CHAPTER 1

PURPOSE AND NEED

1.1 INTRODUCTION

In 1993, the City of Wichita, Kansas, completed a comprehensive master plan for community development. This study evaluated water, sewer, storm water, solid waste systems, fire protection, transportation, law enforcement, schools and libraries, medical services, parks, housing neighborhoods, land use planning, community appearance and historic preservation through the year 2010. Using this information, the City conducted a water supply study in 1993 to evaluate future water demands and possible water sources available to meet that demand. These studies projected growth in the city and surrounding county and provided information to plan facilities necessary to maintain and improve the quality of life and encourage future economic development in the Wichita area.

Historically, the City's mix of water sources has been heavily dependent on groundwater, particularly from the Equus Beds aquifer. During the last 60 years, withdrawal of water from the Equus Beds aquifer for agricultural, industrial, municipal, and domestic use has exceeded recharge. As a result, the water table dropped as much as 50 feet in some areas from the predevelopment level and saltwater contamination from natural and manmade sources to the north and west is moving into the aquifer because of the change in groundwater flow directions. Water quality degradation is currently occurring in the well field and surrounding areas. Groundwater in areas near the Arkansas River have been seriously degraded and the saltwater has the potential to degrade the well field to a level where the water would not be suitable for some existing agricultural uses. Recharging the well field area will reduce future deterioration of the aquifer's water quality by slowing or preventing migration of the saltwater into the well field and assures water availability, especially during extended dry weather periods. Therefore, another goal of any new water development project is the protection of the aquifer's water quality, in addition to the replenishment of the Equus Beds aquifer.

Specifically, this chapter characterizes the anticipated need for an expanded water supply system for the City of Wichita and includes information on historical water use, existing supply and demand, and projections of future water demand and water conservation. Included is a description of the net water needs for the metropolitan area to the year 2050. This chapter includes: a statement of the purpose of and need for the proposed action; the location of the proposed action; a statement of the decision to be made; a summary of the environmental review; a statement about the applicable regulatory requirements; and a description of the organization of this environmental impact statement (EIS).

1.2 PURPOSE

The purpose of the proposed project is to provide a reliable supply of potable water

to the customers of the City of Wichita Water Service Area (Service Area) through the year 2050, which requires delivering water to a growing population and service area. In developing the plans for a larger supply, the City of Wichita Water and Sewer Department (Department) used population and water use projections to determine future water demands. This information was used in turn to determine the necessary water system expansions or additions needed to accommodate the increased demands. These water demands can be met by increasing water system capacity, expanding the use of existing water sources or by developing new water supplies. The project is intended to provide a firm reliable water supply to meet either the average day[1] or the maximum day[2], or peak demand, within the Service Area through 2050.

If groundwater levels remain at their current levels or decline further, the Equus Beds will continue to be contaminated by saltwater intrusion.

1.3 NEED

The City of Wichita's current water service population is approximately 348,000, of which about 32,000 people are served outside the city limits. To meet its future responsibilities, the Department initiated a water supply study in 1993. This study compared projected future water demands with existing raw water supply and system capacity, and found that water supply shortfalls during extended dry weather periods could begin occurring by 2016 for the average day supply, and by 2026 for the maximum day supply. The projected water needs for the Department for the year 2050 are as follows:

- Average day demand of 112 million gallons per day (MGD) and
- Maximum day demand of 223 MGD

Implementation of water supply plans to provide these projected water needs may require up to 15 years of lead time to complete planning, permitting, design, construction, start-up and operational activities. As a result, if system improvements or additions are to be undertaken, the timing of the analysis, planning and approval process required for implementation becomes more urgent.

In addition to the projected water needs for the Service Area, there is also the need to protect the principal groundwater supply source for the City of Wichita from saltwater intrusion. This source is the Equus Beds Well Field. If groundwater levels remain at their current levels or decline further, the Equus Beds aquifer will continue to be contaminated by saltwater intrusion. This saltwater intrusion will result from the natural brine seepage from the Arkansas River drainage and as a by-product of past oil field activities, which will affect both water for agricultural uses and the City of Wichita's drinking water supply (Burns & McDonnell, 1993). Recharging the Equus Beds aquifer would help prevent further water quality degradation and provide a large volume of stored groundwater for future use during drought

[1] *Average day demand* – total amount of raw water used in a calendar year divided by number of days.
[2] *Maximum day demand* – highest raw water demand on a given day in a calendar year; usually occur in July or August.

conditions for both the City and the agricultural community.

The following section provides background information on the City's facilities, existing water supply and demand, conservation programs, and water use projections. These are the components that form the basis for defining the City's future water supply requirements.

