

Table of Contents

<i>List of Tables.....</i>	<i>iv</i>
<i>List of Figures.....</i>	<i>v</i>
<i>List of Appendices.....</i>	<i>v</i>
<i>Executive Summary</i>	<i>i</i>
Section 1: Introduction	1-1
1.1 Background	1-1
1.2 Objectives and Scope of Work	1-1
1.3 Data Sources	1-3
1.4 Report Organization	1-3
1.5 Acronyms and Abbreviations.....	1-4
Section 2: Service Area Information	2-1
2.1 Land Use	2-1
2.2 Climate	2-2
2.3 Demographics	2-4
2.4 Groundwater Basin Description.....	2-5
2.4.1 Hydrologic Information of the Basin	2-6
Section 3: Population and Historical Water Demands	3-1
3.1 Census/SCAG Population Projections	3-1
3.2 Water Production.....	3-4
3.3 Historical Water Demands.....	3-5
3.3.1 Water Demand Classification by Customer Type	3-6
3.3.2 Water Demand Classification by Number of Connections	3-8
3.3.3 Non-Revenue Water	3-10
Section 4: Water Demands Projections.....	4-1
4.1 Data Sources	4-1
4.1.1 Southern California Association of Governments (SCAG) Data	4-1
4.1.2 State of California Department of Finance - Census Data	4-1
4.1.3 SBMWD's Water Billing (HTE) Data	4-1
4.1.4 Previous Planning Studies	4-2
4.2 Potable Water Demand Projections	4-2
4.2.1 Service Area Developments.....	4-2
4.2.1.1 Approved Specific Plan Developments.....	4-2
4.2.1.2 Area Plan Developments	4-2

Table of Contents (cont'd)

4.2.1.3	Redevelopment Planning Areas	4-5
4.2.1.4	Other Development Consideration.....	4-5
4.2.2	Water Duty Factors (WDF).....	4-6
4.3	Weather and Economic Impacts on Water Usage	4-8
4.4	Projected Water Demands without Adjustment Factors.....	4-8
4.5	Demand Projections with Economic Adjustments and Conservation	4-9
4.6	Water Use Efficiency Programs	4-12
4.6.1	SBMWD's DMM Programs and Implementation (UWMP 2010)	4-13
4.6.1.1	Rebates	4-13
4.6.1.2	Residential Rebates for Fiscal Year 2011- 2014.....	4-13
4.6.1.3	Commercial, Industrial, and Institutional (CII) Customer Rebates	4-14
4.6.1.4	Conservation Practices Audits	4-14
4.6.1.5	Water-Smart Landscaping	4-15
4.6.1.6	Public Education	4-15
Section 5:	Current Water Supply	5-1
5.1	Current Supply Sources	5-1
5.1.1	Groundwater	5-1
5.1.1.1	Groundwater Quality	5-1
5.1.1.2	Groundwater Production in the Basin within SBMWD Service Area.....	5-2
5.1.2	Imported Water	5-4
5.1.3	Recycled Water.....	5-4
5.1.3.1	Potential Users	5-6
5.1.4	Transfers, Exchanges, and Groundwater Banking Programs	5-6
5.1.4.1	Transfers and Exchanges	5-6
5.1.4.2	Groundwater Banking Programs.....	5-7
5.2	Future Water Supply Options.....	5-7
Section 6:	Water System Description and Planning Criteria	6-1
6.1	Pipelines.....	6-1
6.2	Wells	6-2
6.3	Booster Pumping Stations.....	6-4
6.4	Storage Reservoirs.....	6-4
6.5	Pressure Regulating Stations and Transfer Valves.....	6-7
6.6	Pressure Zones	6-7
6.7	Hydraulic Planning Criteria.....	6-8
6.7.1	Fire Flow Criteria.....	6-9

Table of Contents (cont'd)

	6.7.2	Storage Criteria	6-10
	6.7.3	Pumping Criteria	6-10
Section 7:		Hydraulic Model Development	7-1
	7.1	Peaking Factors	7-2
	7.2	Elevation Allocation	7-3
	7.3	Demand Allocation	7-3
	7.4	Diurnal Curve	7-4
	7.5	Model Calibration	7-5
Section 8:		Hydraulic Analysis and Capital Improvement Program	8-1
	8.1	Planning Level Unit Costs	8-1
		8.1.1 Pipelines.....	8-1
		8.1.2 Reservoirs.....	8-1
		8.1.3 Booster Stations.....	8-2
	8.2	Existing Conditions Hydraulic Analysis	8-2
		8.2.1 Existing System Evaluation Approach	8-3
		8.2.2 Existing Pump Capacity Evaluation	8-3
		8.2.3 Existing Storage Evaluation	8-4
		8.2.4 Existing Distribution System Evaluation.....	8-6
		Existing Fire Flow Evaluation	8-11
		8.2.5 Recommended System Improvements for Existing Conditions.....	8-11
	8.3	Future Conditions Hydraulic Analysis.....	8-17
		8.3.1 Future Pump Capacity Evaluation.....	8-18
		8.3.2 Future Storage Evaluation	8-19
		8.3.3 Future Distribution System Evaluation	8-20
		Recommendations for Future System Improvements	8-28
	8.4	Additional Analyses	8-29
		8.4.1 IVDA Pipeline	8-29
		8.4.2 Lower Zone 78" Pipeline	8-30
	8.5	Capital Improvement Program	8-33
		8.5.1 Capacity Improvement Program	8-33
		8.5.2 Capacity Related Prioritization Criteria	8-33
		8.5.3 Capacity Improvement Program Summary	8-34
		8.5.4 Pipeline Replacement Program	8-35

