Basic criteria used in developing the Master Plan improvements are identified in this section.

4.1 PROJECTED WASTEWATER FLOWS AND LOADS

As discussed in Section 2, this Master Plan will project wastewater flow to 2030 based on a reduced commercial and industrial development from the General Plan.

As of July 2007, the City had a service obligation of 1275 sewer connections, which increased to approximately 1525, as of June 2009. These connections are primarily single family residences, but include some multi-family and commercial (retail and office) connections. The City has further issued "notices of service" for an additional 1000 un-built single family residences.

Shown in Table 4.1-1 (Wastewater Flow Projection Criteria) are the estimated wastewater flows per development type that will be used to estimate future wastewater flows. Flow for commercial and industrial development as shown in the table is an allowance based upon the development square footage. Some types of development such as storage warehouse may result in substantially less flow, while other developments , such as wet industries (i.e. food processing) create greater flow. Therefore, careful planning and onsite pretreatment should be considered before project approval. Based on future flow projections, significant industrial and commercial development is assumed to start in 2014. Capacity has been reserved for significant industrial and commercial development on the assumption that the City would provide "will serve" notices immediately upon completion of the new treatment facilities.

TABLE 4.1-1: WASTEWATER FLOW PROJECTION CRITERIA

Type of Development	Average Flow
Single Family Residence (gpd)	200
Multi –Family Residence (gpd)	150
Commercial (Retail and Office) Development (gallon per square foot per day)	0.1
Industrial Development (gallon per square foot per day)	0.1

Backwash water from the Ione Water Treatment Plant is treated at the City's secondary WWTP. AWA has verbally informed the City that they intend to stop all backwash water flows to the secondary WWTP within the next two years (2011). However, there is no signed agreement stating a specific termination date and the City currently has no guarantee that the backwash water discharged to the sewer system will be terminated. Therefore, treatment capacity for AWA was included in the future flow projections.

Initial discussions with the CDF Fire Academy to provide wastewater service for the training facility have been conducted. CDF Fire Academy wants to construct new dorms at the training facility. The academy currently receives wastewater treatment services from the Mule Creek Prison and no additional capacity is available. Therefore, capacity for the academy was included in the future flow projections starting in 2012.

The City also has discussed with the State of California the treatment of wastewater from the Preston Youth Correctional Facility and Mule Creek State Prison. Wastewater requirements and impacts for providing service to these two State facilities were not considered in this Master Plan. However, nothing in this plan precludes the City from accepting wastewater, or treated wastewater, from these two State facilities. If such flows are added to the City's wastewater system, additional treatment and/or disposal capacity may be required. In addition, if any other sources of wastewater are delivered to the City, additional treatment and disposal capacity would be required.

Table 4.1-2 (Future Wastewater Service Obligation Assumptions) summarizes the City's future wastewater obligations used to develop the wastewater flow projections to 2030.

TABLE 4.1-2: FUTURE WASTEWATER SERVICE OBLIGATIONS ASSUMPTIONS

Description	Obligation
Residential, Commercial, and Industrial Development	5 Percent Annual Growth
California Fire Academy	14,000 gpd
Commercial Development 2014 "will serve"	700,000 square feet
Industrial Development 2014 "will serve"	850,000 square feet
AWA Backwash Water	50,000 gpd

Table 4.1-3 (Future Hydraulic Peaking Factors) provides future peaking factors for the treatment facility. These factors are multiplied by the flow condition to obtain the peak flow.

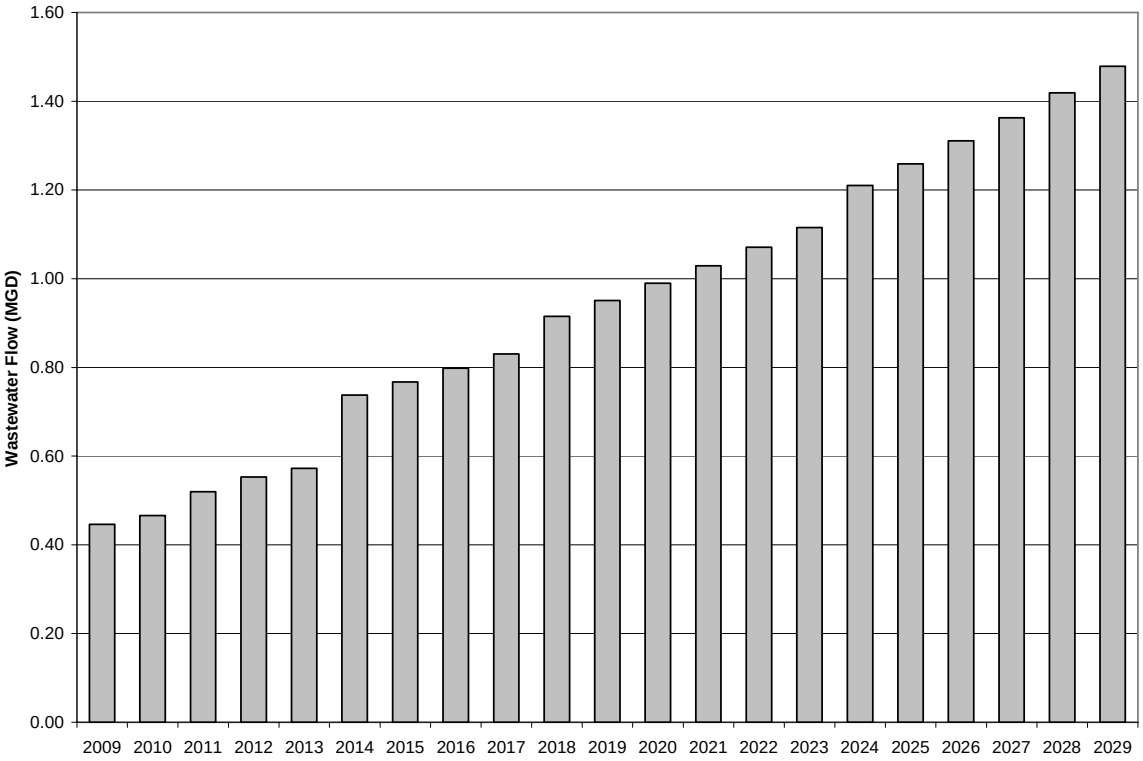
TABLE 4.1-3: FUTURE HYDRAULIC PEAKING FACTORS