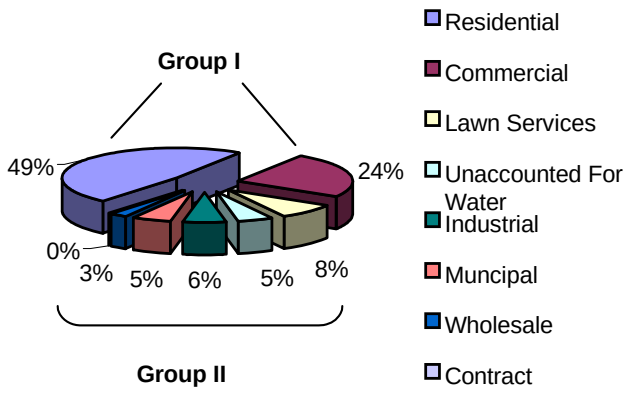
1.3.1 CURRENT SYSTEM - CITY OF WICHITA WATER & SEWER DEPARTMENT

The City of Wichita Water and Sewer Department is the water supply entity of the city government. The City currently supplies water to 124,000 residential and commercial customers within the city limits of Wichita, and to 10 wholesale customers and several residential/commercial customers outside the city limits. The City also provides water to the Cities of Bentley (untreated water only), Andover, Benton, Bel Aire, Eastborough, Kechi, Oaklawn, Rosehill, Park City, Sunview, Valley Center, Sedgwick County Rural Water District #1, and Butler County Rural Water District #8.

1.3.1.1 Existing Demand

In 1999, the average day water demand in the service area was 55.2 MGD and the maximum day water demand was 115.4 MGD. During the year, water use was distributed as follows: 49 percent by residential customers, 24 percent by commercial customers, 6 percent by industrial customers, 3 percent by wholesale customers and 18 percent by all other customer classifications, including lawn service, fire protection, contract, municipal, water utility and unaccounted-for water (Figure 1-1). Group I customers (residential and commercial) accounted for the majority of the water used, at 73 percent. Group II customers (industrial, wholesale, and all other) accounted for the remaining water used at 27 percent. The service area boundaries for 1999 and the projected 2050 growth areas are shown in Figure 1-2.

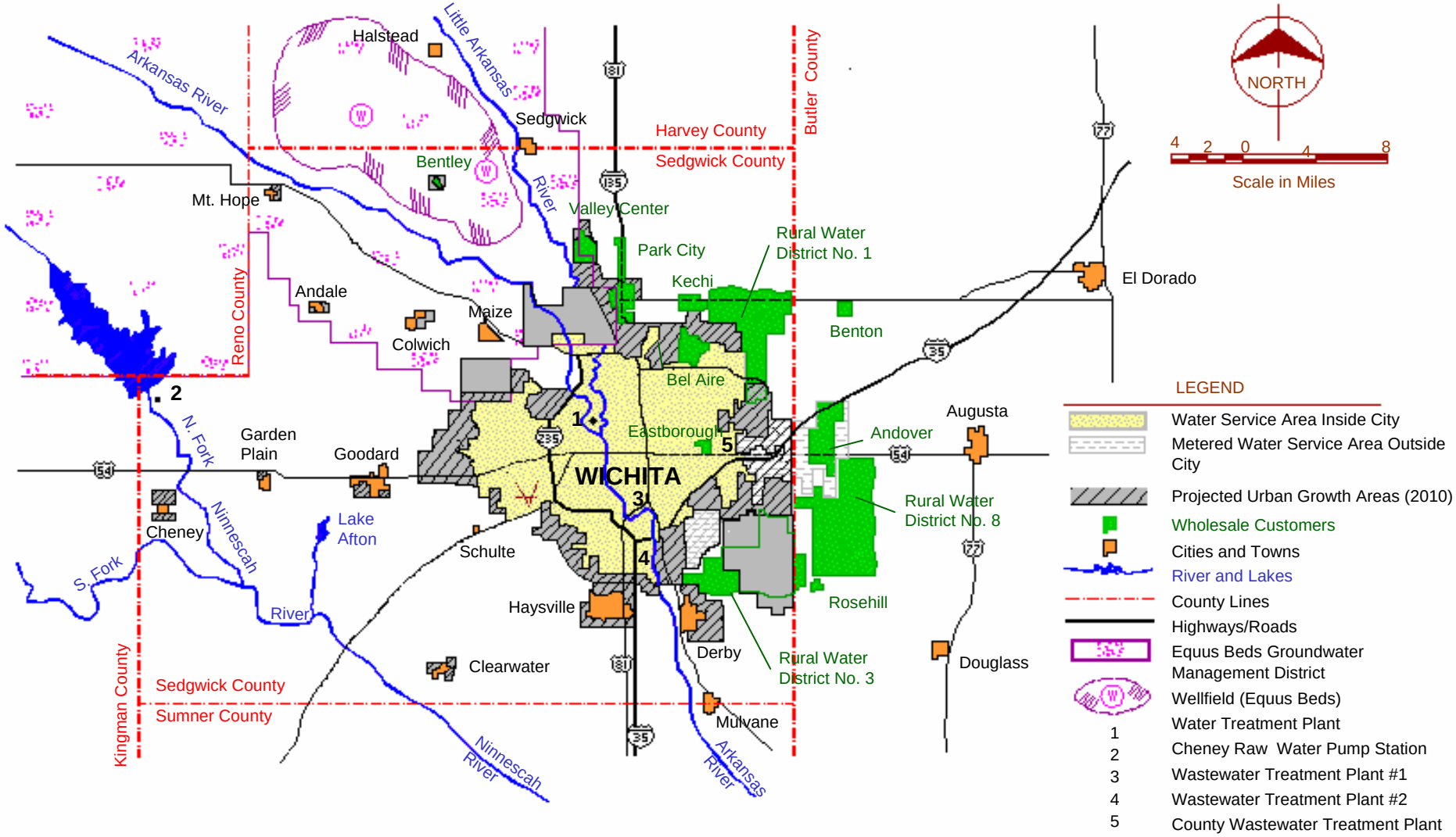
Figure 1-1 1999 Water Distribution by Customer Type



