Plant Characteristics

Items	Characteristics
Design Flows	
Influent Flow	6.00 mgd
Internal Recycle Flows	0.09 mgd
Total Primary Influent Flow	6.09 mgd
Primary Clarifiers	
Number	4
Dimensions, LxWxD, FTxFTxFT	80x18.5x9.5
Total Surface Area	5,920 sf
Surface Overflow Rate	1,028 gpd/sf
TSS Removal (Percent)	59
BOD Removal (Percent)	25
Primary Sludge	
Total Solids	9,681 ppd
Concentration	50,000 mg/L
Flow	0.023 mgd
Primary Effluent Bypass	
Flow Bypassed Around Biofilter (Percent)	0-50
Biofilters	
Number	2
Dimensions, LxWxD, FTxFTxFT	44x44x14
Total Volume	54,208 cf
Organic Loading, ppd BOD/1,000 cf	87
Anoxic Basin	
Total Volume	0.645 MG
Number of Zones	6
Zone 1 Volume	0.073 MG (anoxic)
Zone 2 Volume	0.073 MG (anoxic)
Zone 3 Volume	0.073 MG (anoxic)
Zone 4 Volume	0.103 MG (aerobic)
Zone 5 Volume	0.161 MG (aerobic)
Zone 6 Volume	0.161 MG (aerobic)
Aeration Basins	
Number of Basins	3
Volume, Each Basin	0.26 MG
Total Aeration Basin Volume	0.78 MG
Activated Sludge Criteria	
SRT	4.8 days
MLSS	2,800 mg/L
Effluent, NH_3	0.6 mg/L
Effluent, NO_3	6.5 mg/L
Effluent, NO_3	<10.0 mg/L

Items	Characteristics
Aeration Requirements	
Process Air Requirement	3,100 scfm
Design Peaking Factor	1.3
Peak Process Air Requirement	4,030 scfm
Other Uses (Channel Air, etc.)	500 scfm
Total Design Air Requirement	4,530 scfm
Secondary Clarifiers	
Number	6
Dimensions, LxWxD, FTxFTxFT	95x18.5x13.2
Total Surface Area	10,545 sf
Surface Overflow Rate	565 gpd/sf
Waste Activated Sludge	
Total Solids	6,711 ppd
Concentration	7,891 mg/L
Flow	0.102 mgd
Gravity Belt Thickener	
Number	1
Belt Size, M	2
Solids Loading	2,500 lb/hr
Feed Rate	500 gpm
Operating Cycle, Days/Week	5
Operating Cycle, Hours/Day	4
Thickening Solids Concentration, (Percent)	5.0
Solids Capture, (Percent)	90
Waste Activated Sludge	
Total Solids	15,720 ppd
Volatile Solids	12,610 ppd
Flow	0.038 mgd
Anaerobic Digesters	
Number	2
Diameter	65 ft
Side Water Depth	18 ft
Effective Total Volume (5 Percent Grit Allowance)	113
Volatile Solids Loading, ppd VS/1000 cf	0.11
Hydraulic Retention Time, Days	23
Percent Destruction	49

Contact Information

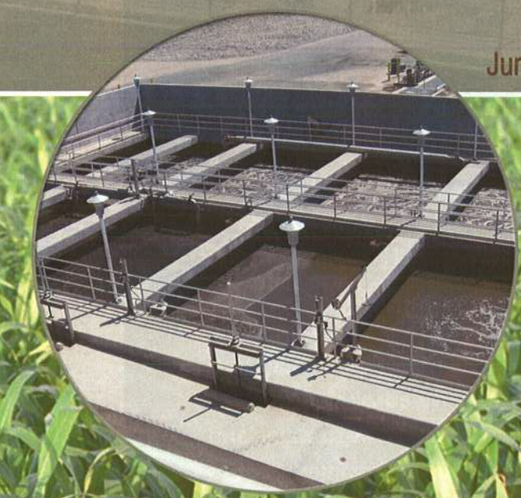
City of Tulare
Water Pollution Control Facilities
Richard Bono, Superintendent
1875 S. West Street
Tulare, CA 93274
Office 559-685-2360
Fax 559-685-8688
www.ci.tulare.ca.us

