



EXECUTIVE SUMMARY

Introduction

The City of Sioux Falls has experienced significant population growth in every decade since 1900, increasing from approximately 10,000 residents in 1900 to over 137,500 residents in 2004. The City of Sioux Falls anticipates that the historical trend of population growth will continue into the future. Unfortunately, the City of Sioux Falls has determined that the existing water sources utilized within close proximity to the City will be unable to meet projected water demands beyond year 2012.

As a potential strategy to secure additional water supply capacity, the City of Sioux Falls is scheduled to receive 10 million gallons per day (mgd) of capacity through its membership in the Lewis and Clark Rural Water System (LCRWS). A substantial portion of the funding for the LCRWS project consists of Federal appropriations. Due to recent Federal funding appropriation shortfalls, implementation of the LCRWS has not proceeded as planned, causing concern that associated implementation delays could preclude the City from receiving its scheduled capacity from LCRWS project in a timely fashion. In addition, the 10 mgd capacity is limited with respect to the City's projected population and associated water demands. Therefore, it is anticipated that the City will need to obtain additional capacity from an expanded LCRWS and/or utilize appropriations from a future use permit issued to the City for the Missouri River to meet the increasing water demands over a reasonable planning horizon.

Basis of Evaluation

Planning Periods

A planning period of 50 years beyond the implementation deadline of year 2012 was established due to the complexity, limited expandability, and significant costs associated with the construction of new water supply, transmission, and treatment system infrastructure. As a result, the year 2062 served as the basis to develop concepts for evaluation and consideration by the City of Sioux Falls. The 50-year planning period was divided into two equal 25-year planning periods, thereby creating planning horizons in year 2037 and year 2062.

Population Projections

Population projections were prepared in accordance with the most recent analysis completed by the City of Sioux Falls Planning Department. The Planning Department based its future population projections through year 2025 on a declining annual percentage growth rate ranging from approximately 2.5 to 2.1 percent. To project the future population of the City of Sioux Falls through year 2062 to coincide with the 50-



year planning period, the population projections prepared by the City of Sioux Falls Planning Department were extended at a declining annual percentage growth rate over five-year periods beyond year 2025. The projected populations for critical years of the 50-year planning period are presented in Table ES.1.

Water Demand Projections

Water system planning capacities for a given year were generated based on multiplying the respective projected population by a peak day water demand value in units of gallons per capita per day (gpcd). Peak day water demand values were established for four climate conditions including normal, average dry, drought, and extended drought. Respective water demand values were developed for each of the climate conditions based on the intent for the City of Sioux Falls to implement water restrictions in accordance with the climate condition to reduce the demand for water and prolong the sustainability of the existing water sources. Table ES.2 presents the peak day water demand projections for critical years of the 50-year planning period and provides a comparison of the sustained available supply of the existing water sources, which then allows the determination of future water system capacity requirements.

Table ES.1 Projected Populations for the City of Sioux Falls

Year	Population Projections
2012	166,398
2037	281,024
2062	443,303

Table ES.2 Planning Period Water Demand Projections and Identified Shortages

Year	Peak Day Water Demand (mgd)			
	Normal Conditions	Average Dry Conditions	Drought Conditions	Extended Drought Conditions
	341 gpcd	304 gpcd	195 gpcd	155 gpcd
2037	95.8	85.2	54.8	43.6
2062	151.2	134.8	86.4	68.7
Available Supply	72.0	63.0	26.0	13.0
Projected Shortages				
2037	23.8	22.4	28.8	30.6
2062	79.2	71.8	60.4	55.7



Water System Concept Design Criteria

Preliminary engineering design criteria were established as a basis for the development of the water system concepts comprising the alternatives considered in the study effort. The design criteria were developed in accordance with parameters established in the Recommended Standards for Water Works (Ten States Standards) and by the City of Sioux Falls, the American Water Works Association (AWWA), the United States Environmental Protection Agency (USEPA), and other recognized sources. In general, the preliminary engineering design criteria are consistent with the planning efforts completed to date for the LCRWS. In reference to the projected water demands, peak day demands for water supply infrastructure were based on drought conditions, and peak day demands for the water treatment infrastructure were based on average dry conditions.