1.3.1.2 Existing Water Supply Facilities

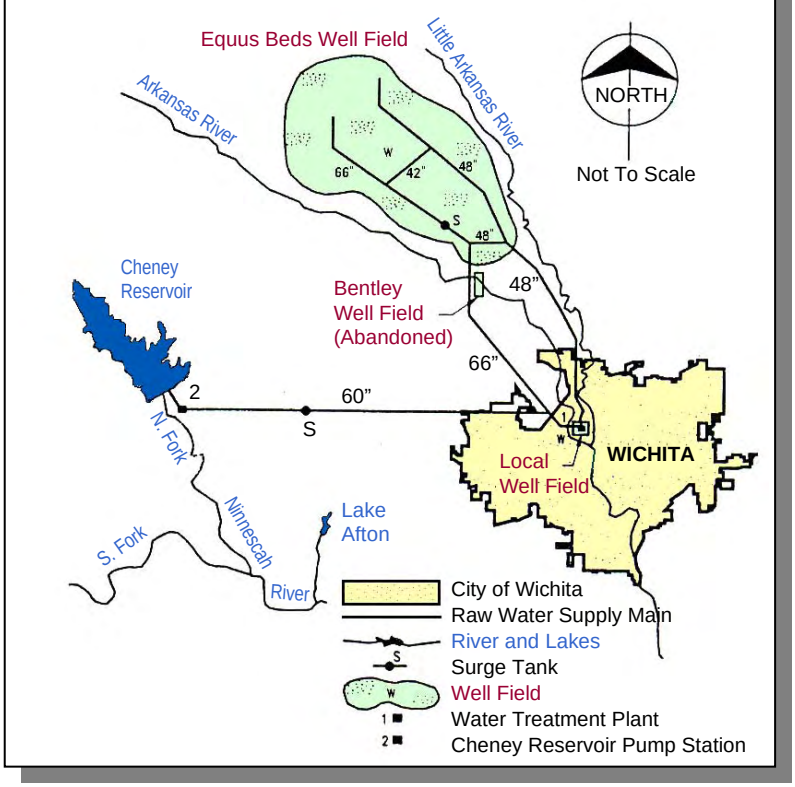
The City maintains water supply, treatment, distribution and storage facilities to serve its customers. The existing water supply sources include: the Equus Beds Well Field, located approximately 25 miles northwest of Wichita; the Emergency & Sim (E&S) Well Field also referred to as the Local Well Field, located next to the Water Treatment Plant in Wichita on the north bank of the Arkansas River; and Cheney Reservoir, located 20 miles west of Wichita (Figure 1-3). The existing water treatment plant for Wichita's Service Area is the Water Treatment Plant, located near the confluence of the Arkansas and Little Arkansas River in downtown Wichita.

Figure 1–2 Water System Service Area



Note: Projected growth areas from information provided by the Wichita-Sedgwick County Metropolitan Area Planning Department
Source: EIS ILWSP for the City of Wichita 2003

Figure 1-3 Raw Water Supply System Schematic



The existing Equus Beds Well Field contains 55 wells which draw groundwater from the High Plains aquifer system. Twenty-five wells were initially constructed in the late 1930's, and another 30 wells were added in the 1950's. Current water rights[3] allow the City of Wichita to pump at an average day rate of 35.7 MGD and a maximum day rate of 78.1 MGD. Existing pumping and pipeline facilities are capable of delivering 65 MGD to the treatment plant with the current hydraulic configuration. Prior to 1993, the City obtained about 60 percent of this water from the Equus Beds Well Field to meet the water demand; in 1994 the City decreased Equus Beds groundwater use to 40 percent and increased the use of surface water.

The 16 existing wells in the Local (E&S) Well Field pump alluvial water from the Arkansas and Little Arkansas rivers within the city limits of Wichita. These wells were originally constructed in 1949 and 1953. Current water rights allow the City of Wichita to pump wells within the Local Well Field at an average day rate of 5.8 MGD and a maximum day rate of 37.1 MGD.

During the 1950's drought, the Department developed several wells 22 miles northwest of the City of Wichita along the Arkansas River, which were referred to as the Bentley Reserve wells. Six wells were constructed in 1956 to provide a maximum of 13 MGD of additional water during a drought. Water produced from these wells was high in chlorides; the wells were subsequently abandoned due to poor water quality and the water rights were dismissed.

