of discharge into Green Arroyo and where the Collier Ditch empties into the Arkansas River is approximately 2 miles. Because of the low discharge volume and distance no flow from the WWTF makes it to the Arkansas River. The discharge from Ft. Reynolds WWTF is to “infiltration lagoons” located in the alluvium of unnamed dry/zero low flow tributaries of the Arkansas River. Because of the low discharge volume and distance no flow from the WWTF makes it to the Arkansas River. Both segments are designated “Use Protected.” The ratio of the low flows of both Green Arroyo and unnamed tributaries to the Avondale Water and Sanitation District’s WWTF’s design flow’s are 0:1. The nearest upstream and downstream facilities had no impact on the assimilative capacities available to either the Avondale or Ft. Reynolds WWTF’s. Both, the Avondale WWTF and the Ft. Reynolds WWTF are under the auspices of one permit, CO-0021075. Therefore, both facilities are addressed in this WQA.

The Avondale WWTF is the sole known point source contributor to Green Arroyo. Thus, the findings of this assessment indicate that there is no dilution, no other sources of pollutants of concern, and that assimilative capacities are equal to the in-stream standards applied to the Avondale WWTF effluent discharge.

Information used in this assessment includes data gathered from the Avondale Water and Sanitation District, and the WQCD. The data used in the assessment consist of the best information available at the time of preparation of this WQA.

II. Water Quality

The Avondale WWTF discharges to Water Body Identification (WBID) stream segment COARMA04d, which is the Arkansas River Basin, Middle Arkansas Sub-basin, Stream Segment 04d. This segment is composed of “All tributaries, including wetlands, to the Arkansas River and Pueblo Reservoir from the inlet to Pueblo Reservoir to the Colorado Canal headgate, except for specific listings in the Fountain Creek Subbasin and in Segments 4a, 4b, 4c, 5 through 18.” Stream segment COARMA04d is classified for:

- Aquatic Life Warm 2
- Recreation 1a
- Agriculture

The Ft. Reynolds WWTF discharges to the alluvium of streams in WBID stream segment COARLA02a, which is the Arkansas River Basin, Lower Arkansas Subbasin, Stream Segment 02a. This segment is composed of “All tributaries to the Arkansas River, including wetlands, all lakes and reservoirs, from the Colorado Canal headgate to the Colorado/Kansas border except for specific listings in segments 2b, 3 through 13, and Middle Arkansas Basin listings.” Stream Segment COARLA02a is classified for:

- Aquatic Life Warm 2
- Recreation 2
- Agriculture

Numeric standards are developed on a basin-specific basis and are adopted for stream segments by the Water Quality Control Commission. To simplify the listing of the segment-specific standards, many of the aquatic life standards are contained in a table at the beginning of each chapter of the regulations. The standards in Table 3a have been assigned to stream segment COARMA04d, and the standards in Table 3b have been assigned to stream segment COARLA02a, in accordance with the *Classifications and Numeric Standards for Arkansas River Basin*.

Table 3a
In-stream Standards for Stream Segment COARMA04d
<i>Physical and Biological</i>
Dissolved Oxygen (DO) = 5 mg/l, minimum
pH = 6.5 - 9 su
Fecal Coliform = 200 colonies/100 ml
<i>Escherichia coli</i> = 126 colonies/100 ml
<i>Inorganic</i>
Free Cyanide acute = 0.2 mg/l
Boron chronic = 0.75 mg/l
Nitrite = 10 mg/l
Nitrate = 100 mg/l
<i>Metals</i>
Total Recoverable Arsenic acute = 100 µg/l

Total Recoverable Cadmium chronic = 10 µg/l
Total recoverable Trivalent Chromium chronic = 100 µg/l
Total Recoverable Hexavalent Chromium chronic = 100 µg/l
Total Recoverable Copper chronic = 200 µg/l
Total Recoverable Lead chronic = 100 µg/l
Total recoverable Nickel chronic = 200 µg/l
Total Recoverable Selenium chronic = 20 µg/l
Total Recoverable Zinc chronic = 2000 µg/l

Table 3b
In-stream Standards for Stream Segment COARLA02a
<i>Physical and Biological</i>
Dissolved Oxygen (DO) = 5 mg/l, minimum
pH = 6.5 - 9 su
Fecal Coliform = 2000 colonies/100 ml
<i>Escherichia coli</i> = 630 colonies/100 ml
<i>Inorganic</i>
Free Cyanide acute = 0.2 mg/l
Boron chronic = 0.75 mg/l
Nitrite = 10 mg/l
Nitrate = 100 mg/l
<i>Metals</i>
Total Recoverable Arsenic acute = 100 µg/l
Total Recoverable Cadmium chronic = 10 µg/l
Total recoverable Trivalent Chromium chronic = 100 µg/l
Total Recoverable Hexavalent Chromium chronic = 100 µg/l
Total Recoverable Copper chronic = 200 µg/l
Total Recoverable Lead chronic = 100 µg/l
Total recoverable Nickel chronic = 200 µg/l
Total Recoverable Selenium chronic = 20 µg/l
Total Recoverable Zinc chronic = 2000 µg/l

Ambient Water Quality

The WQCD 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*. The ambient water quality was not assessed for Green Arroyo or unnamed tributaries for Ft. Reynolds WWTF infiltration lagoons because the background in-stream low flow condition is zero, and because no ambient water quality data are available upstream of the WWTF's discharge points.

III. Water Quantity

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. The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval.

Low Flow Analysis

Although there may be periodic flow in Green Arroyo and the unnamed tributaries upstream of the Avondale Water and Sanitation District's WWTF's, the 1E3 and 30E3 monthly low flows are set at zero, for both WWTF's as shown in Table 4.

<i>Low Flow (cfs)</i>	<i>Annual</i>	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>
1E3 Acute	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

IV. Technical Analysis

In-stream background data and low flows evaluated in Sections II and III are ultimately used to determine the assimilative capacity of Green Arroyo and unnamed tributaries for the Avondale Water and Sanitation District's WWTF's for pollutants of concern. For all parameters except ammonia, it is the WQCD's approach to conduct a technical analysis of stream assimilation capacity using the lowest of the monthly low flows (referred to as the annual low flow) as calculated in the low flow analysis. For ammonia, it is the standard procedure of the WQCD to determine assimilative capacities for each month using the monthly low flows calculated in the low flow analysis, as the regulations allow the use of seasonal flows when establishing assimilative capacities.

The WQCD'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 WQCD to calculate the maximum allowable concentration of pollutants in the effluent, 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)

Q_3 = Downstream flow ($Q_1 + Q_2$)

M_1 = In-stream background pollutant concentrations at the existing quality

M_2 = Calculated maximum allowable effluent pollutant concentration

M_3 = Maximum allowable in-stream pollutant concentration (water quality standards)

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

$$M_2 = M_3$$

Because the low flow (Q_l) for Green Arroyo and Ft. Reynolds infiltration lagoons is zero, the assimilative capacity of Green Arroyo and Ft. Reynolds for the pollutants of concern is equal to the in-stream water quality standards.

Pollutants Evaluated

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

- Fecal Coliform
- *Escherichia coli*

There are no in-stream standards for ammonia or total residual chlorine. Therefore, total ammonia and total residual chlorine were not evaluated in this WQA.

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 in this water quality assessment.

During assessment of the facility, nearby facilities, no additional parameters were identified as pollutants of concern.

Avondale Water and Sanitation District Avondale WWTF

The Avondale WWTF is located at Section 9, T21S, R62W, and Section 11, T21S, R62W in Pueblo County. The current design capacity of the facility is 0.1146 MGD (0.18 cfs). Wastewater treatment is accomplished using aerated lagoons. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

Avondale Water and Sanitation District Ft. Reynolds WWTF

The Ft. Reynolds WWTF is located at Section 11, T21S, and R62W, in Pueblo County. The current design capacity of the facility is 0.016 MGD (0.025 cfs). Wastewater treatment is accomplished using aerated/infiltration lagoons. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

Nearby Sources

No known point sources of pollution were identified on Green Arroyo or unnamed tributaries. Non-point sources of pollution were not considered in this assessment.

Water Supply

Water supply is not a classification for these WBID's. Therefore, water supply parameters are not addressed in this WQA.

Fecal Coliform and *E. coli*

There are no known point sources discharging fecal coliform and/or *E. coli* within one mile of the Avondale Water and Sanitation District WWTF's. Thus, fecal coliform and *E. coli* assimilative capacities were evaluated separately.

It is the standard approach of the WQCD to perform a mass-balance check to determine if fecal coliform standards are exceeded. WQCD procedure specifies that checks are conducted using only the chronic low flow as set out in Section III. Using the mass-balance equation provided in the beginning of Section IV, the background concentration contained in Section II, and the in-stream standards for fecal coliform shown in Section II, checks for fecal coliform were conducted. The data used and the resulting calculations of the allowable discharge concentration, M_2 , are set forth below in Tables 5 and 6.

<i>Parameter</i>	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1 (#/100 ml)	M_3 (#/100 ml)	M_2 (#/100 ml)
Fecal Coliform	0	0.18	0.18	0	200	200
E. Coli	0	0.18	0.18	0	126	126

The full assimilative capacity of the stream for fecal coliform was determined to equal the in-stream water quality standards of 200 colonies/100 ml (chronic), and 126 colonies/100 ml for E. Coli (chronic).

<i>Parameter</i>	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1 (#/100 ml)	M_3 (#/100 ml)	M_2 (#/100 ml)
Fecal Coliform	0	0.025	0.025	0	2000	2000
E. Coli	0	0.025	0.025	0	630	630

The full assimilative capacity of the stream for fecal coliform was determined to equal the in-stream water quality standards of 2000 colonies/100 ml (chronic), and 630 colonies/100 ml for E. Coli (chronic).

V. Antidegradation Review

As set out in *The Basic Standards and Methodologies of 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.

According to the *Classifications and Numeric Standards for Arkansas River Basin*, stream segment COARMA04d is Use Protected. Because the receiving waters are designated as Use Protected, no

antidegradation review is necessary in accordance with the regulations. Thus, for purposes of this WQA, antidegradation review requirements have been met and no further antidegradation evaluation is necessary.

VI. References

Classifications and Numeric Standards for Arkansas River Basin, Regulation No. 32, CDPHE, WQCC, Effective July 21, 2003.

The Basic Standards and Methodologies for Surface Water, Regulation 31, CDPHE, WQCC, Effective October 30, 2001.

CDPS Summary of Rationale General Permit for Domestic Wastewater Treatment Facilities that Discharge to Receiving Waters with a Chronic Low Flow: Design Flow Ratio of 100:1 or Greater, CDPS Permit COG-584000, Statewide, CDPHE, WQCD, September 14, 1994.

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, CDPHE, WQCD, December 2001.

Memorandum Re: First Update to Guidance Version 1.0, CDPHE, WQCD, April 23, 2002.

**AUTHORIZATION TO DISCHARGE UNDER THE
COLORADO DISCHARGE PERMIT SYSTEM**

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

AVONDALE WATER AND SANITATION DISTRICT

is authorized to discharge from the District's wastewater treatment plant

located in Section 9, T21S, R62W and in Section 11, T21S, R62W

to the Green Arroyo and unclassified ground water

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

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

This permit and the authorization to discharge shall expire at midnight, December 31, 2010.