Overview of Alternatives

Water system concepts and implementation schedules for capital improvements were developed for three alternatives: (1) the LCRWS Alternative; (2) the Missouri River Pipeline Alternative; and (3) the Missouri River Pipeline Alternative with Consecutive Users. Under the LCRWS Alternative, the City of Sioux Falls would participate in the proposed LCRWS project and receive its allocated capacity by the year 2012. The City could receive additional capacity from LCRWS via expansion of the system by year 2017 if members agree to expand the system and assign their share of expanded capacity to the City, providing sufficient capacity through year 2037. The increased water demands beyond 2037 would be met via an independent project by the City of Sioux Falls that utilizes future use appropriations from the Missouri River at Gavin's Point Dam.

Under the Missouri River Pipeline Alternative, the City of Sioux Falls would discontinue its membership in the LCRWS project and independently pursue appropriations from the Missouri River at Gavin's Point Dam and implement water supply and transmission infrastructure by year 2012. Increased water demands in future years would be met via expansion of the water supply and transmission infrastructure and the construction of additional water treatment infrastructure per the water demand projections.

The Missouri River Pipeline Alternative with Consecutive Users was developed in consideration of including additional water supply, transmission, and treatment capacity upon initial implementation in year 2012 to provide service to member systems of the LCRWS project. Increased water demands in future years would be met via expansion of the water supply, transmission, and treatment infrastructure per the water demand projections.

The Future Water Supply Evaluation contains detailed information regarding the justification and implementation timeline for capital improvements developed for alternatives.



Opinions of Probable Project Costs

To evaluate the alternatives on a financial basis, opinions of capital and incremental operation and maintenance (O&M) costs were estimated for each of the alternatives. Capital and O&M cost information for the LCRWS project and expansion thereof were obtained from documentation provided by Banner Associates, Inc. and the City of Sioux Falls. All capital and O&M costs prepared otherwise were estimated in November 2004 dollars based on engineering judgment and experience, projects of similar scope, input from contractors and suppliers, estimates previously prepared by other engineering firms under contract with the City, and recent bid tabulations for the LCRWS project. All capital costs prepared previous to this study effort were adjusted to reflect November 2004 dollars using construction cost index tables published by Engineering News Record (McGraw Hill Construction). Opinions of total probable project cost for the City of Sioux Falls with respect to the alternatives are presented in Table ES.3. Estimated incremental annual O&M costs associated with the alternatives for the City of Sioux Falls are presented in Table ES.4. The incremental estimates account for reduced production by the Sioux Falls Water Purification Plant (WPP) upon the receipt of supplemental water system capacity from LCRWS. The incremental estimates also account for the anticipated change in O&M costs associated with the timeline for construction of a future water treatment facility to treat water from the Missouri River at Gavin's Point Dam.

Implementation Considerations

Various implementation considerations were presented and discussed with respect to the alternatives evaluated as part of this study effort. The items discussed in detail were limited to those that were deemed to have significant pertinence to the City of Sioux Falls. The list of items included: (1) planning and funding development; (2) design and construction phasing; (3) water supply appropriations; (4) land and easement acquisition; (5) government agency review and approval; and (6) environmental compliance. Based on the year 2012 deadline for increased water system capacity and the need for additional water system capacity throughout the 50-year planning period, emphasis was placed on planning, funding, design and construction phasing, and land and easement acquisition due to the potential respective impact on the implementation timeline for capital improvements and/or user rates.

