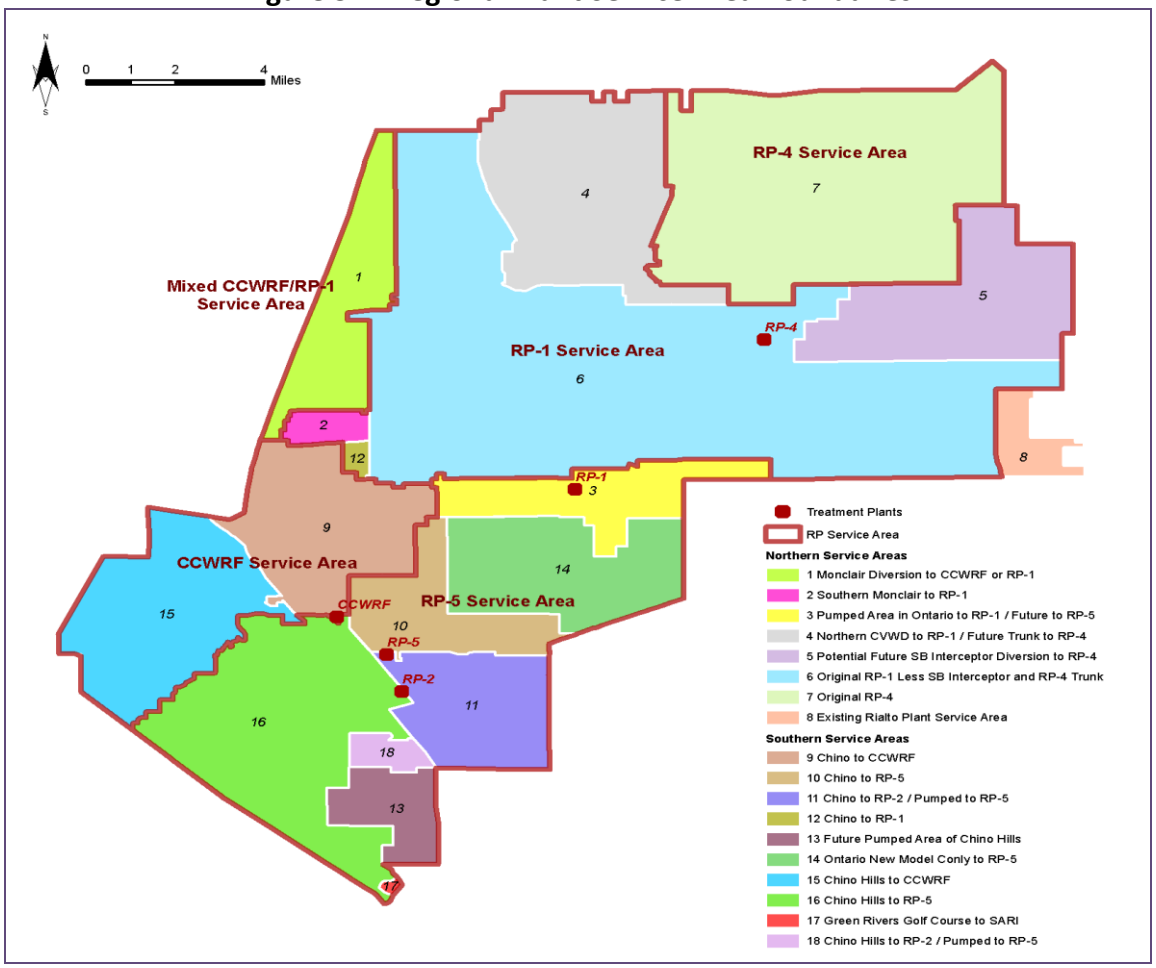
CHAPTER 5
WASTEWATER FLOWS AND PROJECTIONS

5.1 REGIONAL FACILITIES

Regional Water Recycling Plants

Figure 5-1 illustrates the service area boundaries for IEUA's four water recycling plants. The four Regional facilities are: Regional Plant No. 1 (RP-1), Regional Plant No. 4 (RP-4), Regional Plant No. 5 (RP-5), and Carbon Canyon Wastewater Reclamation Facility (CCWRF). The biosolids produced at RP-4 and RP-1 are thickened, digested, and dewatered at solids handling facilities located at RP-1. Similarly, the CCWRF and RP-5 biosolids are treated at Regional Plant No. 2 (RP-2). The stabilized and dewatered solids are transported to the Inland Empire Regional Composting Facility for processing into soil amendment.

Figure 5-1: Regional Plant Service Area Boundaries



RP-5 began treating and discharging wastewater in March 2004. At that time, the RP-2 wastewater influent was diverted to RP-5 for treatment. Since portions of RP-2 are located in the 100-year flood plain, liquid wastewater processing at RP-2 was discontinued and the plant is being used only for processing solids from RP-5 and CCWRF. Biosolids processing at RP-2 will continue until the plant reaches the end of its useful life or until the RP-2 land can no longer be leased from the U.S. Army Corps of Engineers. Some land at RP-5 has been reserved for future solids processing facilities.