Issued and Signed this 17th day of November, 2005

COLORADO DEPARTMENT OF HEALTH


**for Steven H. Gunderson, Director
Water Quality Control Division**

DATE SIGNED NOVEMBER 17, 2005

EFFECTIVE DATE JANUARY 1, 2006

PART I

A. TERMS AND CONDITIONS

1. Service Area

The service area for this treatment facility is delineated in Figure 1. All wastewater flows contributed in this service area may be accepted by the Avondale Water and Sanitation District for treatment at the District's wastewater treatment plant provided that such acceptance does not exceed the throughput or design capacity of the treatment works or constitute a substantial impact to the functioning of the treatment works, quality of the receiving waters, 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 complete wastewater treatment works.

2. Design Capacity

The design capacity of the Avondale wastewater treatment works is 0.1146 million gallons per day (MGD) for hydraulic flow (30-day average) and 211 lbs. BOD₅ per day for organic loading (30-day average).

The design capacity of the Ft. Reynolds wastewater treatment works is 0.016 million gallons per day (MGD) for hydraulic flow (30-day average) and 44.7 lbs. BOD₅ 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 and treatment reaches eighty (80) percent of design capacity. Whenever throughput and treatment reaches ninety-five (95) percent of the design capacity, the permittee shall commence construction of the necessary treatment expansion.

In the case of a domestic wastewater treatment works, which treats wastewater from users under the permittee's jurisdiction, where construction is not commenced in accordance with the above paragraph, the permittee shall cease issuance of building permits within the service area until construction has commenced. If the permittee's domestic wastewater treatment works serves other municipalities or connector districts, the permittee shall have made provisions by contract or otherwise, for the municipalities within the service area to cease issuance of building permits within such service area until construction has commenced. Building permits may continue to be issued for any construction which would not have the effect of increasing the input of sewage to the wastewater treatment works that is the subject of this permit.

If, during the previous calendar year, the monthly organic loading (lbs. BOD₅/day) to the facility in the maximum month exceeded either 80% or 95% of the organic capacity identified in Part I.A.2. of this permit, the permittee shall submit a report by March 31st of the following year that includes:

- (i) a schedule for planning for a facility expansion if 80% of the organic capacity was exceeded; or
- (ii) a schedule for construction of a facility expansion if 95% of the organic capacity was exceeded; or
- (iii) an analysis that indicates that the exceedance of the applicable percentage of the organic capacity (80% or 95%) was an anomaly and is not expected to occur during the current calendar year.

If 80% or 95% of the hydraulic capacity identified in Part I.A.2 of this permit was exceeded during the month of maximum flow, then the permittee is not required to provide the information required in paragraphs (i) through (iii), above, unless violation(s) of effluent limits can be directly related to the magnitude of the hydraulic loading during any such months.

If the permittee has reason to believe that the peak flow in any major interceptor or lift station is expected to cause an overflow from the interceptor or lift station during the current calendar year, the permittee shall submit a report within 30 days of such finding that includes a schedule of actions to be taken immediately that will prevent any overflow to state waters.

A. TERMS AND CONDITIONS

4. Facilities Operation

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee as necessary to achieve compliance with the conditions of this permit. 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 guidelines and regulations.

5. Effluent Limitations

During the period beginning no later than the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from outfall(s) serial number(s): 001A, following the constructed wetlands at the Avondale WWTP.

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), the permitted discharge shall comply with the following limitations.

<u>Effluent Parameter</u>	<u>Discharge Limitations</u>		
	<u>Maximum Concentrations</u>		
	<u>30-Day Avg.</u>	<u>7-Day Avg.</u>	<u>Daily Max.</u>
Flow, MGD	0.1146 <u>a/</u>	N/A	Report <u>e/</u>
5-day Biochemical Oxygen Demand (BOD ₅), mg/l	30 <u>a/</u>	45 <u>b/</u>	N/A
Total Suspended Solids (TSS), mg/l	105 <u>a/</u>	160 <u>b/</u>	N/A
Fecal Coliform Bacteria, Number/100 ml through 6/30/06	6,000 <u>c/</u>	12,000 <u>c/</u>	N/A
Fecal Coliform Bacteria, Number/100 ml beginning 7/1/06	200 <u>c/</u>	400 <u>c/</u>	N/A
Total Residual Chlorine, mg/l	N/A	N/A	0.5 <u>d/</u>
pH, su (minimum-maximum)	N/A	N/A	(6.5-9.0) <u>d/</u>
Oil and Grease, mg/l (no visible sheen)	N/A	N/A	10 <u>d/</u>

6. Effluent Limitations

During the period beginning no later than the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from outfall(s) serial number(s): 002A, following lagoon no. 1 and prior to entering the exfiltration pond at the Ft. Reynolds WWTP.

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), the permitted discharge shall comply with the following limitations.

<u>Effluent Parameter</u>	<u>Discharge Limitations</u>		
	<u>Maximum Concentrations</u>		
	<u>30-Day Avg.</u>	<u>7-Day Avg.</u>	<u>Daily Max.</u>
Flow, MGD	0.016 <u>a/</u>	N/A	Report <u>e/</u>
5-day Biochemical Oxygen Demand (BOD ₅), mg/l	30 <u>a/</u>	45 <u>b/</u>	N/A
Total Suspended Solids (TSS), mg/l	105 <u>a/</u>	160 <u>b/</u>	N/A
Fecal Coliform Bacteria, Number/100 ml	2,000 <u>c/</u>	4,000 <u>c/</u>	N/A
Total Residual Chlorine, mg/l	N/A	N/A	0.5 <u>d/</u>
pH, su (minimum-maximum)	N/A	N/A	(6.5-9.0) <u>d/</u>
Oil and Grease, mg/l (no visible sheen)	N/A	N/A	10 <u>d/</u>

7. Effluent Limitations

During the period beginning no later than the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from outfall(s) serial number(s): 001B, prior to land application.

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), the permitted discharge shall comply with the following limitations.

<u>Effluent Parameter</u>	<u>Discharge Limitations</u>		
	<u>Maximum Concentrations</u>		<u>Daily Max.</u>
	<u>30-Day Avg.</u>	<u>7-Day Avg.</u>	
Flow, MGD	Report	N/A	NA

8. Percentage Removal Requirements (BOD₅ Limitations)

In addition to the concentration limitations on BOD₅ indicated above, the arithmetic mean of the BOD₅ concentrations for effluent samples collected during the calendar month shall demonstrate a minimum of eighty-five percent (85%) removal of BOD₅, as measured by dividing the respective difference between the mean influent and effluent concentrations for the calendar month by the respective mean influent concentration for the calendar month, and multiplying the quotient by 100.

9. Compliance Schedule

a) Ground Water Monitoring

The permittee must, by August 31, 2006, develop and implement a sampling protocol for the ground water monitoring wells. The permittee is to use the outline found in the permit in Part I.C. as a guide to formulate the sampling protocol. Once the protocol is written, the document is to be submitted to the Division for review and approval. The approved document is to be implemented each time ground water samples are taken.

The permittee must, by June 30, 2006, meet final fecal coliform limits at the Avondale facility through the use of on-site chlorination equipment.

Progress reports must be submitted for tasks identified in the above schedule. Refer to PART I, Section D, Reporting Requirements, for specific information.

10. Industrial Waste Management

- a) The permittee has the responsibility to protect the domestic wastewater treatment works (DWTW) from any contributing discharges which would inhibit, interfere, or otherwise be incompatible with operation of the treatment works including the use or disposal of municipal sludge.
- b) Pretreatment Standards (40 CFR 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 waste treatment facility from any source of non-domestic discharge:
 - (i) Pollutants which create a fire or explosion hazard in the treatment facility, 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 261.21;
 - (ii) Pollutants which will cause corrosive structural damage to the treatment facility, 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 facility, or other interference with the operation of the facility;
- (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 facility;
- (v) Heat in amounts which will inhibit biological activity in the facility resulting in interference but in no case heat in such quantities that the temperature in any treatment plant liquid stream exceeds forty (40) degrees Centigrade (104 degrees Fahrenheit);
- (vi) Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through at the facility;
- (vii) Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment facility 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 permittee; and,
- (ix) Any specific pollutant which exceeds a local limitation established by the permittee in accordance with the requirements of 40 CFR 403.5(c) and (d).

B. MONITORING REQUIREMENTS

1. 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, Section A.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, Section D.2.):

<u>Influent Parameter</u>	<u>Frequency</u>	<u>Sample Type f/</u>
Flow, MGD	Continuous	Recorder
BOD ₅ , mg/l (lb/day)	Monthly	Composite
Total Suspended Solids, TSS, mg/l	Monthly	Composite

Self-monitoring samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Monitoring point 300A, at a representative point prior to any physical or biological treatment at the Avondale WWTP.

2. 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, Section A.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, Section D.2.):

<u>Influent Parameter</u>	<u>Frequency</u>	<u>Sample Type f/</u>
Flow, MGD	Continuous	Meters
BOD ₅ , mg/l (lb/day)	Monthly	Composite
Total Suspended Solids, TSS, mg/l	Monthly	Composite

Self-monitoring samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Monitoring point 300F, at a representative point prior to any physical or biological treatment at the Ft. Reynolds WWTP.

3. Effluent Parameters

In order to obtain an indication of the probable compliance or non-compliance with the effluent limitations specified in Part I, Section A.5, the permittee shall monitor effluent parameters at the following required frequencies, the results to be reported on the Discharge Monitoring Report (See Part I, Section D.2.):

<u>Effluent Parameter</u>	<u>Frequency</u>	<u>Sample Type f/</u>
Flow, MGD	Continuous	Recorder
BOD ₅ , mg/l	Monthly	Grab
Total Suspended Solids, TSS, mg/l	Monthly	Grab
Fecal Coliform, Number/100 ml	Monthly	Grab
Total Residual Chlorine, mg/l	Weekly g/	Grab
pH, standard units	Weekly	Grab
Oil and Grease, mg/l	Weekly	Visual i/

Self-monitoring samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Discharge point 001A, following the chlorine contact basin at the Avondale WWTP and prior to mixing with the receiving stream.

4. Effluent Parameters

In order to obtain an indication of the probable compliance or non-compliance with the effluent limitations specified in Part I, Section A.6, the permittee shall monitor effluent parameters at the following required frequencies, the results to be reported on the Discharge Monitoring Report (See Part I, Section D.2.):

<u>Effluent Parameter</u>	<u>Frequency</u>	<u>Sample Type f/</u>
Flow, MGD h/	Continuous	Meter
BOD ₅ , mg/l	Monthly	Grab
Total Suspended Solids, TSS, mg/l	Monthly	Grab
Fecal Coliform, Number/100 ml	Monthly	Grab
Total Residual Chlorine, mg/l	Weekly g/	Grab
pH, standard units	Weekly	Grab
Oil and Grease, mg/l	Weekly	Visual i/

Self-monitoring samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Discharge point 002A, following lagoon no. 1 at the Ft. Reynolds WWTP and prior to entering the exfiltration pond.

5. Effluent Parameters

In order to obtain an indication of the probable compliance or non-compliance with the effluent limitations specified in Part I, Section A.5, the permittee shall monitor effluent parameters at the following required frequencies, the results to be reported on the Discharge Monitoring Report (See Part I, Section D.2.):

<u>Effluent Parameter</u>	<u>Frequency</u>	<u>Sample Type f/</u>
Flow to land application, MGD	Continuous	Recorder

Self-monitoring samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Discharge point 001B, following disinfection at the Avondale WWTP and prior to land application.