Condition	Factor
Maximum Daily Flow	1.9 times ADWF
Peak Hourly Flow	2.5 times ADWF
Instantaneous Peak Flow	3.0 times ADWF

Figure 4.1-4 (Wastewater Flow Projections to 2030) provides an illustration of the wastewater flow projections from July 2009 to 2030. A copy of the future wastewater flow projection is located in **Appendix 7.7**. As shown in Figure 4.1-3 a treatment capacity of about 0.80 MGD is estimated to be required to meet the development until 2016 and a treatment capacity less than 1.6 MGD will be required by 2030. The City would not be able to accommodate any new connections or additional wastewater flows until the Phase 1 Expansion is constructed. Similarly, the City would not be able to accommodate any connections or additional wastewater flows in excess of 0.8

MGD until Phase 2 is completed. These expansions may be required prior to or later than the approximate dates identified herein, depending on actual growth.

FIGURE 4.1-4: WASTEWATER FLOW PROJECTIONS TO 2030



Presented in Table 4.1-5 (Future Hydraulic Loads) are the hydraulic loads based upon average dry weather flows of 0.8 and 1.6 MGD. Table 4.1-3 (Future Hydraulic Peaking Factors) was used to calculate the peak flows.

TABLE 4.1-5: FUTURE HYDRAULIC LOADS

ADWF (MGD)	Maximum Daily Flow (MGD)	Peak Hourly Flow (MGD)	Instantaneous Peak Flow (MGD)
0.8	1.5	2.0	2.4
1.6	3.0	4.0	4.8

It is anticipated that future organic and solids concentration will be similar in strength to a typical municipal treatment system. Presented in Table 4.1.6 (Future Wastewater Organic and Solids Concentration) are the future daily organic and solids concentrations.

TABLE 4.1-6: FUTURE INFLUENT WASTEWATER ORGANIC AND SOLIDS CONCENTRATION – JULY-OCTOBER 2009

Condition	Average Daily Concentration (mg/L)
Biochemical Oxygen Demand (BOD_5)	280
Suspended Solids (SS)	250

Dry solids (sludge) production per pound of BOD_5 from a typical activated sludge is anticipated to be 0.9 pounds per pound of BOD_5. Table 4.1-7 (Future Daily Organic, Solids Loads, and Solids Production) shows the future daily organic and solids loading based upon the ADWF.

TABLE 4.1-7: FUTURE INFLUENT DAILY ORGANIC, SOLIDS LOADS AND SOLIDS PRODUCTION

ADWF (MGD)	Average Daily Biochemical Oxygen Demand (BOD_5) (ppd)	Average Daily Suspended Solids (SS) (ppd)	Average Daily Solids Production (ppd)
0.8	1,870	1,670	1,500
1.6	3,740	3,340	3,000

4.2 FUTURE DISPOSAL CAPACITY

Disposal of ARSA and Mule Creek State Prison wastewater in the City's secondary WWTP percolation ponds will be discontinued in October 2011. This discontinuation of service will reduce disposal requirements by approximately 0.20 to 0.30 MGD. This corresponds roughly to the loss in capacity by the elimination of Pond 4, and reduced disposal capacity of Ponds 5 and 6 due to the filling of the northern 200 feet.

The disposal capacity of Percolation Ponds 5, 6, and 7 will not be adequate for the immediate planned development. Additional disposal capacity is required. City controlled disposal options are limited, so this Master Plan contemplates construction of an additional percolation pond. Presented in Table 4.2-1 (Future Percolation Pond Capacities and Characteristics) are the revised combined pond characteristics assuming an additional pond, Percolation Pond 8, is built.

The secondary treatment plant water balance for a 100 year precipitation occurrence at an average dry weather flow of 0.8 MGD is contained in **Appendix 7.8**. This balance assumes continued disposal of ARSA water at the Castle Oaks Golf Course but no disposal of ARSA water by use of percolation ponds.

TABLE 4.2-1: FUTURE PERCOLATION POND CAPACITIES AND CHARACTERISTICS

Condition	Units	Ponds 5, 6, 7 and 8
Disposal Capacity (Annual)	MGD	0.80
Gross Area	acres	25.0
Water Surface	acres	17.7
Bottom Surface	acres	15.9
Maximum Water Depth	feet	8 to 14
Storage Volume	million gallons	47.1