Comparison of Alternatives

Alternatives considered as part of this study effort were compared via the completion of a present worth analysis through year 2062. In accordance with concerns regarding the implementation of the LCRWS project, two variations were developed for the LCRWS Alternative to quantify the relative financial implications of the potential for inadequate Federal funding to meet the City's year 2012 deadline and the inability for the City of

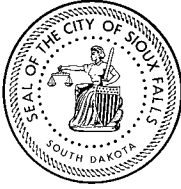


Table ES.3 Opinions of Total Probable Project Cost (November 2004 Dollars)

Alternative	Opinion of Total Probable Project Cost (1)
LCRWS Alternative (2)	\$457,580,000
Missouri River Pipeline Alternative	\$627,970,000
Missouri River Pipeline Alternative with Consecutive Users (3)	\$577,880,000

- (1) Represents estimated costs for capital improvements through year 2062.
- (2) Represents the local share of costs to the City of Sioux Falls with respect to the proposed LCRWS project.
- (3) Represents the allocated share of costs to the City of Sioux Falls of a larger project that is highly dependent upon the willingness of consecutive users to participate.

Table ES.4 Estimated Incremental Annual O&M Costs (November 2004 Dollars)

Alternative	Estimated Incremental Annual O&M Costs
LCRWS Alternative	
Years 2012-2036	\$2,368,000
Years 2037-2062	\$5,515,000
Missouri River Pipeline Alternative	
Years 2012-2027	\$748,000
Years 2028-2049	\$3,259,000
Years 2050-2062	\$5,085,000
Missouri River Pipeline Alternative with Consecutive Users	
Years 2012-2049	\$2,342,000
Years 2050-2062	\$4,500,000

Sioux Falls to obtain a commitment from LCRWS regarding the magnitude and timeline for the acquisition of additional capacity available through expansion of the LCRWS. Therefore, a total of five alternatives were analyzed on a present worth basis: (1) the LCRWS Alternative; (2) the LCRWS Alternative with Limited Federal Funding; (3) the LCRWS Alternative with Limited Expansion Capacity; (4) the Missouri River Pipeline Alternative; and (5) the Missouri River Pipeline Alternative with Consecutive Users. To supplement the present worth analysis, additional alternative considerations were presented to identify the advantages and disadvantages of the alternatives and assist in the non-cost portion of the decision making process.

It should be noted that although the Missouri River Pipeline Alternative with Consecutive Users was included in the present worth analysis, the feasibility of the alternative is questionable due to the absence of Federal funding. The associated increased user costs would likely preclude consecutive users from participating, unless the City of Sioux Falls heavily subsidized the costs of the project on behalf of the consecutive users.



Table ES.5 presents the present worth of the remaining four alternatives evaluated as part of this study effort per the assumptions regarding the issuance of General Obligation Bonds, annual index factors (inflation), and cash resources available to fund portions of the capital improvements in the near-term. The Future Water Supply Evaluation provides a discussion of the present worth analysis. Figure ES.1 presents a comparison of the capital costs for each of the four remaining alternatives and provides an indication as to the relative difference of capital costs through the 2037 and 2062 planning periods.

Table ES.6 presents a summary of the total estimated present worth per meter in each year that a major capital improvement is implemented for the alternatives identified in Table ES.5. It should be noted that the estimated cost increases by year are not cumulative, and are provided only to illustrate the approximate cost impact per meter of each set of capital improvements. In addition to the estimated increases per meter shown in Table E.6, cost per meter decreases will be experienced as debt is retired. The decreases associated with debt retirement are not shown in Table E.6.