B. MONITORING REQUIREMENTS

6. Ground Water Parameters

In order to obtain an indication of the probable compliance or non-compliance with the effluent limitations specified in Part I, Section A.5. and A.6., the permittee shall monitor ground water parameters at the following required frequencies, the results to be reported on the Discharge Monitoring Report (See Part I, Section D.2.):

<u>Ground Water Parameter</u>	<u>Frequency i/</u>	<u>Sample Type f/</u>
Total Coliform, no. /100 ml	Quarterly	Grab
Nitrate plus Nitrite as N, mg/l	Quarterly	Grab
Chloride, mg/l	Quarterly	Grab
COD, mg/l	Quarterly	Grab
TDS, mg/l	Quarterly	Grab
Depth to Ground Water, ft.	Quarterly	Measure

Self-monitoring samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Ground water monitoring wells 050A-050D, ground water monitoring wells at the land application site at the Avondale WWTP; and 051A-051C, ground water monitoring wells around the exfiltration pond at the Ft. Reynolds WWTP.

7. Biosolids Parameters

- a) If biosolids from the treatment facilities are removed and are disposed of at a solid waste disposal site or applied to land for beneficial use*, the following requirements apply.

The discharge of solid waste to land for disposal is regulated by the Colorado Solid Wastes Disposal Sites and Facilities Act (30-20, Part 1 CRS 1973). The Act requires that either a Certificate of Designation be issued by the appropriate board of county commissioners for any disposal site located within an unincorporated portion of a county, or that approval be granted by the appropriate governing body of an incorporated portion of a county for any disposal site located within that incorporated area. Biosolids are considered, by definition, [30-20-101(6)] to be a solid waste.

Section 30-20-102(6) provides an exemption from the Certificate of Designation requirement for biosolids which are used in a beneficial manner and are designated as meeting all applicable regulations of the Department. The application of biosolids to agricultural or disturbed land as a soil conditioner/fertilizer is subject to the Colorado Biosolids Regulations, Regulation No. 64 (5CCR 1002-64). Biosolids disposed of in this manner shall comply with the requirements of these Regulations.

- b) Analytical and Sampling Methods for Monitoring

Sample collection, preservation and analysis shall be performed in a manner consistent with with the requirements of the Biosolids Regulations, 64 (5CCR 1002-64) and/or other criteria specified in this permit. Metals analyses are to be performed using method SW 846 with samples prepared in accordance with method 3050. The methods are also described in the latest version of the EPA Region VIII Biosolids Management Handbook.

- c) Records

Biosolids which are Class A with respect to pathogens and which meet the monthly pollutant concentration limits identified in Part I.A.10.a) shall comply with the recordkeeping requirements identified in sections 7.e)(i)(1) through 7.e)(i)(3), below. If the biosolids are Class B with respect to pathogens, or if any pollutant limited in Part I.A.10.a) increases to the point where the biosolids no longer meet the monthly average pollutant concentration limits in Part I.A.10.a), the permittee shall comply with all of the recordkeeping requirements identified below:

* "Beneficial Use" means the use of nutrients and/or moisture in the biosolids to act as a soil conditioner or low grade fertilizer for the promotion of vegetative growth on land.

B. MONITORING REQUIREMENTS

7. Biosolids Parameters

c) Records (Continued)

(i) The permittee is required to have access to the following information for at least 5 years:

- (1) Test results showing the concentration of each pollutant in Part I.A.10.a);
- (2) A description of how the pathogen reduction requirements in Part I.A.10.b) were met;
- (3) A description of how the vector attraction reduction requirements in Part I.A.10.c) were met;
- (4) A description of how the management practices in Part I.A.10.e) were met (if necessary);
- (5) A description of how the site restrictions in Part I.A.10.b) were met (if necessary); and
- (6) The following certification statement:

"I certify under the penalty of law, that the pathogen requirements in Part I.A.10.a), one of the vector attraction reduction alternatives in Part I.A.10.b), the management practices in Part I.A.10.e) (if necessary) and the site restrictions in Part I.A.10.b) (if necessary) have been met. This determination has been made under my direction and supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements, the vector attraction reduction requirements, the management practices and the site restrictions have been met. I am aware that there are significant penalties for false certification including the possibility of imprisonment."

- (ii) Records of monitoring information shall include the: 1) date, exact place, and time of sampling or measurements and the initials or name(s) of the individual(s) who performed the sampling or measurements; 2) date(s) and times analyses were performed; 3) initials or name(s) of individual(s) who performed the analyses; 4) references and written procedures, when available, for the analytical techniques or methods used; and 5) results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.
- (iii) 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 the life of the permit. Data collected on site, copies of Biosolids Report forms, and a copy of this permit must be maintained on site during the duration of activity at the permitted location.

C. SPECIAL REQUIREMENTS

1. Monitoring/Sampling Protocol

To ensure consistent results in the ground water monitoring program, the permittee is required to submit a sampling protocol to the Division for approval by March 31, 1999. The approved protocol is to be utilized during sampling beginning in April 1, 1999. The sampling protocol is to include the following guidelines:

Sampling Protocol

- (A) Determine static water level with one of the following: (a) a "popper" (a steel tape with a metal cylinder for a weight), or (b) a steel tape - a chalked (carpenter's or blackboard chalk) steel tape with a weight. Be certain to use a surveyed measuring point to determine water surface elevation. Do not pump well during measurement. The total depth of the well should be measured quarterly to determine if the well is "silted in".
- (B) If a well will not readily recharge once the water in the casing is evacuated, it is the Division's position that the water in the well be sampled, using a bladder pump or peristaltic pump, a bottom opening bailer or a syringe sampler. A "Micro Purge" type system is acceptable upon approval by the Division.

C. SPECIAL REQUIREMENTS

1. Monitoring/Sampling Protocol

- (C) Prior to taking the water sample from the well, the permittee shall determine the temperature, pH, specific conductance and dissolved oxygen of the ground water. There are field instruments available to perform field analysis of the above parameters. Each value for an individual parameter shall be within 10% of the previous/succeeding value, in order to establish the time when a ground water sample is taken.
- (D) Before taking the water sample from the well, it is important that all sampling devices be carefully cleaned. A dilute hydrochloric acid rinse followed by successive rinses with deionized water, acetone and distilled organic free water is routinely used. In a badly contaminated situation, a hot water detergent wash before the above rinsing procedure may be necessary. Hexane rinses before the final distilled inorganic water rinse will aid in the removal of sparingly soluble organic materials before sampling for low level organic pollutants. Maintain consistent and uniform procedures throughout the sampling procedure. Dedicated sampling equipment need not be rinsed.
- (E) If the monitoring wells do not yield at a rate adequate to be effectively flushed, a suggested procedure includes removing the water in the well casing to the top of the screened interval to prevent exposure of the gravel pack or formation to atmospheric conditions. The sample is then taken at a rate that would not cause rapid drawdown. If there is sufficient water in the formation to permit a slow recharge, then the well may be pumped dry and allowed to recover. The samples should be collected as soon as a volume of water sufficient for the intended analytical scheme reenters the well. Exposure of water entering the well for periods longer than 2 to 3 hours may render samples unsuitable and unrepresentative of water contained within the aquifer system. In these cases, it may be desirable to collect small volumes of water over a period of time, each time pumping the well dry and allowing it to recover. Whenever full recovery exceeds 3 hours, samples should be collected in order of their volatility as soon as sufficient volume is available for a sample for each analytical parameter or compatible set of parameters. Parameters that are not pH sensitive or subject to loss through volatilization should be collected last. Few reliable data exist on when to choose one sampling method over another in "tight" formations.
- (F) A preferred collection order, which ranks the parameters by volatilization sensitivity, is as follows:
- | | | |
|----------------------------------|----------------------------|----------------------|
| Volatile Organics (VOA) | Total organic carbon (TOC) | Dissolved metals |
| Purgeable organic carbon (POC) | Turbidity | Phenols |
| Purgeable organic halogens (POX) | Cyanide | Extractable organics |
| Total organic halogens (TOX) | Sulfate and chloride | Total metals |
- (G) The samples, other than the ones that were field determined, should have the proper container, should have the correct preservative, should be designated as to whether it is to be filtered or not, should have the proper volume of water taken for analysis and should be analyzed prior to exceeding the maximum holding time.
- (H) All data shall be submitted to the Division by the 28th day of the month following sample taking/analysis. Starting on April 1, 1999, the permittee is to take a ground water sample. Hence, the analytical results of a sample taken in April 1999 are due to the Division by May 28, 1999. The Division will determine if there are limitations changes necessary and whether the permit is to be amended to bring about any necessary changes.