Regional Interceptor System

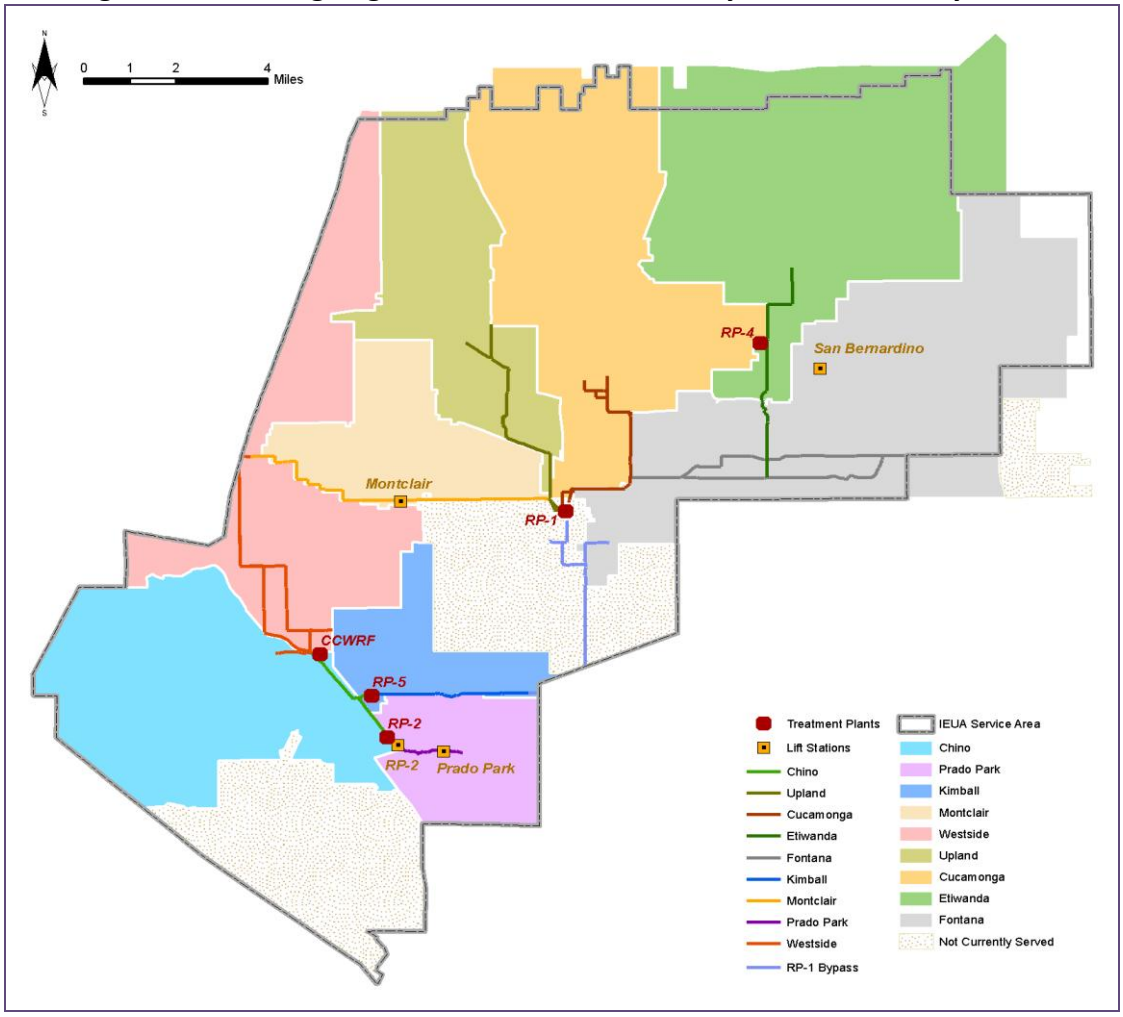
IEUA has a network of regional interceptor sewers that can be used to bypass flow from one treatment plant to another to balance and optimize the use of treatment capacity. Currently, the regional interceptors can bypass flow from RP-4 to RP-1 and from CCWRF to RP-5. In addition, primary effluent can be bypassed from the RP-1 equalization basins to RP-5. Figure 5-2 illustrates the existing regional trunk wastewater system and tributary areas. The main routes for bypassing/diverting flow are:

- Operators can bypass up to 6 million gallons per day (MGD) from RP-4 to RP-1 through the Etiwanda Interceptor.
- Operators can bypass flow from CCWRF to RP-5 through the Chino Interceptor--typically 1 to 2 MGD.
- A portion of the flow from the Cities of Upland and Montclair (about 4 MGD) can be diverted either to CCWRF, through the Westside Interceptor, or to RP-1, via the Montclair Lift Station and Montclair Interceptor. Typically, most of the flow is routed to CCWRF to avoid pumping costs.
- Primary effluent and sludge can be diverted from the RP-1 equalization basins into the Eastside Interceptor and then it flows by gravity to RP-5. Up to 9 MGD could potentially be bypassed; however, operational experience has shown that 1 to 2 MGD is currently the optimum in terms of wastewater treatment plant performance.

As shown on Figure 5-2, IEUA has four wastewater lift stations:

- The Montclair Lift Station pumps wastewater from portions of Montclair, Upland, and Chino to RP-1.
- The Prado Park Lift Station pumps wastewater from the Prado Regional Park in the City of Chino to RP-5.
- The RP-2 Lift Station, which pumps flow from the southeastern portions of the cities of Chino and Chino Hills to RP-5.
- The San Bernardino Avenue Pump Station, which will pump a portion of the flow from the City of Fontana to RP-4 when it is completed in FY 2008/09.

Figure 5-2: Existing Regional Trunk Wastewater System & Tributary Areas



Program Master Planning and Integrated Water Resources Management

IEUA's Wastewater Facilities Master Plan (WFMP) was adopted in August 2002 with the approval of the Regional Technical and Policy Committees. The WFMP, together with the Recycled Water Feasibility Study (2002) and the Organics Management Strategy Business Plan (2002), formed a "Program Master Plan" and were the subject of a Programmatic Environmental Impact Report (PEIR) certified on June 28, 2002. The PEIR integrated all of the Agency's related planning activities into one comprehensive document in order to address the environmental concerns of the overall effects of the projects contemplated by the Agency. This TYCIP is consistent with the IEUA's approved WFMP and PEIR.

The 2002 WFMP and PEIR encompassed the agency's plans for wastewater collection and treatment, water recycling, organics management and energy management in an integrated planning framework. The WFMP and PEIR also considered and were consistent with the related planning activities and reports dealing with water supply, basin management, salinity management and environmental enhancement. This

comprehensive planning process is illustrated in Figure 5-3 and the various planning documents are described below.

Since 2002, the need to integrate all of the Agency's master planning activities into Chino Basin's overall water supply management strategy has become even more apparent. In 2008, there has been a profound shift in California Water Supply Planning in response to two consecutive years of drought and regulatory restrictions on pumping imported water from the Bay-Delta. In addition, rising energy costs, economic recession, climate change, greenhouse gas emission reduction legislation, and drought allocation plans have led to decreased imported water reliability and a call from the Governor to reduce per capita water demand by 20 to 30%. This has led the local water supply stakeholders to enhance programs to meet future water needs through increased local water development, including:

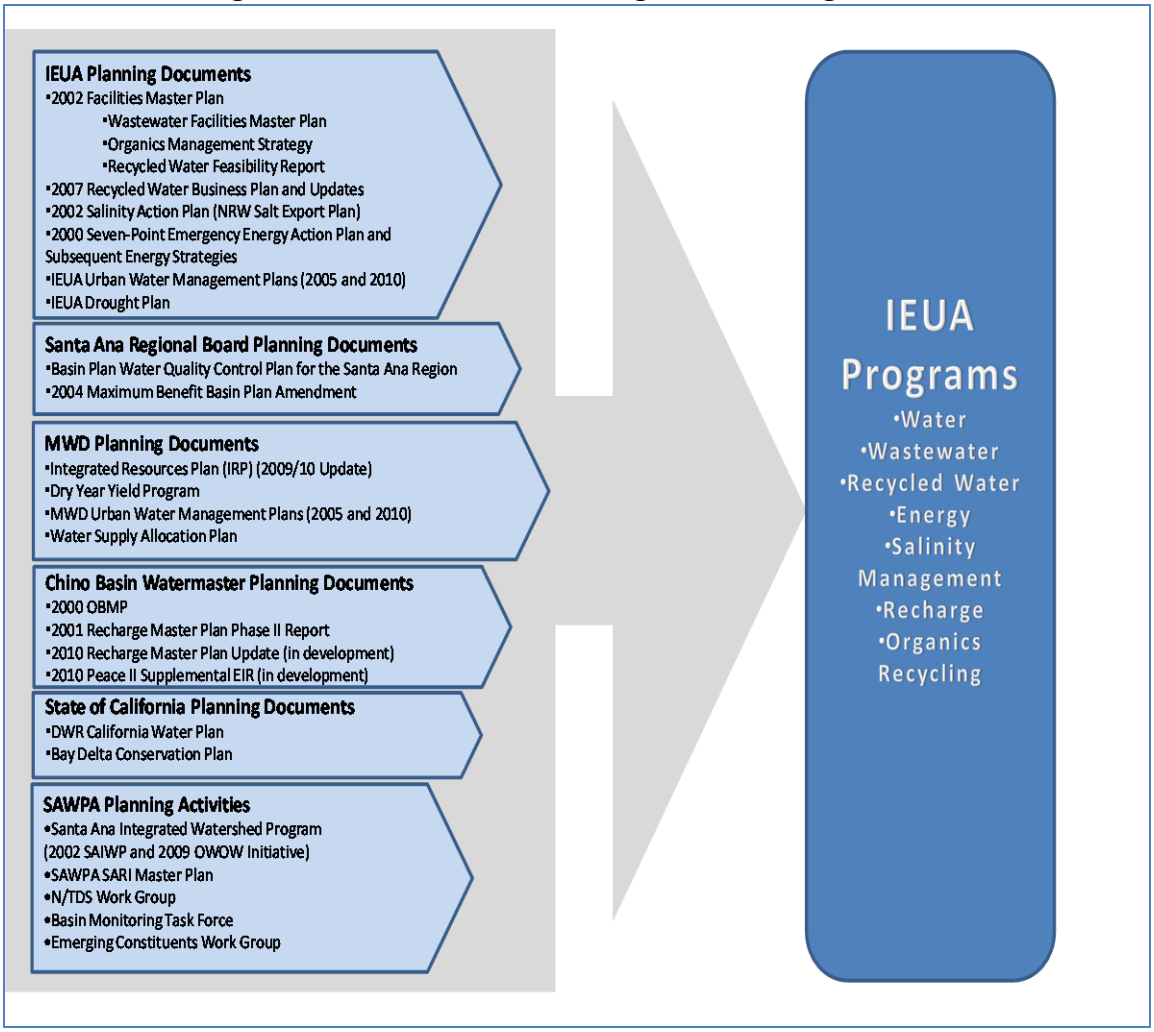
- Recycled Water
- Enhanced Groundwater Recharge
- Desalters
- Dry Year Yield/Conjunctive Management
- Water Efficiency Programs

Thus, IEUA's original planning documents have been expanded and updated to enhance successful programs and derive more water supply and energy benefits. A brief description of each of the original documents and the more recent outgrowths of these planning efforts is given below.

Wastewater Facilities Master Plan

Some of the objectives of the 2002 WFMP were to: (1) identify facilities that need to be replaced or expanded in the near- and long-term to meet projected growth and wastewater flow needs; (2) develop a cost-effective, phased implementation plan; (3) determine space and location needs for additional or expanded treatment facilities; (4) develop strategies for flow diversion between service areas to optimize existing treatment capacity utilization; and (5) maximize water recycling, energy efficiency, and organics recycling.

Figure 5-3: IEUA Coordinated Regional Planning Process



The WFMP included plans for expansion of wastewater facilities to meet the needs of growth within the service area through 2050. Specifically, it included improvements and expansion of wastewater facilities at RP-4; construction of a new 15-MGD wastewater facility at RP-5; conversion of RP-2 to a solids handling facility only (elimination of wastewater treatment at RP-4); and numerous upgrades and odor control facilities at RP-1 and Carbon Canyon RWRF. These plans have all been implemented. In addition, a new, state-of-the art composting facility was put into service near RP-4 that handles biosolids and green waste; a demonstration renewable energy facility was constructed at RP-5; a new, LEED-Platinum administration building and wetlands educational park were constructed near RP-5; the recycled water system was expanded to include additional recycled water pump stations, pipelines, and reservoirs in the northeast and central areas; and organics management facilities were constructed for handling biosolids, manure, and food waste in the southern area.

IEUA Recycled Water Feasibility Study

IEUA prepared a Recycled Water Feasibility Study, adopted by the Board of Directors in August 2002, which delineated the Agency's recycled water program through the year 2020. In 2004, IEUA initiated development of the Regional Recycled Water Program Implementation Plan, which updated information from the 2002 study. In 2005, the IEUA Recycled Water Program Implementation Plan identified additional future recycled water demand, primarily in the developing areas of the cities of Chino and Ontario. IEUA recognizes that water recycling is a critical component of an effective water resources management strategy; over the years, recycled water will become a larger portion of the overall water resources supply mix for the Chino Basin. Water recycling will help "drought proof" the Basin, help achieve the objectives of the OBMP, and provide a lower cost water supply to all the residents within IEUA's service area.

The 2002 Feasibility Study recommended and the 2005 Recycled Water Program Implementation Plan confirmed that interconnection of all four of the IEUA's regional treatment plants in a looped distribution system would maximize beneficial use of recycled water, increase system reliability and flexibility, and provide other operational and cost reducing benefits. The looped system will also allow more customers to be served and provide the flexibility to release surplus recycled water to spreading basins throughout the Basin for recharge.