Conclusions and Recommendations

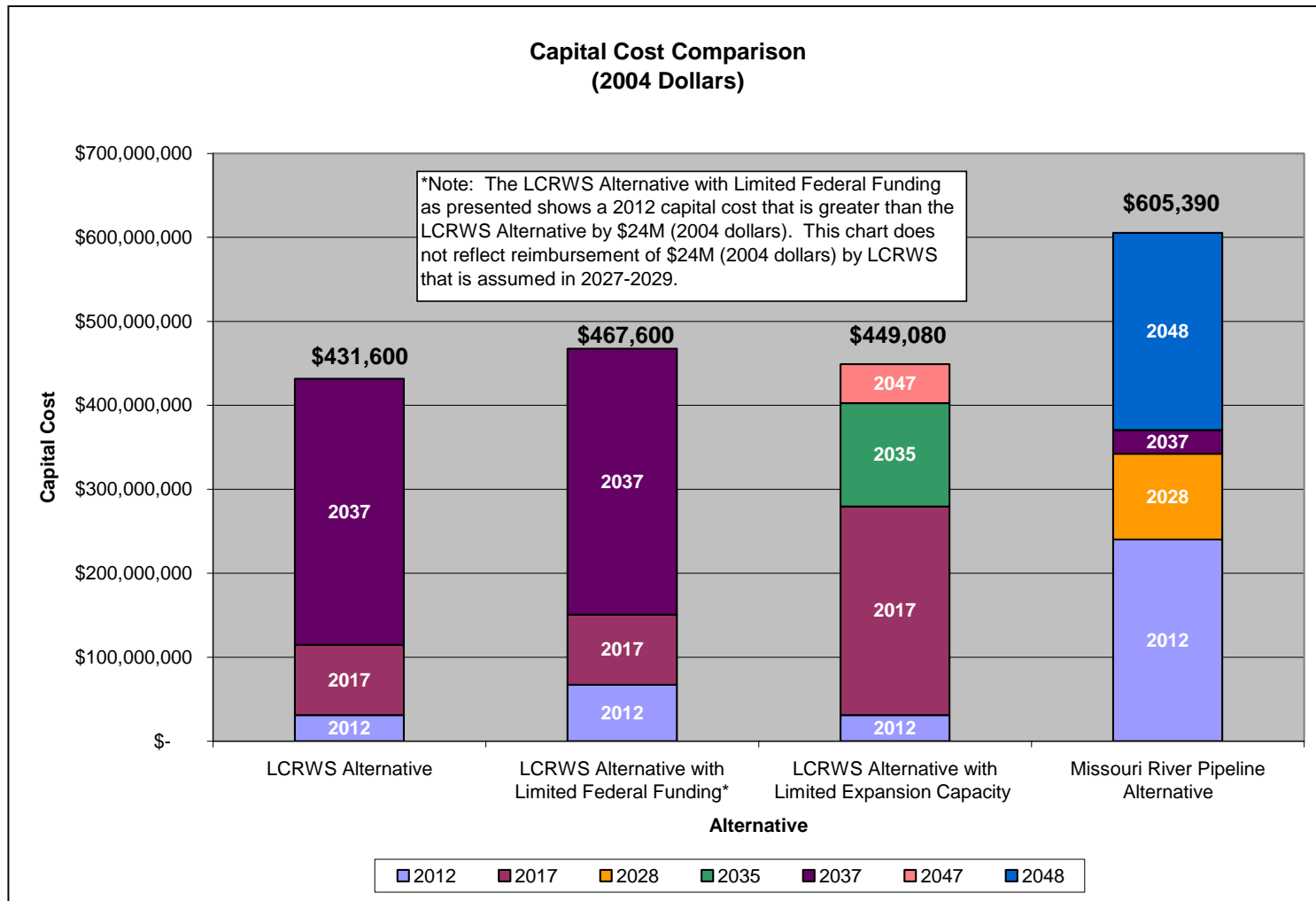
The projected population growth and associated increase in water demands for the City of Sioux Falls are estimated to surpass the capacity of the existing water sources by year 2012. The projected water supply shortage is primarily attributable to the susceptibility of the existing sources to dry climate conditions. As a strategy to obtain additional water supply capacity, the City of Sioux Falls is a member of the LCRWS. However, the implementation for the LCRWS project is dependent upon the level of Federal funding received and could potentially be delayed if reduced levels of funding are realized in upcoming years. In addition, the capacity provided to the City by the proposed LCRWS is limited and is only projected to address the City's water supply concerns through year 2017. Although additional capacity could be available from LCRWS through expansion, LCRWS would first need to commit to expanding the system and other member systems would need to relinquish their rights to the expanded system capacity in order for the City of Sioux Falls to meet demands through a reasonable planning period.