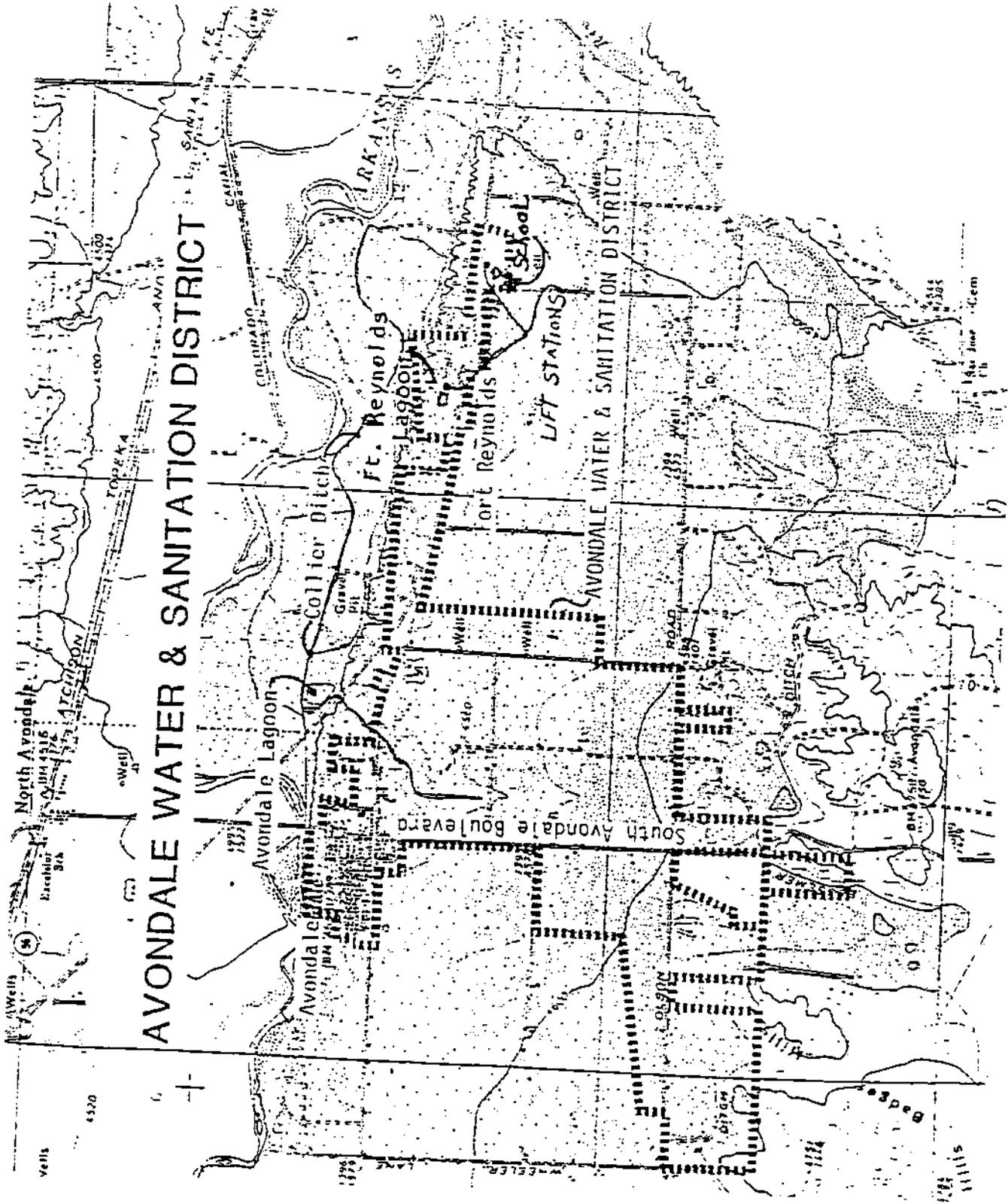
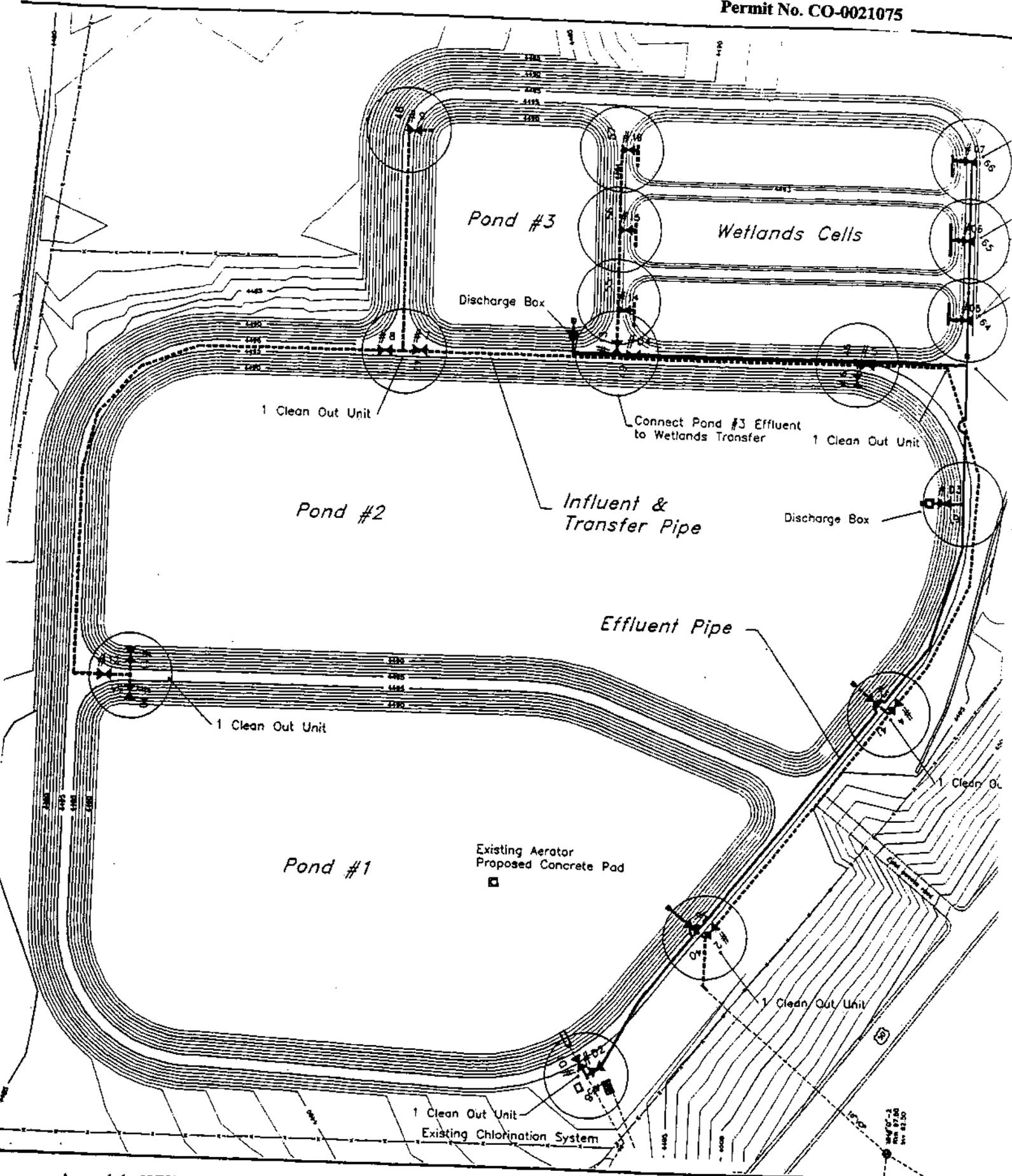
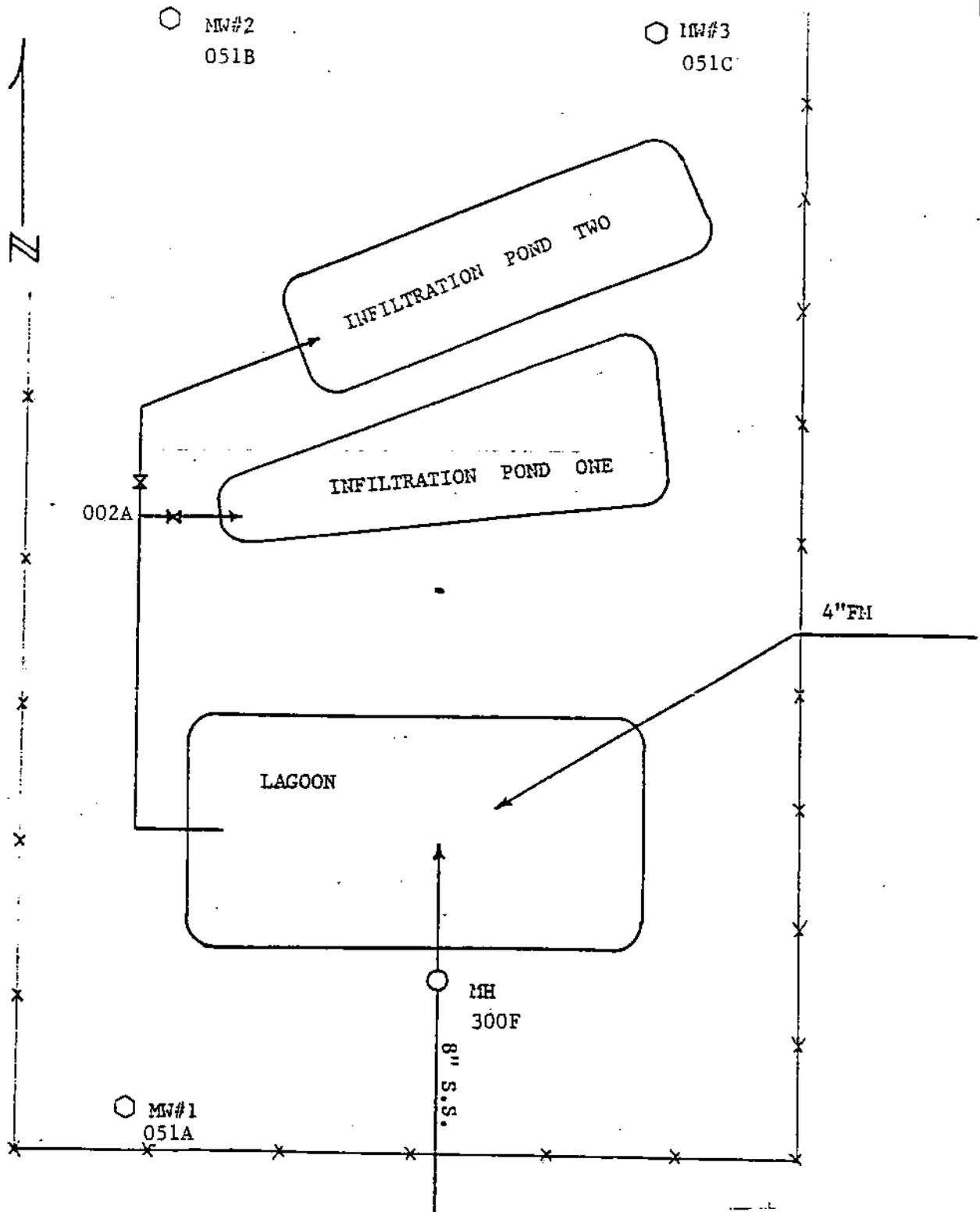


FIGURE 1



Avondale WWTP

FIGURE 2



Ft. Reynolds WWTP

FIGURE 3

FOOTNOTES

- a/** - The thirty (30) day average is defined as being the arithmetic mean of the analytical results for all samples collected during a thirty (30) consecutive day period. The permittee shall report the arithmetic mean of all self-monitoring sample data collected during the calendar month on the Discharge Monitoring Reports. No individual sample result may be used for more than one thirty (30) day average. (For fecal coliform determinations, see footnote **c/**).
- b/** - The seven (7) day average shall be determined by an arithmetic mean of the analytical results for all samples collected during 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 a 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. No individual sample result may be used for more than one (1) seven (7) day average. (For fecal coliform determinations, see footnote **c/**).
- c/** - For fecal coliform bacteria concentrations, the thirty (30) day and seven (7) day averages shall be determined as explained in footnotes **a/** and **b/** above, respectively, except that the geometric mean shall be used instead of the arithmetic mean. 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:

$$\text{Geometric Mean} = (a^{(1/n)} * b * c * d * \dots)$$

"*" - means multiply

Method 2:

$$\text{Geometric Mean} = \text{antilog} ([\log(a) + \log(b) + \log(c) + \log(d) + \dots] / n)$$

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, the numeric value shall be used in the calculations unless the result is "less than 2.2". If the result is "less than 2.2", use a value of 1 in the calculations. If all individual analytical results for the month are reported to be less than numeric values, then report "less than" the largest of those numeric values on the monthly DMR. Otherwise, report the calculated value.

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

- i) A minimum of two samples shall be collected for coliform analysis within the next sampling period.
- ii) **If the sampling frequency is monthly or less frequent:** For the period with the invalid sample results, leave the spaces on the corresponding DMR for reporting coliform results empty and attach to the DMR a letter noting that a result of TNTC was obtained for that period, and explain why another sample for that period had not been collected.

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

- d/** - The "Daily Maximum" limitation for this parameter shall be applied as an instantaneous maximum (or, for pH or DO, instantaneous minimum) value. The instantaneous value is defined as the analytical result of any individual sample. Report the maximum (and/or minimum) of all instantaneous values within the calendar month. Any instantaneous value beyond the noted daily maximum limitation for the indicated parameter shall be considered a violation of this permit.
- e/** - The "Daily Maximum" limitation for this parameter shall be applied as a maximum daily average. The daily average is defined as the arithmetic mean of the analytical results for all samples collected during a 24-hour period. If only one sample is collected during the 24-hour period, the analytical result for that single sample shall be used as the daily average. Report the maximum of all daily average values within the calendar month. Any daily average beyond the noted daily maximum limitation for the indicated parameter shall be considered a violation of this permit.