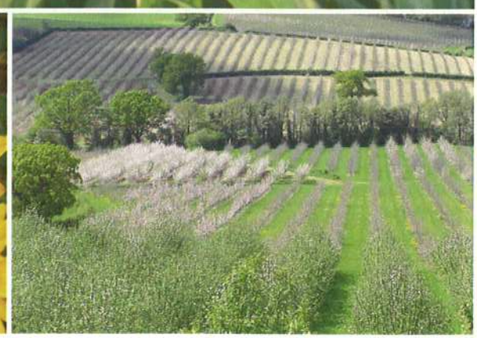
carollo engineers
559-436-6616

City of Tulare
Agri-Center Of The World

June 2006

Domestic Wastewater Treatment Plant Nitrogen Removal Upgrade Project





Plant Processes

The City of Tulare Water Pollution Control Facility (TWPCF) is located southwest of the City. The facility consists of two separate wastewater treatment processes: an activated biofilter/activated sludge plant for treating domestic wastewater, and a Bulk Volume Fermenter (BVF) anaerobic reactor plant for treatment of the industrial wastewater.

The Domestic Plant can treat 6.0 million gallons per day (mgd) of wastewater. The secondary treatment plant's goal is to remove the organic and solid material and the nitrogen in the wastewater that can pollute the environment.

Tulare's first treatment facility was built in the 1920's. Waste was given minimal treatment and used to irrigate crops. As the town and industry grew, additional treatment was required. Several major improvements have been made in the past 30 years to help handle these needs.

The recent expansion in 2006 added an anoxic basin to help in the removal of nitrogen to meet the City's total nitrogen requirements.

A Headworks

Raw wastewater enters the headworks from a system of interconnected manholes and two trunk sewers. It flows through mechanical bar screens removing rags, stick, and other objects that may clog pumps and pipes throughout the plant.

B Grit Removal

Wastewater enters the grit unit where the grit settles to the bottom. A mechanical scraping system conveys the settled grit to a hopper which is then hauled to a landfill.

C Primary Sedimentation

Flow is then directed to the primary sedimentation basin where settleable and floatable materials are removed and pumped to the digesters. The effluent can then be sent to the biotowers or bypassed to the anoxic basins.

Biotowers

D Biotowers

The flow entering the two biological towers, referred to as biotowers, is sprayed down over a redwood media which provides a surface for microorganisms to grow and feed. This process removes the organics from the wastewater.

Anoxic Basin

E Anoxic Basins

Once through the biotowers the flow enters the anoxic basins. In these basins the removal of nitrogen from the wastewater takes place. This process is referred to as denitrification. Returned Activated Sludge (RAS) can be pumped to the basins along with the primary effluent bypass.

Aeration Basins

F Aeration Basins

Once through the anoxic basin the wastewater enters the aeration basins. Fine bubble diffusers introduce air, providing oxygen for the microorganisms helping in the activated sludge process. These organisms break down and consume the organic material in the wastewater.

G Blowers

Blowers provide necessary air for the plant's biological processes and air to mix wastewater channels.

H Secondary Sedimentation

As the flows enter the secondary sedimentation basins from the aeration basins, solids settle to the tank bottom. The settled material is pumped back to the anoxic basins and the excess settled material is pumped to the solids thickener.

I Pump Gallery

Return pumps, waste pumps, sump pumps and other plant utilities are located in the pipe and pump gallery.

J Effluent Pump Station

The secondary effluent pump station lifts the domestic plant effluent to storage ponds for subsequent farm irrigation.

K Solids Thickeners

The Gravity Belt Thickener receives sludge from the sedimentation basins. The thickeners decrease the water content of the sludge by spreading a sludge and polymer mixture on a porous belt.

Digesters

L Digesters

Thickened biosolids and primary sludge are pumped to two anaerobic digesters which stabilize the biosolids to prevent odors and disease. Methane gas produced during the digestion process is used to heat the digesters.

M Operations Building and Laboratory

The operations building houses the main plant controls and laboratory. The treatment processes are continuously monitored by a computer control system. The final reclaimed wastewater is monitored prior to farm irrigation to assure compliance with State requirements.

N Sludge Drying Beds

Sludge beds provide an area for storage and drying of digested biosolids. Dried biosolids can be spread on city-owned farmland.

Site Plan