

7.0 WASTEWATER TREATMENT SYSTEM

7.1 Introduction

In order to adequately plan for the City's wastewater treatment plant needs, we must first understand the general location and extent of current demands on the system.

In general, wastewater entering the WWTP comes from one of four primary sources;

- 1) Residential and Commercial/Industrial wastewater
- 2) Colorado Greenhouse and Thermo
- 3) Water Treatment Plant backwash
- 4) Infiltration and/or Inflow (I/I)

Below are the estimated flows from each source:

Residential and Commercial/Industrial wastewater - Based on an estimated 2007 population of 8,036 and a per capita estimate of wastewater flows of 90 gpcd, we estimate the City should have a base 0.78 mgd of residential wastewater flow. This is supported by raw water deliveries to the WTP that average 0.8 mgd for the last few years during December, January and February.

Colorado Greenhouse and Thermo - Thermo and the Colorado Greenhouse facilities are contracted for 0.43 mgd of Industrial wastewater discharge to the WWTP. Records from the facility show that the facilities are within their contractual amount.

Water Treatment Plant Backwash - The WTP also sends its backwash water to the WWTP with peak flows in mid-summer when the WTP is running at its peak capacity. At a current max day demand of around 3 mgd at the WTP and 92% efficiency, we estimate the WTP contributes 0.24 mgd to the WWTP.

Infiltration and/or Inflow (I/I) - Ideally, the flow entering the wastewater collection system would be comprised of only the above three (3) sources. However, all collection systems leak and the City appears to have a significant problem with a leaking collection system.

To gain an understanding of what current demands should be, we added up the residential, Greenhouse and Thermo and WTP backwash flows. Summing these sources, we estimate the WWTP should experience a peak flow of around 1.42 mgd. However, based on plant records, the WWTP experiences peak flows in August of approximately 1.8 mgd or greater. Thus, there is considerable extraneous unaccounted for water.

Based on previous studies and this data, we believe the majority of these excess flows are directly attributable to excess I/I or inaccurate metering. The City should also note that based on detailed evaluations of the capacity of the existing wastewater treatment facilities, the recommended maximum WWTP throughput has been set at 2.25 mgd. Per the City's current discharge permit, the City is required to begin planning for plant expansions at 80% of plant capacity (i.e. 1.8 mgd) and begin construction at 90% of plant capacity (i.e. 2.03 mgd). Based on these numbers, we recommend the City begin planning for the next WWTP expansion or

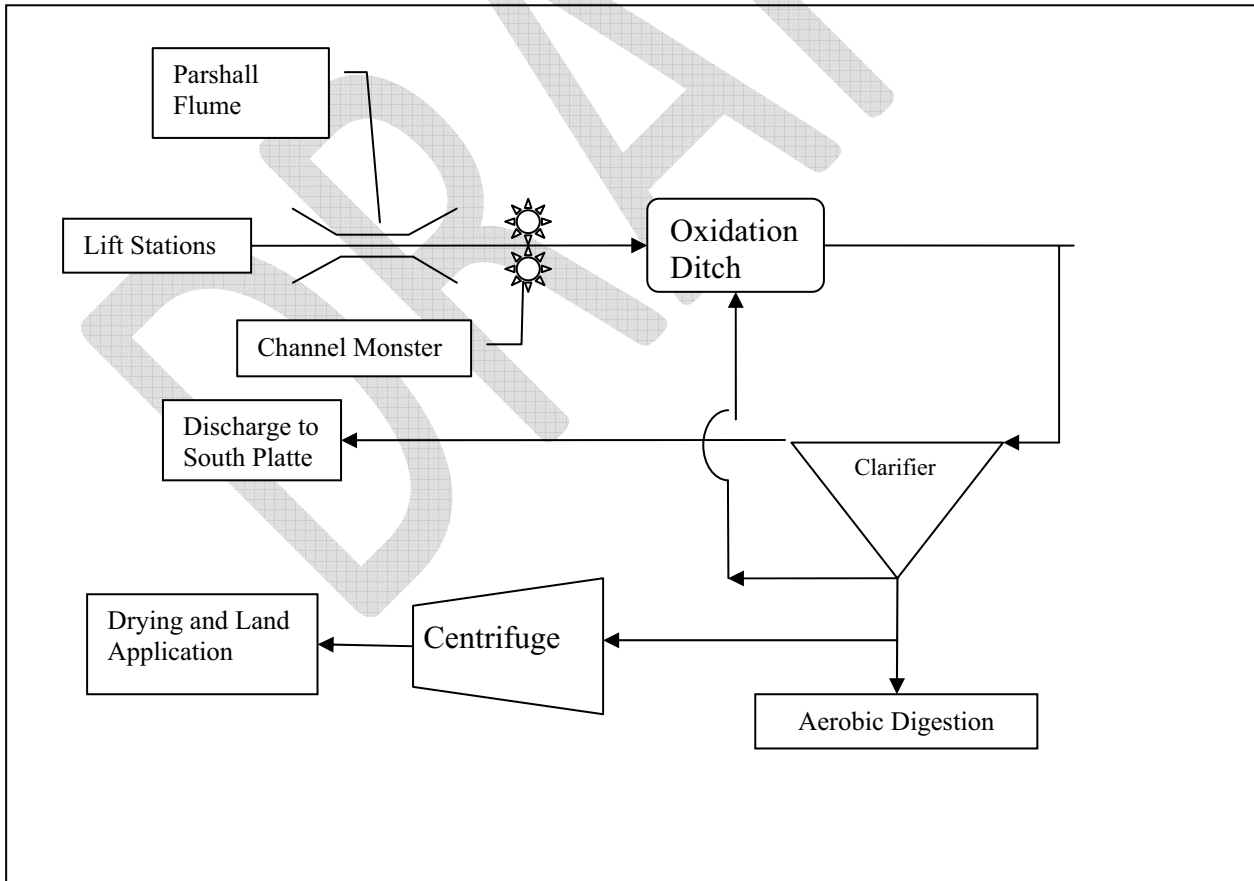
initiate planning to reduce I/I.