FOOTNOTES: (Continued)

f/ - Definitions for sample types are as follows:

- (i) A "recorder" requires the continuous operation of a chart and/or totalizer (or drinking water rotor meters or pump hour meters where previously approved).
- (ii) A "composite" sample, for monitoring requirements, is defined as a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow.
- (iii) A "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.
- (iv) A "grab" sample, for monitoring requirements, is defined as a single "dip and take" sample collected so as to be representative of the parameter being monitored.
- (v) An "instantaneous" measurement, for monitoring requirements, is defined as a single reading, observation, or measurement using existing monitoring facilities.
- (vi) A "sludge composite" sample is a representative sample of sludge from a wastewater treatment process unit, storage unit or stabilization process unit. The sample shall consist of a minimum of three grab samples of 500 milliliters each taken at the start, middle and end of a pumping cycle, or if discharge is continuous or of a cyclical nature, grab samples of 250 milliliters each shall be taken four times during a twenty-four (24) hour period and combined. Compositing samples of semidewatered, dewatered and dried sludge shall consist of a minimum of four (4) grab samples of 0.5 kilograms each taken four times during a twenty-four (24) hour period and combined.

g/ - Monitoring is required only when chlorine is used for disinfection. In the calculation of average total residual chlorine concentrations, those analytical results that are less than the method detection limit shall be considered to be zero for calculation purposes. If all individual analytical results that would be used in the calculations are below the method detection limit, then "less than \bar{x} ", where \bar{x} is the method detection limit, shall be reported on the monthly DMR. Otherwise, report the calculated value.

For purposes of this permit the method detection limits of the DPD colorimetric and the amperometric titration methods of analysis for total residual chlorine are as follows:

<u>Method</u>	<u>Method Detection Limit, mg/l</u>
DPD colorimetric	0.10 mg/l
Amperometric titration	0.05 mg/l

If, during the life of this permit, there are improvements in approved analytical procedures that result in lower detection limits, this permit may be reopened to propose the incorporation of those detection limits into this permit. Modification of the permit will be in accordance with the requirements of 40 CFR, Part 124.

h/ - For this facility, a single flow recording device is provided and is located at the point of inflow to the treatment plant. Since effluent flows will not be significantly different from influent flows, the single flow measurement device will be used for the recording and reporting of both influent and effluent flows. Reported influent flows will be used to monitor compliance with the effluent flow limitation.

i/ - If visible sheen is noted, a grab sample shall be collected and analyzed for oil and grease. The results are to be reported on the DMR under parameter 03582.

j/ - When the measurement frequency indicated is quarterly, samples may be collected at any time during the calendar quarter, with the results being reported on the monthly DMR corresponding to the last month of the quarter (March, June, September or December). If the discharge is intermittent, samples must be collected during the period when discharge occurs.

C. ADDITIONAL MONITORING REQUIREMENTS**1. 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.

2. 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.

3. Analytical and Sampling Methods for Monitoring

The permittee shall install, calibrate, use and maintain monitoring methods and equipment, including biological and indicated pollutant monitoring methods. Analytical and sampling methods utilized by the discharger shall be approved methods as defined by the Regulations for Effluent Limitations (5 CCR 1002-62, 62.5), Federal regulations (40 CFR 136) and any other applicable State or Federal regulations.

When requested in writing, the Water Quality Control Division may approve an alternative analytical procedure or any significant modification to an approved procedure.

4. Records

- a) The permittee shall establish and maintain records. Those records shall include, but not be limited to, the following:
- (i) The date, type, exact place, and time of sampling or measurements;
 - (ii) The individual(s) who performed the sampling or measurements;
 - (iii) The date(s) the analyses were performed;
 - (iv) The individual(s) who performed the analyses;
 - (v) The analytical techniques or methods used; and
 - (vi) The results of such analyses.
- b) The permittee shall retain for a minimum of three (3) years records of all monitoring information, including all original strip chart recordings for continuous monitoring instrumentation, all calibration and maintenance records, copies of all reports required by this permit and records of all data used to complete the application for this permit. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the permittee or when requested by the Division or Regional Administrator.

5. Additional Monitoring by Permittee

If the permittee, using the approved analytical methods, 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 or other forms as required by the division. Such increased frequency shall also be indicated.

C. ADDITIONAL MONITORING REQUIREMENTS**6. Flow Measuring Devices**

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. 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 entering the facility.

D. REPORTING**1. Signatory Requirements**

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

- a) In the case of corporations, by a principal executive officer of at least the level of vice-president or his or her duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the form originates;
- b) In the case of a partnership, by a general partner;
- c) In the case of a sole proprietorship, by the proprietor;
- d) In the case of a municipal, state, or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

The permittee shall, with the exception of reporting the results of whole effluent toxicity (WET) tests, make the following certification on all such documents:

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

D. REPORTING

2. Monthly Reports

Monitoring results shall be summarized for each month and reported on the Discharge Monitoring Report forms (EPA forms 3320-1). One form shall be mailed to the Water Quality Control Division, as indicated below, so that the DMR is received no later than the 28th day of the following month. If no discharge occurs during the reporting period, "No Discharge" shall be reported.

The Discharge Monitoring Report forms shall be filled out accurately and completely in accordance with the requirements of this permit and the instructions on the forms, and shall be signed by an authorized person as identified in the preceding section, Part I.D.1. The Discharge Monitoring Report forms consist of four pages - the top "original" copy, and three attached no-carbon-required copies. After the DMR form has been filled out and signed, the four copies must be separated and distributed as follows.

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

**COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
WATER QUALITY CONTROL DIVISION
WQCD-P-B2
4300 CHERRY CREEK DRIVE SOUTH
DENVER, CO 80246-1530**

The additional copies are for the permittee's records.

D. REPORTING

3. Annual Report

- a) **Annual Biosolids Report:** The permittee shall provide the results of all biosolids monitoring performed in accordance with Part I.B.7, 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 which occur 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:

**original to: COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT,
WATER QUALITY CONTROL DIVISION
WQCD-P-B2
4300 CHERRY CREEK DRIVE SOUTH
DENVER, COLORADO 80246-1530**

**copy to: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION VIII
DENVER PLACE, 999 18TH STREET, SUITE 500
DENVER, COLORADO 80202-2466**

**ATTENTION: BIOSOLIDS PROGRAM MANAGER
P2WP**

4. Special Notifications

a) Definitions

- (i) **Bypass:** The intentional diversion of waste streams from any portion of a domestic wastewater treatment works.
- (ii) **Severe Property Damage:** 1) Substantial physical damage to property at the treatment facilities to cause them to become inoperable, or 2) substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.
- (iii) **Spill:** An incident in which flows or solid materials are accidentally or unintentionally allowed to flow or escape so as to be lost from the domestic wastewater treatment works as defined in the Colorado Water Quality Control Act, which may cause pollution of state waters.
- (iv) **Upset:** An exceptional incident in which there is unintentional and temporary noncompliance with permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

D. REPORTING

4. Special Notifications

b) Noncompliance Notification

- (i) If, for any reason, the permittee does not comply with or will be unable to comply with any maximum discharge limitations, standards or conditions specified in this permit, the permittee shall, at a minimum, provide the Water Quality Control Division and EPA with the following information:
- (1) A description of the discharge and cause of noncompliance.
 - (2) The period of noncompliance, including exact dates and times and/or the anticipated time when the discharge will return to compliance; and
 - (3) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.
- (ii) The following instances of noncompliance shall be reported orally within twenty-four (24) hours from the time the permittee becomes aware of the circumstances. A written report, containing the information requested in Part I.D.4.b)(i), above, shall be mailed to the Division within five (5) days of the time the permittee becomes aware of the circumstances.
- (1) Any instance of noncompliance which may endanger human health or the environment, regardless of the cause for the incident.
 - (2) Any unanticipated bypass, or any upset or spill, which causes any permit limitation to be exceeded.
 - (3) Any suspected discharge of toxic pollutants or hazardous substances, which are listed in Part III. of this permit, in excess of a daily maximum limit or where there is no limit for the toxic pollutant or hazardous substance in question.
- (iii) The permittee shall report all other instances of noncompliance, which are not required to be reported within twenty-four (24) hours, at the time Discharge Monitoring Reports are submitted, except as required in (iv) below. The reports shall contain the information listed in "Noncompliance Notification" (paragraph (i) above).
- (iv) If the permittee knows in advance of the need for a bypass, it shall submit written notification to the division of the need for such bypass at least ten days before the date of the contemplated bypass.

c) Submission of Incorrect or Incomplete Information

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

d) Compliance Schedule Notification

No later than fourteen (14) calendar days following a date identified in the compliance schedules in this permit, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

D. REPORTING

4. Special Notifications

e) Change in Discharge or Wastewater Treatment Facility

The permittee shall inform the Division (Permits Unit) in writing of any intent to construct, install, or alter any process, facility, or activity that is likely to result in a new or altered discharge either in terms of location or effluent quality prior to the occurrence of the new or altered discharge, and shall furnish the Division such plans and specifications which the Division deems reasonably necessary to evaluate the effect on the discharge and receiving stream.

Notice is required only when:

- (i) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged; or**
- (ii) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported pursuant to an approved land application plan.**

If the Division finds that such new or altered discharge might be inconsistent with the conditions of the permit, the Division shall require a new or revised permit application and shall follow the procedures specified in the Colorado Discharge Permit System Regulations, 5CCR 1002.61, Sections 61.5 through 61.6, and 61.15 prior to the date that the new or altered discharge takes place.

f) Deactivation

The permittee shall notify the Permits Unit of the Division within thirty (30) days of deactivation of the permitted facility. Deactivation includes ceasing operation of the facility, ceasing all discharges to State Waters for the remaining term of the existing permit and/or the connection to another wastewater treatment facility.

PART II

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

1. Bypass

- a) 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 optimal operation. These bypasses are not subject to the provisions noted in item b), below. Division notification is not required.
- b) A bypass which causes effluent limitations to be exceeded is prohibited, and the division may take enforcement action against a permittee for such a bypass, unless:
 - (i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (ii) 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 the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
 - (iii) The permittee submitted notices as required in "Non-Compliance Notification," Part I, Section D

2. Upsets

a) Effect of an Upset

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

b) Conditions Necessary for a Demonstration of Upset

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

- (i) An upset occurred and that the permittee can identify the specific cause(s) of the upset;
- (ii) The permitted facility was at the time being properly operated and maintained; and
- (iii) The permittee submitted notice of the upset as required in Part I, Section C of this permit (24-hour notice).
- (iv) The permittee took 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.

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

c) Burden of proof

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

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

3. Reduction, Loss, or Failure of Treatment Facility

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

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

4. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the State.

For all domestic wastewater treatment works, the permittee shall dispose of sludge in accordance with State and Federal regulations.

5. Minimization of Adverse Impacts

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to waters of the State resulting from any discharge. As necessary, accelerated or additional monitoring of the influent or effluent will be required to determine the nature and impact of noncompliance.

6. Discharge Point

Any discharge to the waters of the State from a point source other than specifically authorized herein is prohibited.