Cheney Reservoir was built in the early 1960's as an additional water supply for the City of Wichita. It was built in cooperation with the U.S. Bureau of Reclamation (Reclamation). The City of Wichita currently has water rights for an average day rate of 47 MGD and a maximum day rate of 120 MGD. The reservoir was originally designed to

[3] *Water rights* – Kansas Department of Agriculture, Division of Water Resources administers water rights in Kansas and permits annual quantities and the maximum rate of diversion.

provide a firm yield[4] of 47 MGD, however, several years of severe drought in the 1950's caused Reclamation to recalculate the firm yield at 38.2 MGD. In 1998, the City of Wichita procured a second reevaluation and that yield study determined a firm yield of 43.7 MGD. The City expanded the Cheney Reservoir pumping station in 1996 so that a firm pumping capacity of 80 MGD could be attained. Additional water can be pumped when lake levels are higher than an elevation of 1,420 ft mean sea level. The total pumped from the Equus Beds and Cheney Reservoir is restricted to 92,638 acre-feet/year. Prior to 1993, the City used about 40 percent surface water from Cheney Reservoir to meet the water demand; then in 1994 the City increased use of Cheney Reservoir surface water to 60 percent.

The American Waterworks Company, a private entity, constructed the City's original water facilities in 1886. The City constructed the Water Treatment Plant in 1940 and purchased the distribution system in 1957. The treatment plant was expanded in 1995 and currently has a maximum day production capacity of 160 MGD.

Pipelines of various diameters deliver water from the three current water supply sources to the Water Treatment Plant (Figure 1-3). Water pumped from the Equus Beds is transferred to the treatment plant through 48-inch cast iron and 66-inch concrete pipelines that are connected via cross-ties. Water is pumped from Cheney Reservoir to the treatment plant via a 60-inch diameter concrete pipeline. Water pumped from the Local (E&S) Well Field is transferred to the treatment plant through a 24-inch pipeline. Hydraulic capacities for the existing raw water pumping, transmission and treatment facilities are listed in Table 1- 1.

Table 1-1 Facility Capacities

Facility	Existing Capacity	Maximum Capacity
Cheney Reservoir Raw Water Pump Station	80 MGD	80 MGD
Cheney Reservoir Raw Water Transmission Piping	80 MGD	80 MGD
Equus Beds Well Field/Transmission Piping	65 MGD	72 MGD
E&S (Local) Well Field/Transmission Piping	30 MGD	30 MGD
Water Treatment Plant	160 MGD	160 MGD

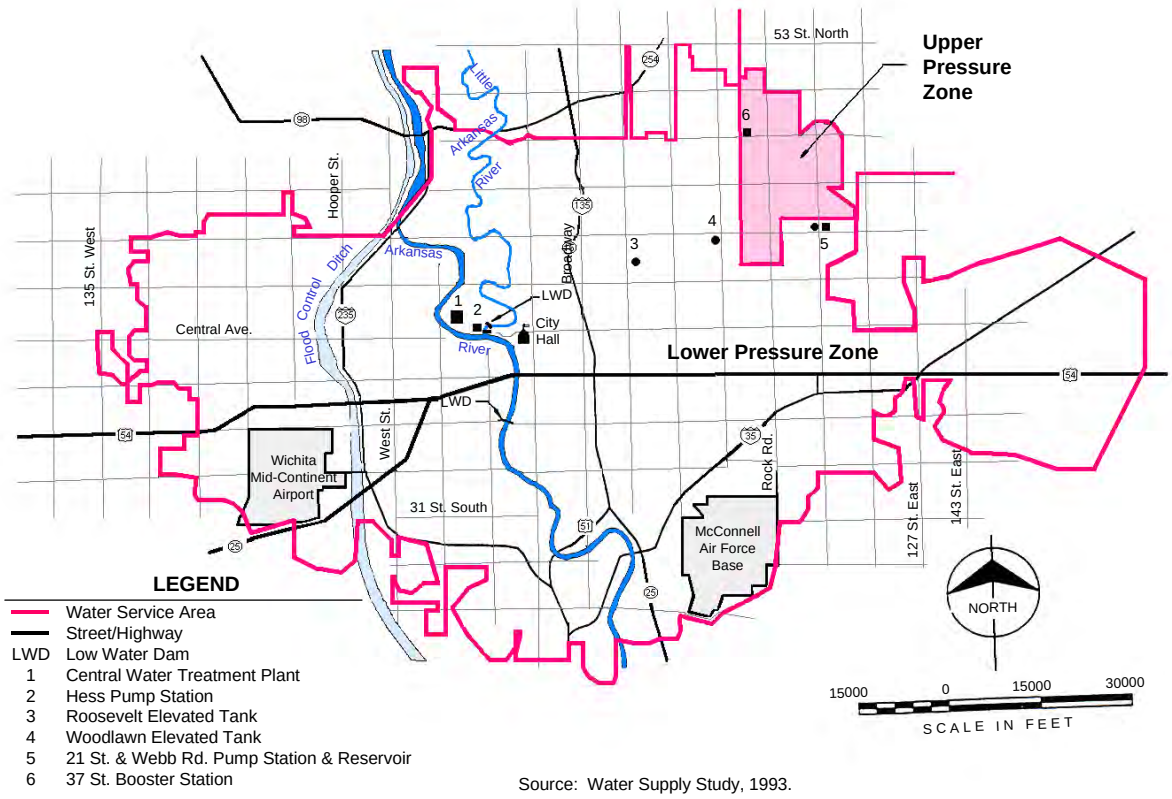
The City's current water delivery system transports water from the Water Treatment Plant to pumping stations and storage tanks throughout the Wichita metro area (Figure 1-4). The Hess Pumping Station is the primary facility distributing water to the Service Area. It is located adjacent to the treatment plant. The Hess Pumping station contains eight pumps which have a total pumping capacity[5] of 236 MGD and a firm capacity[6] of 200 MGD. Other pumping