In addition to determining the average wastewater generation within the City, the variability of the flow over the last few years was also studied to determine the month when the peak flows in the system occur. The results of this analysis indicate that the peak flows occur during the months of July and August – paralleling the peak use of water at both the WTP and Thermo. Based on our review of the data, it is clear that the City should begin to focus on options to reduce extraneous flows into the WWTP. This can be accomplished thru a number of programs including replacing/rehabilitating older portions of the collection system, reducing the wastewater backwash from the WTP and ensuring compliance with Thermos WWTP agreement with the City. We believe that, over time, these extraneous flows can be reduced by as much as 0.5 MGD – significantly delaying the next expansion of the WWTP.

7.2 Existing Wastewater Treatment System Analysis - USA 2007

A schematic of the operation of the existing WWTP is shown in Figure 7-1.

Figure 7-1 WWTP Schematic Flow Diagram



In general, the existing WWTF is operating without major concerns – save two, the clarifier and “headworks”. The clarifier is a mechanical device that separates the treated liquids from the

solids. OMI staff has had problems with its operation in the past and is concerned that when it fails, they will be severely hampered in their ability to meet treatment standards. The City is currently purchasing the components required to rebuild the clarifier in as timely manner as possible. This is a sound plan but the City should recognize that it will pay a labor premium when this process becomes necessary. Although the City can divert flows into the currently unutilized lagoons, the lagoons will not provide the time required to rebuild the clarifier. The other issue is the “headworks”. The headworks is where larger solids are screened and removed to protect downstream treatment processes. The current headworks is no longer operational and the City should plan to construct a new headworks facility. The best time for this should be when the Todd Creek Farms lift station or S. Lift station is built/rebuilt.

Another issue the City must address is the implications of future regulations including potential ammonia standards and mixing zone restrictions. Each of these regulations will most likely result in some further reduction in the throughput of the WWTF. Although the answers were not available as of the writing of this report, CWS in conjunction with CH2MHill is working with the City to determine their potential implications to the City. At a minimum the City should plan on a WWTP capacity not in excess of 2.25 MGD.

7.3 Wastewater Treatment System Analysis USA 2007-2012

The single most important issue facing the wastewater utility is when the next plant expansion will be required. Our goal is to delay that expansion as long as possible. This goal is potentially feasible if the City can find and reduce the I/I into its collection system. For example, one of the benefits of the 2008 WTP expansion project is that the efficiency of the facility will increase, reducing flows to the WWTP. We estimate this increase in efficiency will reduce the flows into the WWTF by as much as 120,000 gpd. This will buy the City some time to address the issues at hand. That said, at a minimum, the City should plan for another WWTP expansion no later than 2012. This facility will most likely be a mirror image of the current facility and will double the capacity of the existing facilities.

As Todd Creek Farms begins their development, the methodology for selling capacity within the City facilities will be critical. We recommend the City avoid selling capacity on a tap-by-tap basis as this places the risk of constructing future facilities on the City. Rather, the City should require Todd Creek Farms to pre-purchase capacity to minimize the capital outlay to the City.

The City will be required to complete a “mixing zone analysis” during this planning period. This analysis, as well as “other” pending standards including ammonia removal, will most likely drive down the rated throughput of the facility. As such, the City should ascertain the most likely future capacity of the plant so that management decisions are made accordingly.

We recommend the City plan for a WWTP expansion during this planning period.

7.4 Wastewater Treatment System Analysis USA 2007-2027

Based on the planning numbers utilized herein, a “duplicate or mirror” treatment facility constructed during the 2007-2012 planning period should provide capacity through 2027.

7.5 Miscellaneous Recommendations

The NFRWQPA has become more involved in the planning, operations and management of wastewater treatment facilities. As such, prior to any major improvements (lift stations or plant expansions) the City will need to complete a Utility Plan. This Utilities Master Plan provides some of the framework within the plan but the plan must be specifically prepared in accordance with the 208 planning guidelines. We recommend the City begin to work on this document so that when growth dictates improvements, this step will have been completed.

7.6 Cost Estimates

In order to assist in planning for the future, planning level cost estimates were developed for each of the improvements outlined. These cost estimates are meant to serve as a planning level guide only. Before beginning any project recommended in this master plan, it is recommended that a detailed cost analysis be performed for the project. The costs were computed based on similar construction projects completed within the area. All costs are provided as present day costs.