

Contents

	Executive Summary	ES-1
1.0	Purpose	1-1
2.0	Project Overview	2-1
2.1	The Challenge.....	2-1
2.2	The Solution.....	2-1
2.3	Project Benefits.....	2-2
2.4	Criteria for Moving Ahead.....	2-3
2.5	Stakeholder Involvement	2-4
2.6	Study Areas	2-5
2.7	Timeline	2-6
3.0	Study Summary	3-1
3.1	Surface Water Availability	3-1
3.2	Groundwater for Agriculture	3-5
3.3	Agricultural Conservation	3-8
3.4	Facility Siting.....	3-11
3.5	River Water Quality	3-13
3.6	River Habitat	3-15
3.7	Waterfowl and Wildlife	3-17
3.8	Matagorda Bay Health.....	3-18
3.9	Net Environmental Benefit Analysis	3-21
3.10	Permitting Requirements.....	3-22
3.11	Socioeconomic Study	3-23
3.12	Other Studies.....	3-24
3.13	Additional Detailed Study Results.....	3-25
4.0	Water Supply	4-1
4.1	Surface Water	4-1
4.2	Groundwater for Agriculture	4-22
4.3	Agricultural Conservation	4-33
5.0	Facility Siting.....	5-1
5.1	Facilities within the Colorado River Basin.....	5-1
5.2	Transmission, Terminal Storage and Water Treatment Facilities.....	5-14
6.0	Environmental Issues.....	6-1
6.1	River Water Quality	6-1
6.2	River Habitat	6-9
6.3	Waterfowl and Wildlife	6-18
6.4	Matagorda Bay Health.....	6-23
6.5	Net Environmental Benefit Analysis	6-35

7.0	Permitting Requirements	7-1
	Permitting Schedule	7-1
	Section 404/10 Permit Requirements	7-2
	NEPA Information Requirements	7-3
	Water Rights Permitting Requirements	7-3
	Status of Permitting Activities	7-4
	Potential Risks Associated with Permitting.....	7-4
8.0	Socioeconomic Analyses.....	8-1
	Socioeconomic Study Framework.....	8-1
	Study Components and Interactions with Other Study Teams	8-2
	Status of Socioeconomic Studies.....	8-7
9.0	Study Period Costs	9-1
10.0	Implementation Period Costs	10-1
	Cost Estimating Methodology	10-3
	Bases of Cost Estimates.....	10-5
	Cost Summary.....	10-6
	Potential Risks Associated with Cost Estimates.....	10-9
11.0	Other Analyses	
	11.1 Uncertainty Analysis.....	11-1
	11.2 Potential Implications of Climate Change	11-2
	11.3 Water Quality Study of Tidally Influenced Reach of the Colorado River....	11-5
12.0	Conclusions	12-1
13.0	References	13-1
14.0	Acknowledgements.....	14-1

List of Tables

3-1	Analytical Component Integration Overview for Instream Flow Guidelines.....	3-16
4-1	Projected Irrigation Water Demands in the LCRA Irrigation Divisions without the Project (in acre-feet per year).....	4-5
4-2	Projected Irrigation Water Demands in the LCRA Irrigation Divisions with the Project (in acre-feet per year)	4-6
4-3	Results from Water Availability Analyses.....	4-17
4-4	Preliminary Estimate of Total Wells by Irrigation Division (as a Percentage by Division).....	4-27
4-5	Estimated Future Project Groundwater Demands	4-28
4-6	Years during which the Drought of Record occurred in Groundwater Modeling Predictive Simulations	4-28
4-7	Predicted Net Drawdown Statistics (in feet) by Decade for <u>End of Year</u> Water Levels in Simulation where Drought of Record Occurs from 2056-2065	4-29

4-8	Predicted Net Drawdown Statistics (in feet) by Decade for <u>End of Growing Season</u> Water Levels in Simulation where Drought of Record Occurs from 2056-2065.....	4-30
4-9	Caps Placed on the Adoption of Best Management Practices.....	4-36
4-10	Summary of RiceWCA Projections (Average Values).....	4-38
4-11	Potential Maximum Savings from the Delivery System Conservation Measures ...	4-41
4-12	Projected Distribution of Demand Reductions	4-42
5-1	Derived Factors for Conceptual Alternative Projects.....	5-5
5-2	Description of Conceptual Alternative Projects.....	5-7
5-3	Summary of Derived Major Factors for Conceptual Alternative Analysis.....	5-8
6-1	Results of QUAL-TX Modeling for the 2010, 2030, 2060, and 2080 Conditions for 95,000 acre-feet per year Yield to SAWS Scenario in the Colorado River between Austin and Bay City during the Critical Month.....	6-3
6-2	Sensitivity of River Water Quality to Exceedances to Orthophosphate Concentration in Wastewater Treatment Plant Discharges	6-7
6-3	Analytical Component Integration Overview for Instream Flow Guidelines	6-13
6-4	Proposed Matagorda Bay Health Evaluation Freshwater Inflow Criteria	6-30
6-5	Comparison of 2006 Freshwater Inflow Needs Study (FINS) and the Project's Matagorda Bay Health Evaluation Team (MBHE) Inflow Criteria Methodologies.	6-31
9-1	Projected Study Period Costs.....	9-3
10-1	Project Alternative Cost Comparison, Annualized Cost Model.....	10-3
10-2	Project Facility Sizing Assumptions	10-5