[4] *Firm yield* - yield of reservoir during most severe drought of record.

[5] *Total pumping capacity* – summation of capacity with all units working.

[6] *Firm capacity* – capacity with largest unit out of service, in large number of units – 10% out of service for planning purposes.

Figure 1-4 Existing Water Distribution System Major Components



Source: Water Supply Study, 1993.

stations are located in the northeast portion of the city to maintain adequate water pressure and accommodate peak day demand. There are also two above ground storage tanks. One storage reservoir is also located in the metro area (Figure 1-4).

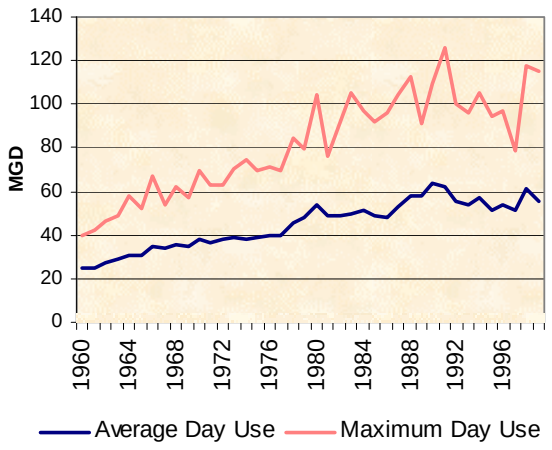
1.3.2 HISTORIC WATER USE

Water use varies by year and throughout the year, with peaks typically occurring during the summer. Long-term climatic cycles are the major determinant of annual water usage, while short-term climatic fluctuations affect the peak demand in a given year. Figure 1-5 shows the historical water production for the City of Wichita in terms of average daily and maximum daily production for the Department's service area from 1960-1999. The maximum amount of water used in one day is a key factor in determining water production requirements.

Average daily usage between 1960 and 1996 has ranged from a low of 24.9 MGD in 1960 to 64.2 MGD in 1990 (Figure 1-5). The peak water use day was in 1991, at 125.7 MGD. The peak demand would have been higher if not for the City implementing watering restrictions. This was due to a limited available supply caused by deteriorating physical conditions of the Equus Bed wells. Physical repairs and replacements to the Equus Bed wells were completed between 1992 and 1998. The maximum daily use in 1998 was the second highest on record at 117.4 MGD. In 1989, the total pumpage and average daily use were the third highest levels on record. Average daily and maximum daily demands show increasing trends over the

36-year period of record as population and customers increased.

Figure 1-5 Historical Water Use



Review of annual usage from 1970 to 1998 shows Groups I and II have been steadily increasing. Since 1970, unaccounted-for water[7] (UAF) ranged from 0 percent to 12 percent. Percentages below seven percent are considered not easily attainable and are caused by inconsistencies associated with reading meters every two months and other data collection/entry errors. The City staff believes that a realistic range for UAF is 11 percent to 13 percent. Since July 1992, meters are read on a monthly basis. Meter rehabilitation and replacement programs began in 1970 to help reduce UAF. As a result the UAF has declined to 8 percent since enactment of these programs.

The City has completed annual leak detection surveys since 1991. One hundred to 225 miles of pipe are surveyed each year. Also, water treatment facilities are operated to minimize water losses through recycling of the water used to clean filters and screens and other water treatment processes.

The City uses public awareness and education programs to encourage water conservation practices. These include local talks to school children, water conservation booths at various local events, development of demonstration projects in landscaping irrigation, and radio and TV commercials. In addition the City also uses an inverted rate structure to promote water conservation, which is discussed further in Chapter 2.

1.3.3 PROJECTED DEMAND

Estimating future water demand depends on the number of anticipated users, their consumption pattern, and efforts to reduce consumption through conservation. This section provides the basis for the projection of water demands through 2050 for the City's expanding service area. The year 2050 provides a 50-year planning horizon for the City.

Future demands for water were based on several sets of population projections.