7. Inspections and Right to Entry

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

- a) To enter upon the permittee's premises where a regulated facility or activity is located or in which any records are required to be kept under the terms and conditions of this permit;
- b) At reasonable times to have access to inspect and copy any records required to be kept under the terms and conditions of this permit and to inspect any monitoring equipment or monitoring method required in the permit; and
- c) To enter upon the permittee's premises in a reasonable manner and at a reasonable time to inspect and/or investigate any actual, suspected, or potential source of water pollution, or to ascertain compliance or noncompliance with any applicable state or federal statute or regulation or any order promulgated by the division. The investigation may include, but is not limited to the following: sampling of any discharge and/or process waters, the taking of photographs, interviewing of any persons having any knowledge related to the discharge permit or alleged violation, access to any and all facilities or areas within the permittee's premises that may have any affect on the discharge, permit, or alleged violation. Such entry is also authorized for the purpose of inspecting and copying records required to be kept concerning any effluent source.

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

7. Inspections and Right to Entry - Continued

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

- d) The Division shall split samples taken by the Division during any investigation with the permittee if requested to do so by the permittee.

8. 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.

9. Availability of Reports

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

As required by the Federal Clean Water Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Clean Water Act, and Section 25-8-610 C.R.S.

10. Transfer of Ownership or Control

A permit may be transferred to a new permittee only upon the completion of the following:

- a) The current permittee notifies the division in writing 30 days in advance of the proposed transfer date;
- b) The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage and liability between them; and
- c) The Division does not notify the existing permittee and the proposed new permittee of its intent to modify, or revoke and reissue, the permit.
- d) Fee requirements of the Colorado Discharge Permit System Regulations, Section 61.15 have been met.

11. Contract Requirements

The permittee shall include pertinent terms and conditions of this permit in all contracts for receipt by the permittee of any effluent not required to be received by the permittee.

B. ADDITIONAL CONDITIONS

1. Permit Violations

Failure to comply with any terms and/or conditions of this permit shall be a violation of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

2. Civil and Criminal Liability

Except as provided in Part I, Section C and Part II, Section A, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance (See 40 CFR 121.60)

3. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibility, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

4. Division Emergency Power

Nothing in this permit shall be construed to prevent or limit application of any emergency power of the division.

5. Severability

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

6. Oil and Hazardous Substance 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 under Section 311 (Oil and Hazardous Substance Liability) of the Clean Water Act, except as recognized by federal law.

7. Property Rights

The issuance of this permit does not convey any property or water rights in either real or personal property or stream flow or any exclusive privileges, nor does it authorize any injury to private property, any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

B. ADDITIONAL CONDITIONS

8. Modification, Suspension, or Revocation of Permit

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

All permit modification, termination or revocation and reissuance actions shall be subject to the requirements of the Colorado Discharge Permit System Regulations, Sections 61.5 (b&c), 61.6, 61.7 and 61.15 except for minor modifications.

- a) This permit may be modified, suspended, or terminated in whole or in part during its term for reasons determined by the Division including, but not limited to, the following:
- (i) Violation of any terms or conditions of the permit;
 - (ii) Obtaining a permit by misrepresentation or failing to disclose any fact which is material to the granting or denial of a permit or to the establishment of terms or conditions of the permit; or
 - (iii) Materially false or inaccurate statements or information in the permit application of the permit; or
 - (iv) A determination that the permitted activity endangers human health or the classified or existing uses of state waters and can only be regulated to acceptable levels by permit modifications or termination.
- b) A permit may be modified in whole or in part for the following causes, provided that such modification complies with the provisions of Section 61.10:
- (i) There are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit.
 - (ii) The Division has received new information which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of different permit conditions at the time of issuance. For general permits, this cause includes information indicating that cumulative effects on the environment are unacceptable. For permits issued to new sources or new dischargers, this cause includes information derived from effluent testing required under Section 61.4 (7)(e). This provision allows a modification of the permit to include conditions that are less stringent than the existing permit only to the extent allowed under Section 61.10.
 - (iii) The standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued. Permits may be modified during their terms for this cause only as follows:
 - (1) The permit condition requested to be modified was based on a promulgated effluent limitation guideline, EPA approved water quality standard, or an effluent limitation set forth in 5 CCR 1002-62, § 62.1 et seq.; and

B. ADDITIONAL CONDITIONS

8. Modification, Suspension, or Revocation of Permit

b) (iii) (Continued)

- (2) EPA has revised, withdrawn, or modified that portion of the regulation or effluent limitation guideline on which the permit condition was based, or has approved a Commission action with respect to the water quality standard or effluent limitation on which the permit condition was based; and**
 - (3) The permittee requests modification as required in the Colorado Discharge Permit System Regulations after the notice of final action by which the EPA effluent limitation guideline, water quality standard, or effluent limitation is revised, withdrawn, or modified; or**
 - (4) For judicial decisions, a court of competent jurisdiction has remanded and stayed EPA promulgated regulations or effluent limitation guidelines, if the remand and stay concern that portion of the regulations or guidelines on which the permit condition was based and a request is filed by the permittee in accordance with this Regulation, within ninety (90) days of judicial remand.**
 - (iv) The Division determines that good cause exists to modify a permit condition because of events over which the permittee has no control and for which there is no reasonable available remedy.**
 - (v) The permittee has received a variance.**
 - (vi) When required to incorporate applicable toxic effluent limitation or standards adopted pursuant to § 307(a) of the Federal act.**
 - (vii) When required by the reopener conditions in the permit.**
 - (viii) As necessary under 40 C.F.R. 403.8(e), to include a compliance schedule for the development of a pretreatment program.**
 - (ix) When the level of discharge of any pollutant which is not limited in the permit exceeds the level which can be achieved by the technology-based treatment requirements appropriate to the permittee under Section 61.8 (b) of the Colorado Discharge Permit System Regulations.**
 - (x) To establish a pollutant notification level required in Section 61.8 (c) of the Colorado Discharge Permit System Regulations.**
 - (xi) To correct technical mistakes, such as errors in calculation, or mistaken interpretations of law made in determining permit conditions, to the extent allowed in Section 61.10 of the Colorado Discharge Permit System Regulations.**
 - (xii) When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.**
 - (xiii) For any other cause provided in Section 61.10 of the Colorado Discharge Permit System Regulations.**
- c) Any condition set forth in the approval of the site location may become a condition of the permit, if so identified. Any site approval condition that is included in this permit pursuant to these regulations shall only be subject to enforcement through the Colorado Water Quality Control Act, C.R.S. 25-8-101, et seq.**

B. ADDITIONAL CONDITIONS

8. Modification, Suspension, or Revocation of Permit (Continued)

- (d) **At the request of a permittee, the Division may modify or terminate a permit and issue a new permit if the following conditions are met:**
 - (i) **The Regional Administrator has been notified of the proposed modification or termination and does not object in writing within thirty (30) days of receipt of notification,**
 - (ii) **The Division finds that the permittee has shown reasonable grounds consistent with the Federal and State statutes and regulations for such modifications or termination;**
 - (iii) **Requirements of Section 61.15 of the Colorado Discharge Permit System Regulations have been met, and**
 - (iv) **Requirements of public notice have been met.**
- e) **Permit modification (except for minor modifications), termination or revocation and reissuance actions shall be subject to the requirements of Sections 61.5 (2&3), 61.6, 61.7 and 61.15 of the Colorado Discharge Permit System Regulations. The Division shall act on a permit modification request, other than minor modifications requests, within 180 days of receipt thereof. Except for minor modifications, the terms of the existing permit govern and are enforceable until the newly issued permit is formally modified or revoked and reissued following public notice.**
- f) **Upon consent by the permittee, the Division may make minor permit modifications without following the requirements of Sections 61.5 (2&3), 61.7, and 61.15 of the Colorado Discharge Permit System Regulations. Minor modifications to permits are limited to:**
 - (i) **Correcting typographical errors; or**
 - (ii) **Increasing the frequency of monitoring or reporting by the permittee; or**
 - (iii) **Changing an interim date in a schedule of compliance, provided the new date of compliance is not more than 120 days after the date specific in the existing permit and does not interfere with attainment of the final compliance date requirement; or**
 - (iv) **Allowing for a transfer in ownership or operational control of a facility where the Division determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage and liability between the current and new permittees has been submitted to the Division; or**
 - (v) **Changing the construction schedule for a discharger which is a new source, but no such change shall affect a discharger's obligation to have all pollution control equipment installed and in operation prior to discharge; or**
 - (vi) **Deleting a point source outfall when the discharge from that outfall is terminated and does not result in discharge of pollutants from other outfalls except in accordance with permit limits; or**
 - (vii) **Incorporating conditions of a POTW pretreatment program that has been approved in accordance with the procedures in 40 C.F.R. 403.11 (or a modification thereto that has been approved in accordance with the procedures in 40 C.F.R. 403.18) as enforceable conditions of the POTW's permits.**
- g) **When the permit is modified, only the conditions subject to modification are reopened. If the permit is revoked and reissued, the entire permit is reopened and subject to revision and the permit is reissued for a new term.**

B. ADDITIONAL CONDITIONS

8. Modification, Suspension, or Revocation of Permit (Continued)

- h) The filing of a request by the permittee for a permit modification, revocation and reissuance or termination does not stay any permit condition.**
- i) All permit modifications and reissuances are subject to the antibacksliding provisions set forth in 61.10 (e) through (g) of the Colorado Discharge Permit System Regulations.**

9. Permit Renewal Application

If the permittee desires to continue to discharge, a permit renewal application shall be submitted at least one hundred eighty (180) days before this permit expires. If the permittee anticipates there will be no discharge after the expiration date of this permit, the division must be promptly notified so that it can terminate the permit in accordance with Part II Section B.8.

10. Confidentiality

Any information relating to any secret process, method of manufacture or production, or sales or marketing data, which may be acquired, ascertained, or discovered, whether in any sampling investigation, emergency investigation, or otherwise, shall not be publicly disclosed by any member, officer, or employee of the commission or the division, but shall be kept confidential. Any person seeking to invoke the protection of this Subsection (10) shall bear the burden of proving its applicability. This section shall never be interpreted as preventing full disclosure of effluent data.

11. Fees

The permittee is required to submit an annual fee as set forth in the 1983 amendments to the Water Quality Control Act, Section 25-8-502 (1) (b), and the Colorado Discharge Permit System Regulations 5CCR 1002-61, Section 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.