Table ES.5 Present Worth of Alternatives (November 2004 Dollars)

Alternative	Present Worth of Debt Service and Incremental Annual O&M Costs
LCRWS Alternative	\$751,140,000
LCRWS Alternative with Limited Federal Funding	\$760,890,000
LCRWS Alternative with Limited Expansion Capacity	\$815,360,000
Missouri River Pipeline Alternative	\$853,300,000



Figure ES.1 Capital Cost Comparison (November 2004 Dollars)



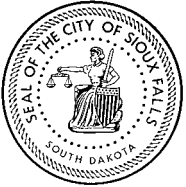


Table ES.6 Total Estimated Present Worth of Annual Costs per Meter (November 2004 Dollars)

Year	LCRWS Alternative	LCRWS Alternative with Limited Federal Funding	LCRWS Alternative with Limited Expansion Capacity	Missouri River Pipeline Alternative
Baseline (2004)	\$323	\$323	\$323	\$323
2012	\$420	\$476	\$420	\$715
2017	\$534	\$587	\$782	
2027		\$580		
2028		\$573		\$855
2029		\$566		
2030		\$560		
2035			\$928	
2037	\$852	\$864	\$902	\$788
2042	\$810	\$822	\$813	
2047			\$844	
2048				\$962
2050				\$967
2053				\$930
2060			\$812	
2062	\$735	\$747		

⁽¹⁾ The cost impact per meter is indicative of the implementation year of the capital improvement, reimbursement of program funding, or debt service retirement.



With regards to the City's participation in the LCRWS project, the City commissioned this study effort to assess the impacts of reduced levels of Federal funding and capacity available through system expansion and provide a comparison to the concept of utilizing the City's future use permit on the Missouri River. The results of the Future Water Supply Evaluation indicated that the City of Sioux Falls should continue to participate in the LCRWS project to meet the projected water demands through year 2037 based on the assumptions made as part of the study effort, the present worth of the alternatives considered, and additional alternative considerations. The study effort anticipated that the City of Sioux Falls would obtain supplemental water supply capacity beyond year 2037 from Gavin's Point Dam utilizing its future use permit for the Missouri River. It should be noted that the amount of capacity available to the City of Sioux Falls from LCRWS and the timeline in which it is provided could require the City to expedite the implementation of obtaining supplemental water supply capacity from the Missouri River at Gavin's Point Dam. As alternatives to obtaining water from the Missouri River at Gavin's Point Dam, the City of Sioux Falls could consider the pursuit of appropriations near Vermillion, South Dakota and associated supply and transmission infrastructure to meet the projected long-term water supply demands.

Participation in the LCRWS project represents the least costly increment of increased capacity. Additional capacity from LCRWS via expansion also represents a relatively low cost per unit of increased capacity. However, the magnitude of expanded capacity available and the timeline in which the expanded capacity is provided will have a direct impact on the implementation timeline of relatively large capital improvements necessary to meet long-term water demand projections. Therefore, the City of Sioux Falls needs to obtain a commitment from LCRWS, preferably in year 2005, regarding the amount of capacity available to the City of Sioux Falls via expansion of the LCRWS, the timeline in which the expanded capacity could be provided, and the associated cost of service implications.

Although it is recommended that the City of Sioux Falls continue to participate in the LCRWS project, the City should initiate preliminary planning efforts associated with future capital improvements. It is anticipated that the completion of the preliminary planning efforts in the near-term will assist with difficult processes, such as the acquisition of land and easements, and decrease the timeline associated with implementing the capital improvements. If issues pertaining to the LCRWS are encountered, the City should proceed with the prescribed steps and courses of action contained in the Future Water Supply Evaluation to assist the City of Sioux Falls with identifying potential options, supporting policymakers in making timely decisions, and proceeding with the most appropriate and economical alternative to meet the City's water system demands through year 2062 and beyond.