1.3.3.1 Population and Customer Projection

The City of Wichita's water service area is slightly larger than the city limits of Wichita and smaller than Sedgwick County and the metropolitan statistical area. Population data for the City includes the area defined by the city limits. Population data for Sedgwick County includes the area defined by the

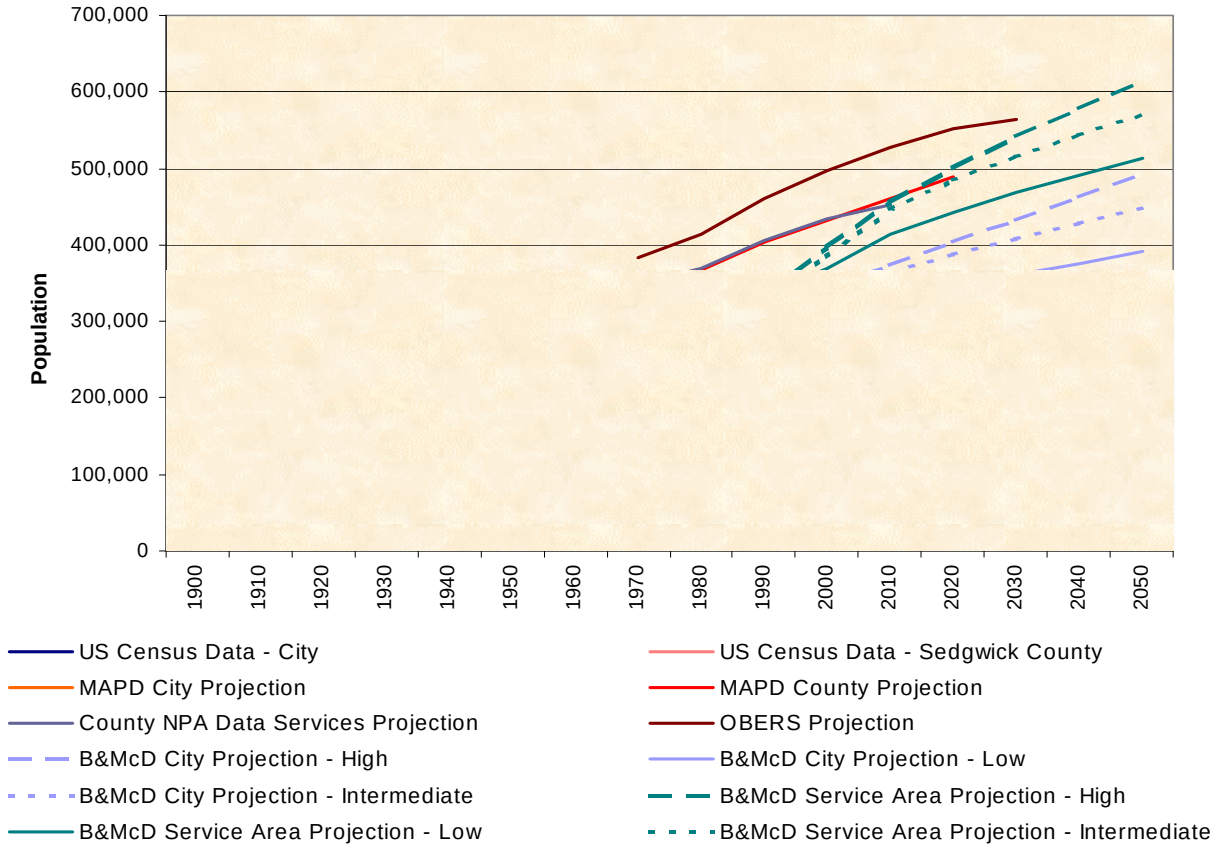
[7] *Unaccounted-for water* - treated water that is lost in the system because of pipe leakage, inaccurate meters and unaccounted-for uses.

county boundary. Population data for the statistical metropolitan area includes the City of Wichita, in addition to the remaining areas in Sedgwick County and adjoining Butler County. Population projections for the water service area were developed from U.S. Census Bureau data, Wichita water department customer data, U.S. Department of Commerce – Bureau of Economic Analysis (OBERS) data, Wichita-Sedgwick County Metropolitan Area Planning Department (MAPD) studies and engineering studies by others (Figure 1-6). Projections include consideration for the availability of land, water, and sewer systems, current and future transportation plans, zoning, area topography, and socioeconomic factors.

Estimating future water demand depends on the number of anticipated users, their consumption pattern, and efforts to reduce consumption through conservation.

According to the 1990 U.S. Census, the total population of Sedgwick County was 403,662. That total represented an increase of 37,131, or 10 percent, from 1980. Population growth nationally from 1980 to 1990 was 9.8 percent. During

Figure 1-6 Population Projections



the same time period the 1990 population for the City of Wichita was 304,011, up 24,739 from 1980 U.S. Census estimate, an increase of 8.9 percent. Future demands for water were based on several sets of population projections. MAPD, a technical planning assistance agency serving the Wichita metropolitan area in Sedgwick and Butler counties, prepared one set of projections. These projections were developed considering birth, death, and migration rates. The population in 2020 for the City of Wichita was predicted by MAPD to be 365,688, and for Sedgwick County, 489,363.