Table of Contents (cont'd)

List of Tables

Table 1-1: Abbreviation Explanations
Table 2-1: General Plan Land Use Categories
Table 2-2: Climate Information
Table 2-3: Demographics for City of San Bernardino
Table 3-1: Population Projections Based on Various Sources
Table 3-2: Historical Water Production
Table 3-3: Historical Water Demands
Table 3-4: Historical Water Demand by Customer Type (AF)
Table 3-5: Summary of Number of Metered Connections by Customer Class
Table 3-6: Historic Production, Demand and Losses
Table 4-1: City of San Bernardino Specific Plans
Table 4-2: Water Duty Factors
Table 4-3: Ultimate Water Demand Projections without Adjustment
Table 5-1: BHG Basin Production
Table 5-2: Monthly Water Production 2012 (AF)
Table 5-3: Existing and Planned Wholesale Water Supplies
Table 5-4: Current and Projected Wastewater Collection and Treatment
Table 5-5: Recycled Water Plan Participating Agencies
Table 5-6: Potential Recycled Water Use
Table 5-7: Transfer and Exchange Opportunities
Table 5-8: Summary of Current and Planned Water Supplies (AF)
Table 6-1: Pipeline Summary
Table 6-2: Existing Well Summary
Table 6-3: Existing Storage Reservoirs
Table 6-4: Pressure Zone Summary
Table 6-5: Summary of System Performance Criteria
Table 7-1: Calibration Results
Table 8-1: Booster Station Unit Costs for New Pump Stations
Table 8-2: Existing Pumping Capacity Evaluation
Table 8-3: Existing Storage Evaluation
Table 8-4: Recommended Storage Project
Table 8-5: Recommended Pipeline Projects
Table 8-6: Zone Realignment Studies
Table 8-7: Future Pumping Capacity Evaluation
Table 8-8: Future Storage Evaluation
Table 8-9: Recommended Pumping Project for Future Conditions
Table 8-10: Recommended Storage Projects for Future Conditions
Table 8-11 Summary of Capacity-Based Capital Improvements

Table of Contents (cont'd)

List of Figures

Figure 1-1: Service Area Map
Figure 2-1: Land Use Map
Figure 3-1: Comparison of SBMWD Population Projections
Figure 3-2: Annual Water Production 2001 to 2013
Figure 3-3: Total Monthly Well Production
Figure 3-4: Water Demand by Customer Type
Figure 3-5: Number of Connections by Customer Type
Figure 3-6: Historical Non-Revenue Water Trends
Figure 4-1: Verdemont Heights Area Plan
Figure 4-2: Comparison of Ultimate Water Demand Projections
Figure 4-3: Comparison of SBMWD Demand Projections
Figure 4-4: SBMWD Demand Projections with Additional Conservation
Figure 4-5: SBMWD Demand Projections to the Rate of Population Growth
Figure 6-1: Existing System Storage Reservoirs
Figure 7-1: Model Development Workflow
Figure 7-2: Daily Diurnal Demand Pattern
Figure 8-1: Existing Distribution System Peak Hour Pressures – North Area
Figure 8-2: Existing Distribution System Peak Hour Pressures – Central Area
Figure 8-3: Existing Distribution System Peak Hour Pressures - South Area
Figure 8-4: Distribution System Fire Flow Findings - North Area
Figure 8-5: Distribution System Fire Flow Findings - Central Area
Figure 8-6: Distribution System Fire Flow Findings - South Area
Figure 8-7: Ultimate Maximum Day Demands and Minimum System Pressure – North Area
Figure 8-8: Ultimate Maximum Day Demands and Minimum System Pressure – Central Area
Figure 8-9: Ultimate Maximum Day Demands and Minimum System Pressure – South Area
Figure 8-10: Ultimate Maximum Day Demands plus Fire Flow Demands – North Area
Figure 8-11: Ultimate Maximum Day Demands plus Fire Flow Demands – Central Area
Figure 8-12: Ultimate Maximum Day Demands plus Fire Flow Demands – South Area
Figure 8-13: Water Age in Lower Zone

List of Appendices

A DWR Annual Summary Reports
B TM1 – Weather/Economic Analysis of Historical Water Use
C System Schematic and Facility Inventory

Table of Contents (cont'd)

- D TM2 – Model Development and Calibration
- E Hydraulic Analysis Tables for Pumping and Storage
- F Department 5-Year CIP