PART III

CATEGORICAL INDUSTRIES

Aluminum Forming
Asbestos Manufacturing
Battery Manufacturing
Builders' Paper and Board Mills
Carbon Black Manufacturing
Cement Manufacturing
Coil Coating
Copper Forming
Dairy Products Processing
Electrical and Electronic Components
Electroplating
Explosives Manufacturing
Feedlots
Ferroalloy Manufacturing
Fertilizer Manufacturing
Fruit and Vegetable Processing Manufacturing
Glass Manufacturing
Grain Mills
Ink Formulation
Inorganic Chemicals Manufacturing
Iron and Steel Manufacturing
Leather Tanning and Finishing
Meat Processing
Metal Finishing
Metal Molding and Casting (Foundries)
Nonferrous Metals Manufacturing
Nonferrous Metals Forming and Metal Powders

Paint Formulation
Paving and Roofing Materials
(Tars and Asphalt)
Pesticide Chemicals
Petroleum Refining
Pharmaceutical Manufacturing
Phosphate Manufacturing
Plastics Molding and Forming
Porcelain Enameling
Pulp, Paper, and Paperboard
Manufacturing
Rubber Manufacturing
Seafood Processing
Soap and Detergent Manufacturing
Steam Electric Power Plants
Sugar Processing
Textile Mills
Timber Products Processing

Toxic Pollutants And Hazardous Substances
Organic Toxic Pollutants in Each of Three Fractions in
Analysis by Gas Chromatography/Mass Spectroscopy (GC/MS)

Volatiles

Acrolein
 Acrylonitrile
 Benzene
 Bromoform
 Carbon Tetrachloride
 Chlorobenzene
 Chlorodibromomethane
 Chloroethane
 2-Chloroethylvinyl Ether
 Chloroform
 Dichlorobromomethane
 1,1-Dichloroethane
 1,2-Dichloroethane
 1,1-Dichloroethylene
 1,2-Dichloropropane
 1,2-Dichloropropylene
 Ethylbenzene
 Methyl Bromide
 Methyl Chloride
 Methylene Chloride
 1,1,2,2-Tetrachloroethane
 Tetrachloroethylene
 Toulene
 1,2-Trans-dichloroethylene
 1,1,1-Trichloroethane
 1,1,2-Trichloroethane
 Trichloroethylene
 Vinyl Chloride

Acid Compounds

2-Chlorophenol
 2,4-Dichlorophenol
 2,4-Dimethylphenol
 4,6-Dinitro-o-cresol
 2,4-Dinitrophenol
 2-Nitrophenol
 4-Nitrophenol
 P-chloro-m-cresol
 Pentachlorophenol
 Phenol
 2,4,6-Trichlorophenol

Base/Neutral

Acenaphthene
 Acenaphthylene
 Anthracene
 Benzidine
 Benzo(a)anthracene
 Benzo(a)pyrene
 3,4-Benzofluoranthene
 Benzo(ghi)perylene
 Benzo(k)fluoranthene
 Bis(2-chloroethoxy)methane
 Bis(2-chloroisopropyl)ether
 Bis(2-ethylhexyl)phthalate
 4-Bromophenyl phenylether
 Butylbenzyl phthalate
 2-Chloronaphthalene
 4-Chlorophenyl phenylether
 Chrysene
 Dibenzo (a,h) anthracene
 1,2-Dichlorobenzene
 1,3-Dichlorobenzene
 1,4-Dichlorobenzene
 3,3-Dichlorobenzidine
 Diethylphthalate
 Dimethylphthalate
 Di-n-butylphthalate
 2,4-Dinitrotoluene
 2,6-Dinitrotoluene
 Di-n-octylphthalate
 1,2-Diphenylhydrazine (as azobenzene)
 Fluoranthene
 Fluorene
 Hexachlorobenzene
 Hexachlorobutadiene
 Hexachlorocyclopentadiene
 Hexachloroethane
 Indino(1,2,3-cd) pyrene
 Isophorone
 Naphthalene
 Nitrobenzene
 N-Nitrosodimethylamine
 N-Nitrosodi-n-propylamine
 N-Nitrosodiphenylamine
 Phenanthrene
 Pyrene
 1,2,4-Trichlorobenzene
 bis(2-chloroethyl)ether

Toxic Pollutants And Hazardous Substances

Metals, 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

Pesticides

Aldrin
Alpha-BHC
Beta-BHC
Gamma-BHC
Delta-BHC
Chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
Dieldrin
Alpha-Endosulfan
Beta-Endosulfan
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Heptachlor
Heptachlor Epoxide
PCB-1242
PCB-1254
PCB-1211
PCB-1232
PCB-1248
PCB-1260
PCB-1016
Toxaphene
Lindane
Mirex
Demeton

Toxic Pollutants And Hazardous Substances

Inorganic Toxic Pollutants

Asbestos

Hazardous Substances

Acetaldehyde
Allyl alcohol
Allyl chloride
Amyl acetate
Aniline
Benzonitrile
Benzyl chloride
Butyl acetate
Butylamine
Captan
Carbaryl
Carbofuran
Carbon disulfide
Chlorpyrifos
Coumaphos
Cresol
Crotonaldehyde
Cyclohexane
2,4-D(2,4-Dichlorophenoxy acetic acid)
Diazinon
Dicamba
Dichlobenil
Dichlone
2,2-Dichloropropionic acid
Dichlorvos
Diethyl amine
Dimethyl amine
Dinitrobenzene
Diquat
Disulfoton
Diuron
Epichlorohydrin
Ethanolamine
Ethion
Ethylene diamine
Ethylene dibromide
Formaldehyde
Furfural
Guthion
Isoprene
Isopropanolamine
Keithane
Kepone

Malathion
Mercaptodimethur
Methoxychlor
Methyl mercaptan
Methyl methacrylate
Methyl parathion
Mevinphos
Mexacarbate
Monoethyl amine
Monomethyl amine
Naled
Napthenic acid
Nitrotoluene
Parathion
Phenolsulfanate
Phosgene
Propargite
Propylene oxide
Pyrethrins
Quinoline
Resorcinol
Strontium
Strychnine
Styrene
TDE (Tetrachlorodiphenylethane)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)
2,4,5-TP [2-(2,4,5-Trichlorophenoxypropanoic acid)]
Trichlorofon
Triethylamine
Trimethylamine
Uranium
Vandium
Vinyl Acetate
Xylene
Xylenol
Zirconium

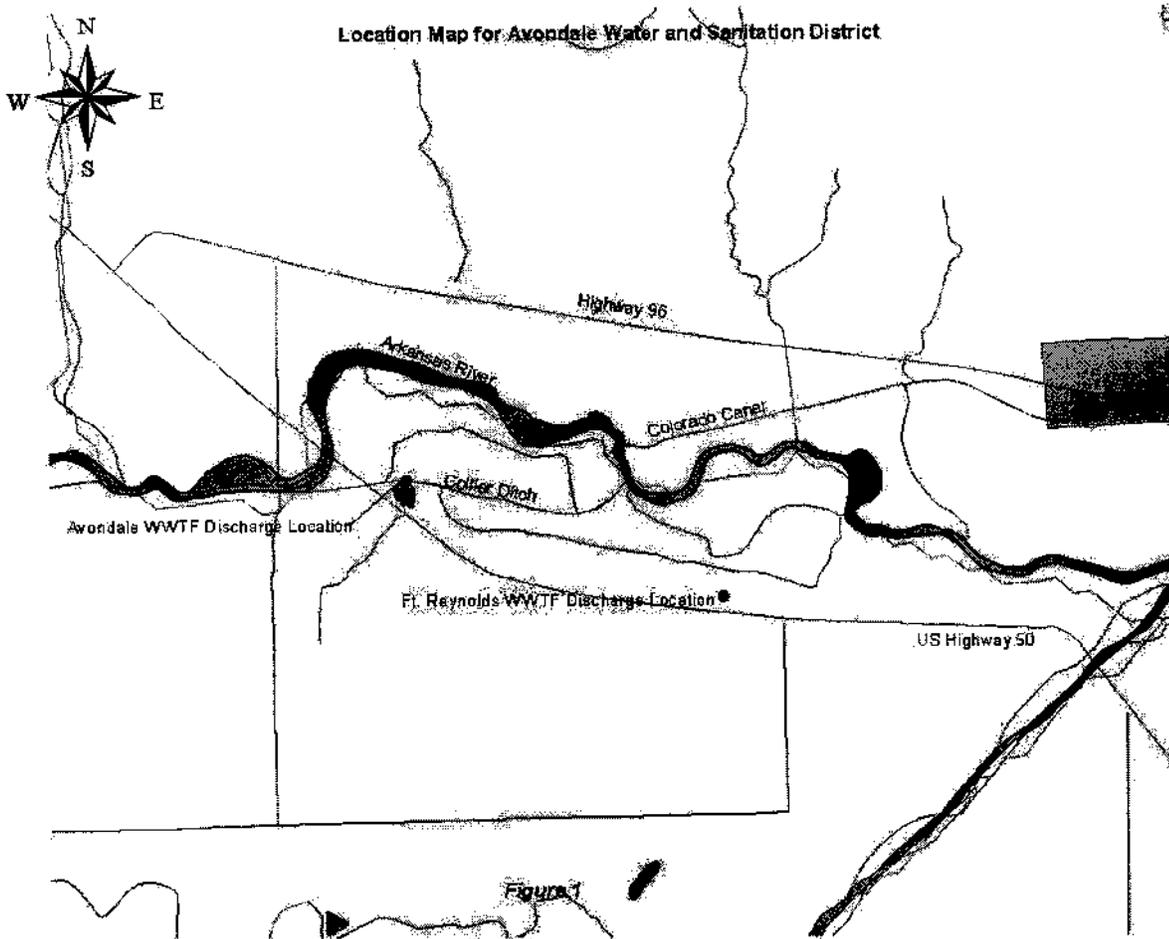
**WATER QUALITY ASSESSMENT
GREEN ARROYO AND UNNAMED TRIBUTARIES
AVONDALE WATER AND SANITATION DISTRICT WWTF'S**

Table 1 Assessment Summary-Avondale WWTF	
Name of Facility	Avondale Water and Sanitation District Avondale WWTF
CDPS Number	CO-0021075
WBID - Stream Segment	Arkansas River Basin, Middle Arkansas Sub-basin, Stream Segment 04d: All tributaries, including wetlands, to the Arkansas River and Pueblo Reservoir from the inlet to Pueblo Reservoir to the Colorado Canal headgate, except for specific listings in the Fountain Creek Subbasin and in Segments 4a, 4b, 4c, 5 through 18. COARMA04d
Classifications	Aquatic Life Warm 2 Recreation 1a Agriculture
Designation	Use Protected

Table 2 Assessment Summary-Ft. Reynolds WWTF	
Name of Facility	Avondale Water and Sanitation District Fort Reynolds WWTF
CDPS Number	CO-0021075
WBID - Stream Segment	All tributaries to the Arkansas River, including wetlands, all lakes and reservoirs, from the Colorado Canal headgate to the Colorado/Kansas border except for specific listings in segments 2b, 3 through 13, and Middle Arkansas Basin listings. COARLA02a
Classifications	Aquatic Life Warm 2 Recreation 2 Agriculture
Designation	Use Protected

I. Introduction

The Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) developed the water quality assessment (WQA) of Green Arroyo and unnamed tributaries near the Avondale Water and Sanitation District's Avondale, and Ft. Reynolds Wastewater Treatment Facilities (WWTF). The WQA was prepared to facilitate issuance of the Colorado Discharge Permit System (CDPS) permit for the Avondale Water and Sanitation District's Avondale, and Ft. Reynolds WWTF's, CDPS Permit No. CO-0021075, and is intended to determine the assimilative capacities available to both facilities for pollutants of concern. Figure 1 contains a map of the study area evaluated as part of this WQA.