IEUA's adopted Recycled Water Feasibility Study (August 2002), indicated that by the year 2020 the projected use of recycled water would exceed 70,000 acre-feet per year (AFY), with over 1,700 customers projected to be connected to the regional recycled water distribution system. Subsequent implementation of the 2005 Recycled Water Program Implementation Plan and the 2005 IEUA Urban Water Management Plan showed that a total of over 93,000 AFY of recycled water could be delivered to over 1,900 potential customers. IEUA will recharge up to 33,800 AFY of recycled water (blended with storm water and imported water to meet the overproduction replenishment needs) into the Chino Groundwater Basin and facilitate direct deliveries of over 69,000 AFY of recycled water to local customers. IEUA's goal is to use as much recycled water for local beneficial uses as is economically practical and replenish the Chino Groundwater Basin. In June 2007, IEUA received a new permit for recycled water recharge adding several more basins that can be utilized for recharge with recycled water. These added basins will increase both the volume and distribution of recycled water availability in the Chino Basin.

Recycled Water 3-Year Business Plan

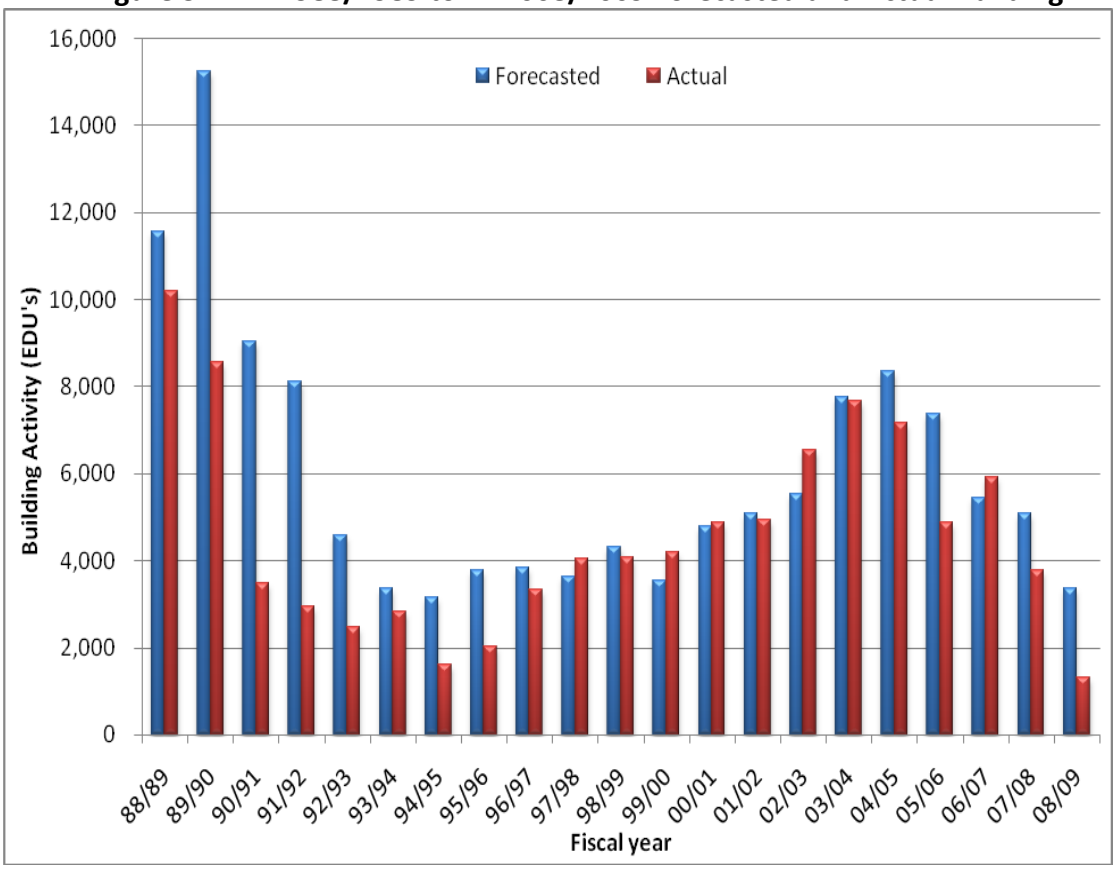
In FY 2007/08, in response to potential water supply shortages and reductions in MWD imported water supplies, IEUA accelerated implementation of the recycled water program deliveries by committing to a 3-Year Business Plan. The 3-Year Business Plan (initially adopted in December 2007) is intended to be a "short-term" action-oriented document that will be updated annually to adjust the goals, timelines and projects that will expand the use of recycled water. The 3-Year Business Plan, as updated in 2008, has

a goal of increasing the total recycled water connected demand to 50,000 AFY by FY 2011/2012. The program is to be funded by a combination of state and federal grants, State Revolving Fund Financing (SRF) and MWD rebates. In addition, the recycled water supply is not impacted by drought and will mitigate the impacts of regional or statewide water supply limitations.

5.2 HISTORICAL WASTEWATER FLOWS

Forecasting growth within IEUA's service area has not been easy in the last few years. With the significant drop in housing prices, limited credit availability and rise of interest rates from their recent historic lows, the real estate market has softened dramatically throughout the southland. As shown in Figure 5-4, FY 2008/09 revised forecasts were significantly higher than actual building activities, underscoring the challenge in predicting economic conditions and the local market response.