Burns & McDonnell (1997) developed population projections through the year 2050 for the City of Wichita and its service area (Figure 1-6). These projections were developed at high, low and intermediate estimates. High range estimates were developed using a linear regression of population data from 1950 to 1990, and low range estimates were made using data from 1960 to 1990.

An OBERS (1985) population projection for the statistical metropolitan area for the year 2035 is 574,200 (Figure 1-6). Evaluations of the upper and lower range estimates (Burns & McDonnell 1997) with the OBERS projection, MAPD (1996) study, and projections by other studies, show the population increasing by an average of 3,000 people per year (1,280 residential connections) to the year 2015 and then by 2,000 people per year (910 residential connections) from 2016 to 2050. This projection would result in a year 2050 city population of about 448,000.

In addition to the City of Wichita's residential population, the projected service area also includes existing and anticipated wholesale customers and individually metered customers outside the city limits. Figure 1-7 shows the projected population growth for the wholesale and individually metered customers outside the city limits (existing wholesale category) increasing from approximately 31,000 in 1990 to 54,000 in 2050.

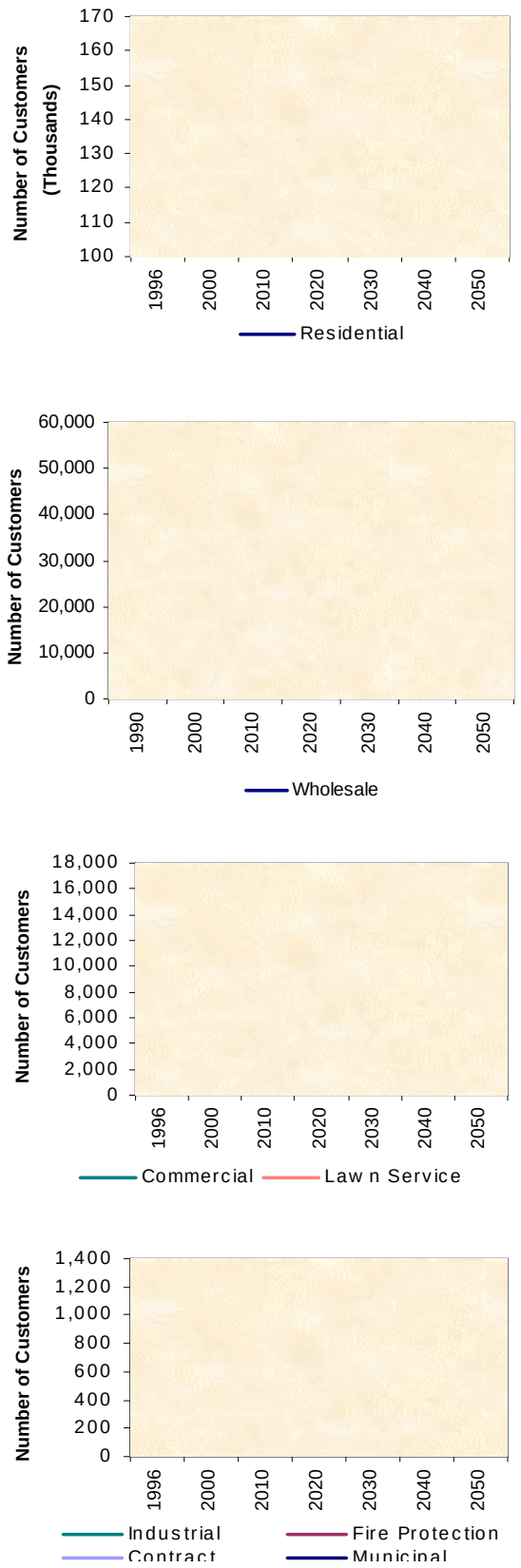
Anticipated wholesale customers include additional town/areas in Sedgwick County not currently served by the Department's water system. These areas include Mt. Hope, Andale, Cheney, Garden Plain, Goodard, Clearwater, Haysville, and Derby (Figure 1-2). Connection of these customers to the system would add about 68,000 people to the year 2050 projected service area.

The City developed a service area customer and water usage projection computer model to help forecast the number of customers, usage and water conservation savings by customer class to the year 2050. Historical data included in the model from 1970 to 1996 shows recent trends in customer growth, gallons per meter day usage, and average day and maximum day usage. Customer data from 1970 to 1996 used in this analysis and customer projections by the model are shown in Figure 1-7. Residential customers are expected to increase between 1996 and 2050 by approximately 56,200, or about 52 percent. Total customers are expected to increase during the same time period by approximately 63,918, or about 51 percent.