List of Figures

ES-1	Project Overview	ES-1
ES-2	Schedule Overview	ES-6
ES-3	Cost Estimate for Delivery of Treated Water to SAWS Distribution System (per acre-foot), Annualized Cost Method	ES-8
2-1	Project Overview	2-2
2-2	Timeline	2-6
3-1	Off-Channel Storage Facility Operation Schematic.....	3-1
3-2	Irrigation Demand Reductions with and without the Project.....	3-10
3-3	Freshwater Inflow Criteria in the Larger Context	3-20
4-1	Off-Channel Storage Facility Operation Schematic.....	4-2
4-2	Simulated Storage in Project Off-Channel Storage Facility under 2060 Conditions	4-10
4-3	Water Supplied to Off-Channel Storage Facility for the Project under 2060 Conditions	4-11
4-4	Monthly Combined Storage Variations in Lakes Buchanan and Travis under 2060 Conditions with and without the Project.....	4-12
4-5	Projected Shortages for Irrigation Water Demand under 2060 Conditions without the Project	4-14

4-6	Annual Supplies of River Water, Groundwater and Highland Lakes Stored Water used to meet LCRA’s Projected Irrigation Demands with the Project in Operation under 2060 Conditions and with 95,000 Acre-Feet per Year Delivered to SAWS.....	4-14
4-7	Annual River Flows at Mouth of Colorado River under 2060 Conditions with and without the Project (95,000 Acre-Feet per Year Delivered to SAWS).....	4-16
4-8	LSWP Groundwater Model Geographic Domain.....	4-23
4-9	Cumulative Distribution of Predicted Net Drawdown in Decades 2060 and 2080 for <u>End of Growing Season</u> Water Levels in Simulation where Drought of Record Occurs from 2056-2065	4-31
4-10	Irrigation Demand Reductions with and without the Project.....	4-43
4-11	Projected Increase in Irrigation Water Savings, 2010 – 2090	4-44
5-1	Typical Embankment Dam Cross-Section of Off-Channel Storage Facility.....	5-2
5-2	Conceptual Layout of Off-Channel Storage Facility	5-3
5-3	Locations of Potential Intake and Off-Channel Storage Facilities as well as Delivery Points to SAWS used to Develop Conceptual Alternative Projects	5-6
5-4	Comparison of Estimated Acres of Jurisdictional Wetlands/Wetlands among Conceptual Alternative Projects.....	5-9
5-5	Comparison of Estimated Capital Costs among Conceptual Alternative Projects ..	5-10
5-6	Comparison of Estimated Unit Costs per Acre-Foot Delivered to SAWS among Conceptual Alternative Projects.....	5-11
5-7	Conceptual Alternative Project 8A, Wharton County.....	5-12
5-8	SAWS Facilities Overview.....	5-15
5-9	Transmission Facilities Within Region L/Outside Region K (SAWS Project Option 17)	5-18
5-10	Transmission Facilities Within Region L/Outside Region K (SAWS Project Option 22)	5-19
5-11	Transmission Facilities Within Region L/Outside Region K (SAWS Project Option 27)	5-19
6-1	Spatial Results of Predicted Dissolved Oxygen Concentrations for the Colorado River below Austin for with and without Project Conditions for 2030, 2060, and 2080 Conditions for 95,000 acre-feet per year Yield to SAWS Scenario during the Critical Month.....	6-4
6-2	Projected Frequency of Algal Blooms in 2080, as Indicated by Chlorophyll-a Levels Exceeding 40 µg/L, Versus Water Storage in the Off-Channel Storage Facility	6-8
6-3	LSWP Intensive Study Sites	6-10
6-4	Spawning Habitat and Adhesive Blue Sucker Eggs Collected in Onion Creek in Spring 2007	6-11
6-5	Drift Net and Larval Blue Sucker from the Utley Riffle During Spring 2007 in the Lower Colorado River	6-12
6-6	Weighted Usable Area of Aquatic Habitat versus Simulated Discharge for Each Habitat Guild at the Bastrop Intensive Study Site.....	6-14

6-7	Summary of Draft Instream Flow Guidelines – Ecological Functions and Application.....	6-16
6-8	Conceptual Waterfowl Habitat Map for the LSWP Study Area.....	6-20
6-9	Documented Waterfowl Habitat Selection Based on Water Depth.....	6-21
6-10	Waterfowl Energy Availability Model – User Interface	6-22
6-11	Matagorda Bay Health Model Interactions	6-24
6-12	Freshwater Inflow Criteria in the Larger Context	6-26
6-13	Freshwater Inflow Criteria Development Process.....	6-27
6-14	Proposed Assessment Locations	6-28
6-15	Services Provided by Natural Resources	6-36
8-1	Socioeconomic Study Analyses	8-1
8-2	LSWP Water Delivery to SAWS of 95,000 acre-feet per year	8-4
8-3	LSWP Water Delivery to SAWS of 120,000 acre-feet per year	8-4
9-1	Overview of Study Period Costs	9-2
10-1	Cost Estimate for Delivery of Treated Water to SAWS Distribution System (per acre-foot per year), Annualized Cost Method.....	10-7
10-2	Estimated Annual Costs, Annualized Cost Method, Component Cost Contributions (95,000 acre-foot Project Scenario)	10-8
10-3	Estimated Annual Costs, Annualized Cost Method, Component Cost Contributions (120,000 acre-foot Project Scenario)	10-9
11-1	Process to Evaluate Uncertainty and Variability	11-2
11-2	Summary of Key Climate Indicators and Potential Changes for Texas/Gulf Coast Region	11-3
11-3	Scenario Approach – Analytical Process.....	11-4