Figure 5-4: FY 1988/1989 to FY 2008/2009 Forecasted and Actual Building

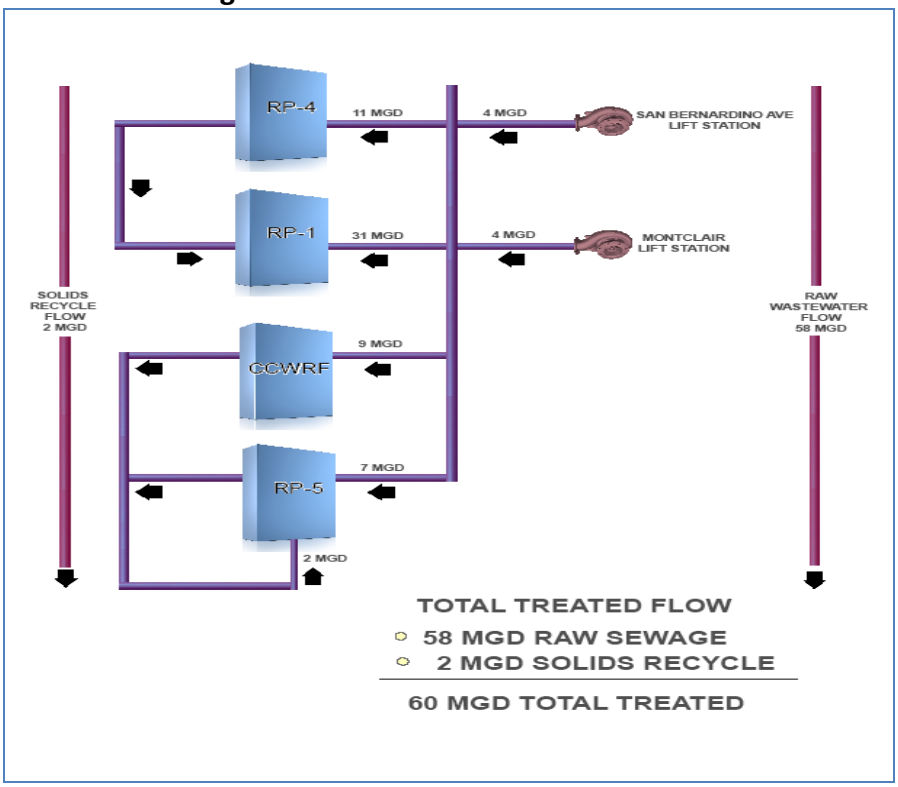


5.3 CURRENT WASTEWATER FLOWS

In recent years, as the need for recycled water increased, there were extensive efforts by the Operations Division, Planning & Water Resources Division, and Engineering & Construction Management Division to monitor wastewater flows at the regional plants and within the collection system. At each treatment plant, detailed accounts of flows and recycle streams entering and leaving the facilities were logged. Flow meters were recalibrated and influent and effluent readings compared to ensure quality data. Flow balances were performed for each facility and for the Agency as a whole, to ensure that service area flow quantities and recycle flow quantities could be distinguished. The information was used to prepare an Agency-wide System Flow Balance. This helped to clarify the Agency's options for optimizing flow distribution between facilities. It also verified the current baseline for future flow projections. Several diversion scenarios between the Regional Plants (RPs) were analyzed and stress tests at some of the Regional Plants were conducted to determine the bottlenecks within the plant.

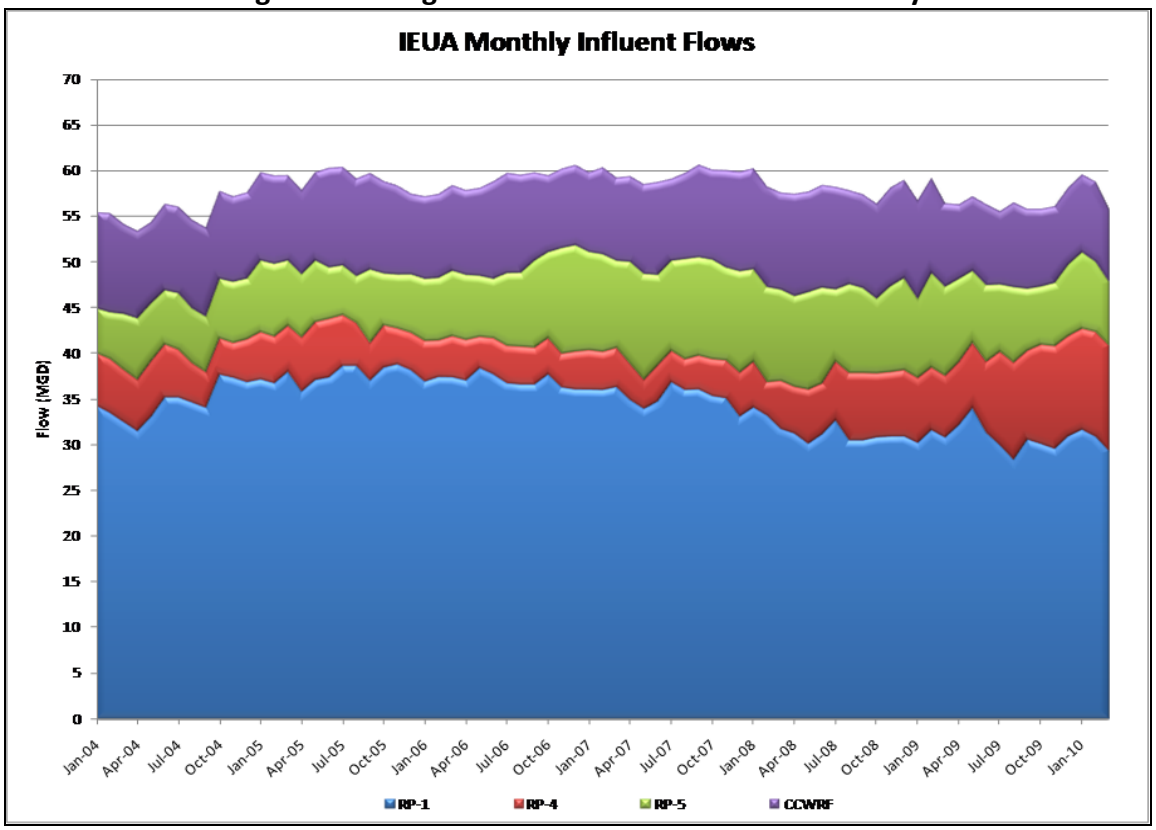
Figure 5-5 shows the current flows being treated at each of the Agency's regional water recycling facilities. In June 2009, the San Bernardino Avenue Lift Station came on line, which increased the amount of flow treated at RP-4 by approximately 4 MGD and correspondingly decreased the amount treated at the other three regional recycling facilities. The use of the lift station allows more flow to be supplied directly to recycled water users in the Northeast recycled water network.