The Avondale WWTF discharges to Green Arroyo which then empties into the Collier Ditch. Green Arroyo is a dry/zero low flow tributary to the Arkansas River. From the point of discharge into Green Arroyo and where the Collier Ditch empties into the Arkansas River is approximately 2 miles. Because of the low discharge volume and distance no flow from the WWTF makes it to the Arkansas River. The discharge from Ft. Reynolds WWTF is to "infiltration lagoons" located in the alluvium of unnamed dry/zero low flow tributaries of the Arkansas River. Because of the low discharge volume and distance no flow from the WWTF makes it to the Arkansas River. Both segments are designated "Use Protected." The ratio of the low flows of both Green Arroyo and unnamed tributaries to the Avondale Water and Sanitation District's WWTF's design flow's are 0:1. The nearest upstream and downstream facilities had no impact on the assimilative capacities available to either the Avondale or Ft. Reynolds WWTF's. Both, the Avondale WWTF and the Ft. Reynolds WWTF are under the auspices of one permit, CO-0021075. Therefore, both facilities are addressed in this WQA.

The Avondale WWTF is the sole known point source contributor to Green Arroyo. Thus, the findings of this assessment indicate that there is no dilution, no other sources of pollutants of concern, and that assimilative capacities are equal to the in-stream standards applied to the Avondale WWTF effluent discharge.

Information used in this assessment includes data gathered from the Avondale Water and Sanitation District, and the WQCD. The data used in the assessment consist of the best information available at the time of preparation of this WQA.

II. Water Quality

The Avondale WWTF discharges to Water Body Identification (WBID) stream segment COARMA04d, which is the Arkansas River Basin, Middle Arkansas Sub-basin, Stream Segment 04d. This segment is composed of "All tributaries, including wetlands, to the Arkansas River and Pueblo Reservoir from the inlet to Pueblo Reservoir to the Colorado Canal headgate, except for specific listings in the Fountain Creek Subbasin and in Segments 4a, 4b, 4c, 5 through 18." Stream segment COARMA04d is classified for:

- Aquatic Life Warm 2
- Recreation 1a
- Agriculture

The Ft. Reynolds WWTF discharges to the alluvium of streams in WBID stream segment COARLA02a, which is the Arkansas River Basin, Lower Arkansas Subbasin, Stream Segment 02a. This segment is composed of "All tributaries to the Arkansas River, including wetlands, all lakes and reservoirs, from the Colorado Canal headgate to the Colorado/Kansas border except for specific listings in segments 2b, 3 through 13, and Middle Arkansas Basin listings." Stream Segment COARLA02a is classified for:

- Aquatic Life Warm 2
- Recreation 2
- Agriculture

Numeric standards are developed on a basin-specific basis and are adopted for stream segments by the Water Quality Control Commission. To simplify the listing of the segment-specific standards, many of the aquatic life standards are contained in a table at the beginning of each chapter of the regulations. The standards in Table 3a have been assigned to stream segment COARMA04d, and the standards in Table 3b have been assigned to stream segment COARLA02a, in accordance with the *Classifications and Numeric Standards for Arkansas River Basin*.

Table 3a	
In-stream Standards for Stream Segment COARMA04d	
<i>Physical and Biological</i>	
Dissolved Oxygen (DO) = 5 mg/l, minimum	
pH = 6.5 - 9 su	
Fecal Coliform = 200 colonies/100 ml	
<i>Escherichia coli</i> = 126 colonies/100 ml	
<i>Inorganic</i>	
Free Cyanide acute = 0.2 mg/l	
Boron chronic = 0.75 mg/l	
Nitrite = 10 mg/l	
Nitrate = 100 mg/l	
<i>Metals</i>	
Total Recoverable Arsenic acute = 100 µg/l	
Total Recoverable Cadmium chronic = 10 µg/l	
Total recoverable Trivalent Chromium chronic = 100 µg/l	
Total Recoverable Hexavalent Chromium chronic = 100 µg/l	
Total Recoverable Copper chronic = 200 µg/l	
Total Recoverable Lead chronic = 100 µg/l	
Total recoverable Nickel chronic = 200 µg/l	
Total Recoverable Selenium chronic = 20 µg/l	
Total Recoverable Zinc chronic = 2000 µg/l	

Table 3b	
In-stream Standards for Stream Segment COARLA02a	
<i>Physical and Biological</i>	
Dissolved Oxygen (DO) = 5 mg/l, minimum	
pH = 6.5 - 9 su	
Fecal Coliform = 2000 colonies/100 ml	
<i>Escherichia coli</i> = 630 colonies/100 ml	
<i>Inorganic</i>	
Free Cyanide acute = 0.2 mg/l	
Boron chronic = 0.75 mg/l	
Nitrite = 10 mg/l	
Nitrate = 100 mg/l	
<i>Metals</i>	
Total Recoverable Arsenic acute = 100 µg/l	
Total Recoverable Cadmium chronic = 10 µg/l	
Total recoverable Trivalent Chromium chronic = 100 µg/l	
Total Recoverable Hexavalent Chromium chronic = 100 µg/l	
Total Recoverable Copper chronic = 200 µg/l	
Total Recoverable Lead chronic = 100 µg/l	
Total recoverable Nickel chronic = 200 µg/l	
Total Recoverable Selenium chronic = 20 µg/l	
Total Recoverable Zinc chronic = 2000 µg/l	

Ambient Water Quality

The WQCD 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*. The ambient water quality was not assessed for Green Arroyo or unnamed tributaries for Ft. Reynolds WWTF infiltration lagoons because the background in-stream low flow condition is zero, and because no ambient water quality data are available upstream of the WWTF’s discharge points.

III. Water Quantity

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. The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval.

Low Flow Analysis

Although there may be periodic flow in Green Arroyo and the unnamed tributaries upstream of the Avondale Water and Sanitation District’s WWTF’s, the 1E3 and 30E3 monthly low flows are set at zero, for both WWTF’s as shown in Table 4.

Table 4													
Low Flows for Green Arroyo at the Avondale Water and Sanitation District WWTF and Ft. Reynolds 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
30E3 Chronic	0	0	0	0	0	0	0	0	0	0	0	0	0

IV. Technical Analysis

In-stream background data and low flows evaluated in Sections II and III are ultimately used to determine the assimilative capacity of Green Arroyo and unnamed tributaries for the Avondale Water and Sanitation District’s WWTF’s for pollutants of concern. For all parameters except ammonia, it is the WQCD’s approach to conduct a technical analysis of stream assimilation capacity using the lowest of the monthly low flows (referred to as the annual low flow) as calculated in the low flow analysis. For ammonia, it is the standard procedure of the WQCD to determine assimilative capacities for each month using the monthly low flows calculated in the low flow analysis, as the regulations allow the use of seasonal flows when establishing assimilative capacities.

The WQCD'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 WQCD to calculate the maximum allowable concentration of pollutants in the effluent, 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:

$$M_2 = \frac{M_3Q_3 - M_1Q_1}{Q_2}$$

Where,

Q_1 = Upstream low flow (1E3 or 30E3)

Q_2 = Average daily effluent flow (design capacity)

Q_3 = Downstream flow ($Q_1 + Q_2$)

M_1 = In-stream background pollutant concentrations at the existing quality

M_2 = Calculated maximum allowable effluent pollutant concentration

M_3 = Maximum allowable in-stream pollutant concentration (water quality standards)

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 Green Arroyo and Ft. Reynolds infiltration lagoons is zero, the assimilative capacity of Green Arroyo and Ft. Reynolds for the pollutants of concern is equal to the in-stream water quality standards.

Pollutants Evaluated

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

- Fecal Coliform
- *Escherichia coli*

There are no in-stream standards for ammonia or total residual chlorine. Therefore, total ammonia and total residual chlorine were not evaluated in this WQA.

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 in this water quality assessment.

During assessment of the facility, nearby facilities, no additional parameters were identified as pollutants of concern.

Avondale Water and Sanitation District Avondale WWTF

The Avondale WWTF is located at Section 9, T21S, R62W, and Section 11, T21S, R62W in Pueblo County. The current design capacity of the facility is 0.1146 MGD (0.18 cfs). Wastewater treatment is accomplished using aerated lagoons. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

Avondale Water and Sanitation District Ft. Reynolds WWTF

The Ft. Reynolds WWTF is located at Section 11, T21S, and R62W, in Pueblo County. The current design capacity of the facility is 0.016 MGD (0.025 cfs). Wastewater treatment is accomplished using aerated/infiltration lagoons. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

Nearby Sources

No known point sources of pollution were identified on Green Arroyo or unnamed tributaries.

Non-point sources of pollution were not considered in this assessment.

Water Supply

Water supply is not a classification for these WBID's. Therefore, water supply parameters are not addressed in this WQA.

Fecal Coliform and *E. coli*

There are no known point sources discharging fecal coliform and/or *E. coli* within one mile of the Avondale Water and Sanitation District WWTF's. Thus, fecal coliform and *E. Coli*. assimilative capacities were evaluated separately.

It is the standard approach of the WQCD to perform a mass-balance check to determine if fecal coliform standards are exceeded. WQCD procedure specifies that checks are conducted using only the chronic low flow as set out in Section III. Using the mass-balance equation provided in the beginning of Section IV, the background concentration contained in Section II, and the in-stream standards for fecal coliform shown in Section II, checks for fecal coliform were conducted. The data used and the resulting calculations of the allowable discharge concentration, M_2 , are set forth below in Tables 5 and 6.

Table 5
Assimilative Capacity for Fecal Coliform and E. Coli.
for the Avondale WWTF

<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁ (#/100 ml)</i>	<i>M₃ (#/100 ml)</i>	<i>M₂ (#/100 ml)</i>
Fecal Coliform	0	0.18	0.18	0	200	200
E. Coli	0	0.18	0.18	0	126	126

The full assimilative capacity of the stream for fecal coliform was determined to equal the in-stream water quality standards of 200 colonies/100 ml (chronic), and 126 colonies/100 ml for E. Coli (chronic).

Table 6
Assimilative Capacity for Fecal Coliform and E. Coli.
for the Ft. Reynolds WWTF

<i>Parameter</i>	<i>Q₁ (cfs)</i>	<i>Q₂ (cfs)</i>	<i>Q₃ (cfs)</i>	<i>M₁ (#/100 ml)</i>	<i>M₃ (#/100 ml)</i>	<i>M₂ (#/100 ml)</i>
Fecal Coliform	0	0.025	0.025	0	2000	2000
E. Coli	0	0.025	0.025	0	630	630

The full assimilative capacity of the stream for fecal coliform was determined to equal the in-stream water quality standards of 2000 colonies/100 ml (chronic), and 630 colonies/100 ml for E. Coli (chronic).

V. Antidegradation Review

As set out in *The Basic Standards and Methodologies of 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.

According to the *Classifications and Numeric Standards for Arkansas River Basin*, stream segment COARMA04d is Use Protected. Because the receiving waters are designated as Use Protected, no antidegradation review is necessary in accordance with the regulations. Thus, for purposes of this WQA, antidegradation review requirements have been met and no further antidegradation evaluation is necessary.

VI. References

Classifications and Numeric Standards for Arkansas River Basin, Regulation No. 32, CDPHE, WQCC, Effective July 21, 2003.

The Basic Standards and Methodologies for Surface Water, Regulation 31, CDPHE, WQCC, Effective October 30, 2001.

CDPS Summary of Rationale General Permit for Domestic Wastewater Treatment Facilities that Discharge to Receiving Waters with a Chronic Low Flow: Design Flow Ratio of 100:1 or Greater, CDPS Permit COG-584000, Statewide, CDPHE, WQCD, September 14, 1994.

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, CDPHE, WQCD, December 2001.

Memorandum Re: First Update to Guidance Version 1.0, CDPHE, WQCD, April 23, 2002.