Figure 5-5: Current Wastewater Flows



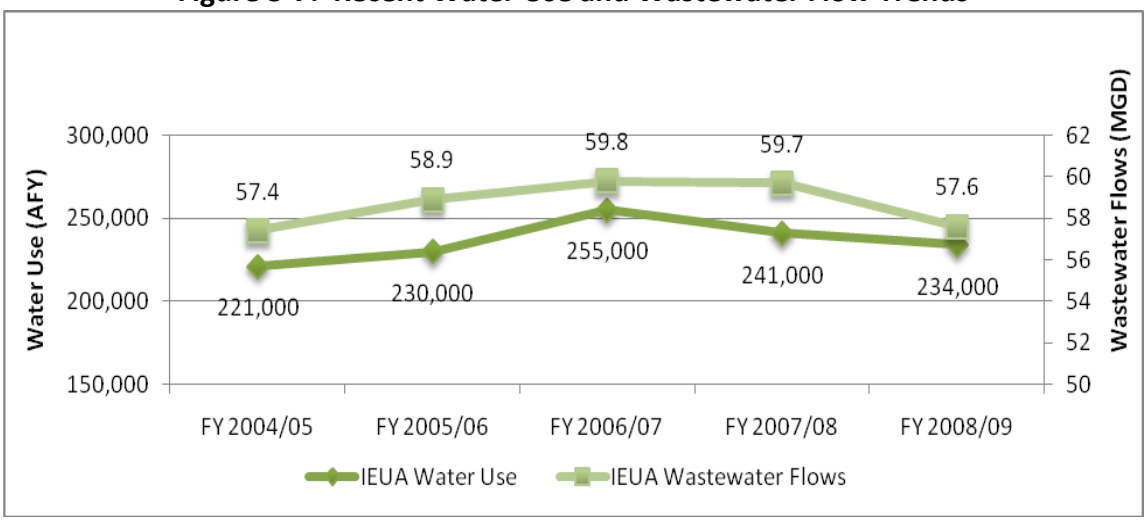
IEUA's historical wastewater flow trend is shown below in Figure 5-6. This figure depicts the raw sewage from each regional water recycling plant's tributary area and the total for all facilities combined.

Figure 5-6: Regional Plant Wastewater Flow History



Since the beginning of the current drought in FY 2006/07, both water consumption and wastewater generation in IEUA's service area have been trending downward (Figure 5-7). IEUA's member agencies' overall water use decreased approximately 32,000 acre-feet over the past three years. This coincides with the beginning of the three-year drought and can be largely attributed to IEUA and its member agencies' public education, water use efficiency programs, ordinance enforcement and the economic downturn.

Figure 5-7: Recent Water Use and Wastewater Flow Trends



In FY 2008/2009, with the recorded increase of 1,314 EDUs in the IEUA service area, IEUA would have expected to see an increase of up to 360,000 gallons per day in total raw sewage influent flow into the regional sewerage system (estimated using a wastewater generation factor of 270 gpd/EDU). Instead, the average daily flow rates of raw sewage into the Regional Water Recycling Plants have decreased by approximately 1 MGD. Los Angeles County and Orange County sanitation agencies have also experienced a leveling off or declining of wastewater flows over the past few years. This trend may reflect the decrease in economic growth and the increase in area foreclosures to some extent. However, it is expected to continue for the next few years, even after the economy rebounds, as conservation continues.

The backbone of the regional system has been designed using the raw sewage flow rate specified in the Regional Sewerage Service Contract—Exhibit J—which is 270 gallons per day per equivalent dwelling unit (gpd/EDU). IEUA still plans its regional sewer system around Exhibit J. However, the current average flow rate for new developments is estimated to be 200 gpd/EDU. Newly constructed and re-modeled homes are assumed to generate less wastewater on average due to the installation of water- efficient appliances. It is expected that the overall average Agency service area flow per EDU will continue to decline, given the rising price of water, decreases in water supply availability and greater need for water conservation.

5.4 FUTURE WASTEWATER SUPPLIES

A survey of the Contracting Agencies is conducted in September of each year to determine the rate of projected growth for the next ten years, in terms of Equivalent Dwelling Units (EDUs). The results of the 2010 survey are summarized in Table 5-1.

TABLE 5-1: Ten-Year Growth Forecast By Contracting Agencies

Fiscal Year	City of Chino (EDUs)	City of Chino Hills (EDUs)	CVWD (EDUs)	City of Fontana (EDUs)	City of Montclair (EDUs)	City of Ontario (EDUs)	City of Upland (EDUs)	Total (EDUs)
09/10	92	31	308	500	158	318	52	1,459
10/11	42	412	461	650	290	318	197	2,370
11/12	56	797	464	715	255	1,428	422	4,137
12/13	54	780	468	760	123	1,508	581	4,274
13/14	63	530	471	815	48	1,673	695	4,295
14/15	61	243	476	1,000	48	1,754	402	3,984
15/16	54	143	479	1,365	48	1,754	494	4,337
16/17	54	93	483	1,217	48	1,992	280	4,167
17/18	54	78	487	1,325	48	1,992	355	4,339
18/19	54	41	490	1,195	48	1,992	105	3,925
Totals	**584**	**3,148**	**4,587**	**9,542**	**1,114**	**14,729**	**3,583**	**37,287**

Table 5-1 shows that 40% of the growth in the IEUA service area was projected to occur within the City of Ontario (primarily from the development of the New Model Colony). Building activity was projected to be approximately 75% residential and 25% commercial/industrial, by EDUs. In round numbers, the Contracting Agencies projected 4,000 EDU's per year on average over the next ten fiscal years (FY 2009/10 – FY 2018/19). The growth forecast for IEUA's FY 2010/11 annual budget is more conservative, assuming slower growth and fewer new EDUs per year, consistent with the slowdown in the economy. The ten-year budget and capital spending plan assumes an average of 1,100 new EDUs in FY 2010/11, 1,200 new EDU's in FY 2011/12 and increasing by 200 EDUs per year for each of the following 8 years.

Ten-Year Wastewater Flow Forecast

For purposes of forecasting future wastewater flows and determining capacity needs, this Ten-Year Plan uses a revised estimate of EDU growth that reflects the current conditions and assumptions that were the basis of the Agency's long-range budget. Figure 5-8 below shows a comparison of projected wastewater flows using the original Contracting Agency estimates and the revised budgetary estimates. Using the Contracting Agency estimates, the total wastewater flows would increase by 6-8 MGD over the 10 years. Using the adopted budget estimates, the total flows will increase by 3-4 MGD.

Figure 5-8: 10-Year Flow Forecast (200gpd/EDU)

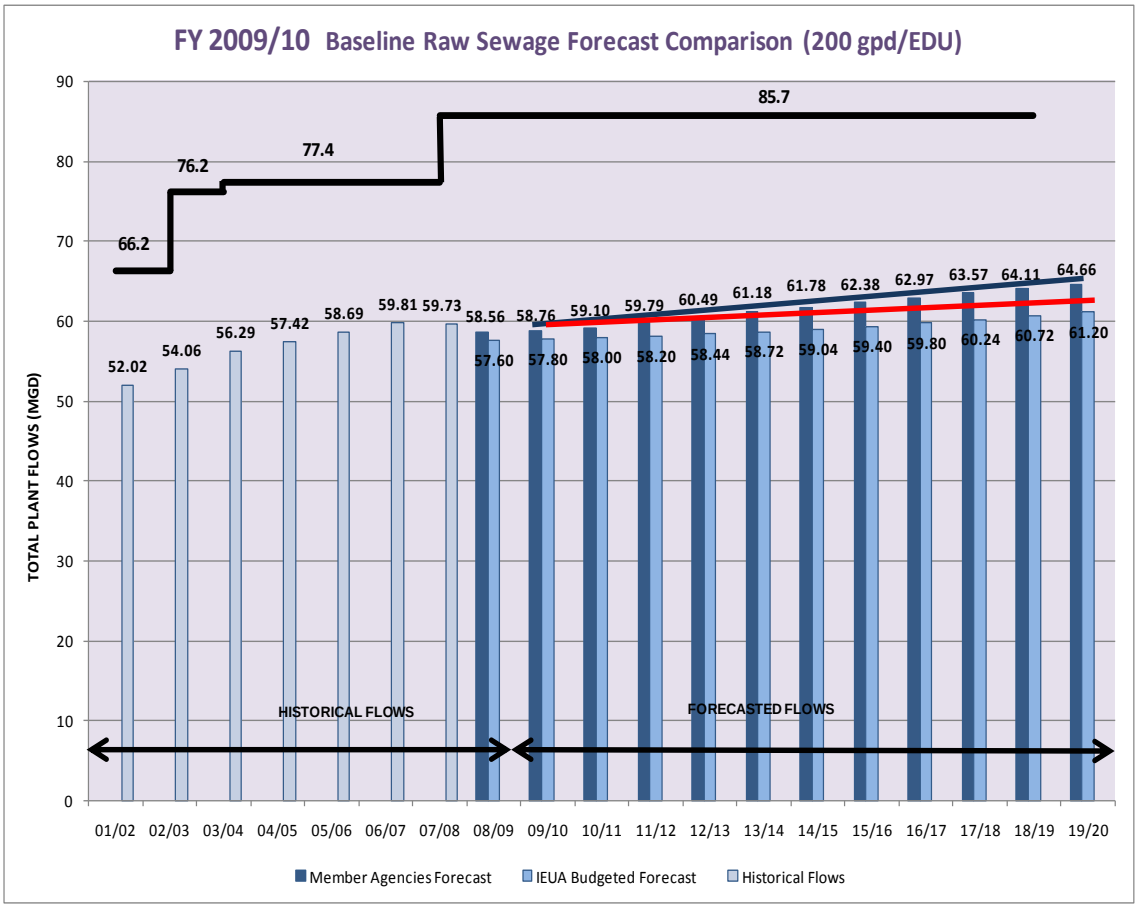
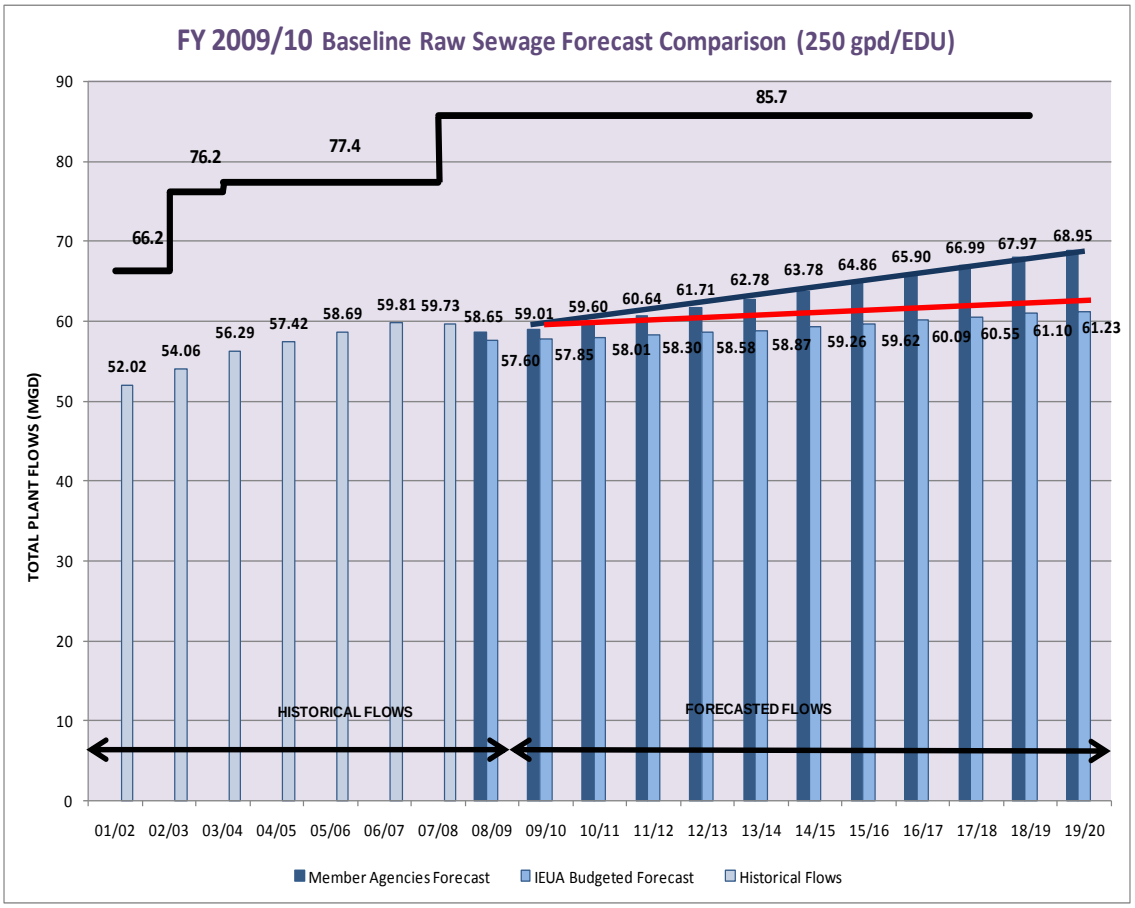


Figure 5-9 provides the same comparison using a flow factor of 250 gpd/EDU. The upper horizontal solid line is the combined capacity of the Agency's water recycling facilities. Regardless of which flow factor and which growth forecast is used, the treatment capacity is adequate for the projected flows.

Figure 5-9: 10-Year Flow Forecast (250 gpd/EDU)



Capacity Utilization Forecast

Table 5-2 presents the Ten-Year Capacity Demand Forecast by wastewater treatment plant. The current service areas of each Regional Plant were used to allocate projected sewage flows to each plant. For each service area, Table 5-2 compares the anticipated average regional plant influent flows now (FY 2009/10) and in FY 2019/20. It shows the baseline raw sewage flows from the service areas as well as the "adjusted" flows. The adjusted flows are the expected actual treated flows including bypasses, diversions, and the solids handling liquid recycle stream that is pumped from RP-2 to RP-5. Currently, the total baseline raw sewage flow is 57.8 MGD and the adjusted total influent flow is 60.0 MGD. The difference (2.2 MGD) is due to recycling solids-handling sidestreams between RP-2 and RP-5.

TABLE 5-2 REGIONAL SYSTEM FLOW AND CAPACITY UTILIZATION SUMMARY (MGD)								
	FY2009/10 Projected				FY2019/2020 Forecast			
Water Recycling Facility	**Raw Service Area Flow**	**Plant Influent Flow**	**Plant Rated Capacity**	**Percent Capacity Utilization**	**Raw Service Area Flow**	**Plant Influent Flow**	**Plant Rated Capacity**	**Percent Capacity Utilization**
RP-1	31.8	31.3	44.0	71%	32.8	32.3	44.0	73%
RP-4	7.3	11.0	14.0	79%	8.2	11.8	14.0	84%
CCWRF	11.5	8.7	11.4	76%	11.7	9.0	11.4	79%
RP-5	7.2	9.0	16.3*	55%	8.5	10.3	16.3	63%
IEUA Total	57.8	60.0	85.7	70%	61.2	63.4	85.7	74%

*Note: RP-5's current discharge permit establishes the plant's rated capacity, including recycle flows, at 16.3 MGD.

Table 5-2 Assumptions Looking Forward:

- Assumes 200 gpd/EDU and uses the Agency's budgetary estimate of projected EDU growth.
- Former Ontario Lift Station flow (2.5 MGD) is considered part of RP-5 raw service area flow.
- San Bernardino Lift Station routing 4 – 5 MGD (tributary to RP-1) to RP-4.
- All flows going through the Montclair Interceptor are routed to RP-1.
- 2.2 MGD of solids handling side-stream flow is recycled from RP-2 to be treated at RP-5.

As shown in Table 5-2, the forecasted total system flow for FY 2017/18 is 65.6 MGD, including the recycle stream from RP-2 to RP-5. The overall treatment plant capacity utilization is expected to increase to 77 % at the end of ten years. Agency-wide capacity utilization will be balanced and optimized between facilities to achieve the lowest operational cost while satisfying recycled water demands and water quality requirements. This will be accomplished using the bypass and diversion capabilities.

As reflected in Table 5-2, it is likely that capacity utilization at RP-4 and CCWRF will be higher than at the other water recycling facilities, with the operational goal being to supply recycled water to the users with the least amount of pumping energy. For example, using the Montclair Diversion, approximately 3.6 MGD could be diverted from

CCWRF to RP-1. Evaluations performed with the Agency's "Optimo" Flow Balancing and Optimization Model, as well as Unit Production Cost (UPC) tracking, have demonstrated that unit treatment costs at RP-1 ($/MG of water produced) are generally lower than at the other Regional Plants and that it is cost-effective to treat as much water there as possible. However, the lower treatment cost at RP-1 needs to be balanced against the higher energy cost for pumping wastewater from the Montclair Diversion to RP-1. Furthermore, the demand for recycled water in the pressure zones served by CCWRF is quite high in the summer, and the optimization modeling indicated that the demand will be high enough to use all of the recycled water that CCWRF can produce within three years. Therefore, it is likely that capacity utilization at CCWRF will be above 90 %%.

The Agency's flow modeling also indicated that diverting more flow to RP-1 using the Montclair Diversion and Pump Station would not increase the unused capacity at RP-5 significantly because the diurnal peak flows from CCWRF would still need to be bypassed to RP-5. CCWRF relies to some degree on the ability to bypass to RP-5 to guarantee Title 22 redundancy as well as for repair and maintenance shut-downs. Regular bypassing of an average of about 2 MGD was the norm until the CCWRF influent control structure improvements at the end of 2007. Since then, only the diurnal peak flows are bypassed, averaging about 1 MGD. Therefore, for the RP-5 flow forecast, it was assumed that 1 MGD of flow would still be bypassed from CCWRF to RP-5 on average, whether or not the Montclair Diversion flow goes to RP-1.

5.5 FUTURE WASTEWATER FACILITY EXPANSION

Ten-Year Capacity Improvement Plans

The Agency has just been through a phase of rapid construction and expansion including two wastewater facility expansion projects that increased wastewater treatment capacity by 23 MGD. The current flow forecast for the next ten years indicates relatively slower growth and relatively few capacity improvement projects targeted to specific needs. The TYCIP emphasis will be on repair and replacement of existing structures, providing system redundancy where needed to guarantee performance and compliance, expansion of the recycled water system, and achieving energy sustainability. In case growth in the service area during the next ten years exceeds the budgetary and capital planning estimates, and falls closer to the original Contracting Agency estimates, the TYCIP includes projects which will optimize the use of existing capacity and provide operational flexibility.

The ten-year flow forecast was used to develop several scenarios for utilizing the capacity at RP-5. In addition, the Agency's Modeling Team used the "Optimo" flow routing and optimization model to look at different flow bypassing and diversion scenarios. It was concluded that, through routing more flow to RP-4 and RP-1, there will be enough capacity in the Regional System to last through the next ten years without a major expansion at RP-5. This reduced the scope of work for the RP-5/RP-2 Capacity

Improvements Project and substantially reduced the cost of the project. Instead of planning on significant plant process modifications to provide additional capacity, the project is now focused on a few specific areas, including resolving some hydraulic issues and making better use of some unused equipment to provide redundancy and flexibility.

Fifty-Year Flow Projection

As indicated in Figure 5-10 ("Regional System 50-Year Flow Projections"), wastewater flows have been projected to reach somewhere between a low of 85 MGD to a high of 98 MGD by the year 2050. These projections were developed considering current, historical and future growth information. The "low" scenario reflects a wastewater flow increase of about 0.7 MGD per year and the "high" scenario reflects 1.0 MGD per year. The current trend falls between the two curves.

Figure 5-10: Regional System 50-Year Forecast