1.3.3.2 Water Projections

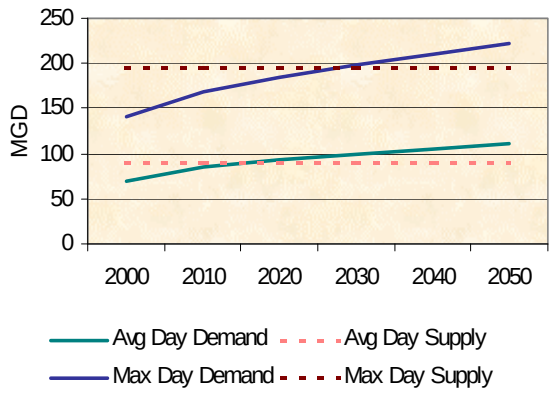
A review of the existing water supply sources, and water delivery and treatment facilities showed that sufficient firm capacity was present to meet average daily demands to the year 2016

Figure 1-7 Customer Projections



(Figure 1-8). Shortfalls in meeting maximum daily demand are expected in 2026 (Figure 1-8).

Figure 1-8 Projected Water Needs



According to industry standards, water sources and water supply facilities such as intakes, wells, and treatment plants should be sized to supply the customers' anticipated maximum daily demand. Without reliable water supply sources and facilities capable of meeting the maximum daily demand, water deficits would occur, resulting in low system pressures, inadequate flows for fire fighting, and inadequate supply for drinking and other purposes.

Average Day Demand. Projections of average day demand were based upon projected population estimates of the residential portion of the service area to the year 2050 multiplied by the projected gallons per meter-day for year 2050. Gallons per meter-day was used in place of gallons per capita-day as a means of estimating changes in consumption resulting from population changes because of the number of classifications within the City's water systems. Average

meter use was projected to increase to 300 gallons per meter-day in 2050, up from 223 in 1996. Customer growth was based on an average of 1,040 new customers per year between 1997 and 2050. Approximately 1,280 new customers per year are expected between 1997 to 2015 and 910 new customers per year between 2016 to 2050.

Based on a conservation goal of 16 percent, the average day usage in year 2050 would be 112 MGD and the maximum day usage would be 223 MGD.

Table 1-2 illustrates the total average and maximum day projected use in 2050 with and without water conservation for the service area. Projected demands include water for residential, commercial, wholesale customer classifications and unaccounted-for water.

Maximum Day Demand. As indicated above, a reliable water system should be capable of meeting maximum day demand to provide an adequate water supply essential for public services related to health and human safety (i.e. firefighting and sewage treatment). Projections of maximum day demand for residential customers were based upon multiplying demand factors of 2.14, 2.0, and 1.8 representing no conservation level, low conservation level and high conservation level respectively, by the projected average day demands. A value of 2.0 was used for planning purposes. Demand factors are the ratio of a specific year's highest maximum day use to annual average day use. The maximum day water demand was intentionally controlled by the Department in 1990 and 1991 through water restrictions and limited pumping of water to water plant storage. Table 1-2 shows the maximum day water demand projections with and without water conservation.

1.3.4 WATER CONSERVATION MEASURES

One factor that can affect water demand is conservation. The degree of water conservation achieved is influenced largely by the amount of emphasis a city places on water conservation, including enforcement activities during dry periods. Two levels of conservation are considered in this study for planning

Table 1-2 Average and Maximum Day Water Demand Projections

	Estimated Service Area	Avg. Day Demand (MGD) Conservation Level			Max. Day Demand (MGD) (2.0 factor) Conservation Level		
Year	Population	None	Low	High	None	Low	High
2000	385,694	88.0	70.4	57.6	176.1	140.9	115.1
2010	445,652	101.2	84.6	70.4	202.3	169.1	140.9
2020	484,825	110.9	92.8	77.8	221.7	185.5	155.6
2030	516,080	118.6	99.4	83.8	237.2	198.8	167.6
2040	543,760	126.0	105.7	89.4	252.0	211.3	178.9
2050	570,260	133.0	111.6	94.7	265.9	223.1	189.5

purposes, a low range and a high range. The low range conservatively estimates potential savings from conservation activities and more closely reflects case studies by other cities (Lehman, 1991 and Featherstone, 1991). The high range estimates potential savings from conservation activities based on theoretical values.

Low range water conservation is anticipated to reduce demand by approximately 16 percent while high range conservation is anticipated to reduce demand by approximately 29 percent. Literature on water conservation indicates that 15 percent conservation is an obtainable goal for most cities and could be a reasonable goal for the City of Wichita (Schlette, 1991). Based on a conservation goal of 16 percent, the average day usage in year 2050 would be 112 MGD and the maximum day usage would be 223 MGD.

Programs Currently in Use. The City has implemented a variety of conservation measures, such as limiting lawn watering to two days a week during drought conditions, conducting leak tests, and repairing or replacing meters on an eight-year basis. There are also a variety of public awareness and education programs in place to promote water conservation to consumers. The City gives talks to students approximately once a month or 12 to 15 times a year on water conservation. Water conservation booths are presented at the Home Show each year, as is an interactive booth with display boards at the yearly Earth Day Celebration. The City also provides brochures and articles for local newspapers. Currently under construction is a water well interpretive area to teach people about groundwater. In addition, the City has prepared radio and television commercials and has sponsored local events such as the Drum and Bugle Corp. The City continues to encourage local industries to implement conservation measures.

An inverted water rate structure was initiated January 1, 1993. This rate structure system is designed to encourage water conservation by providing lower water costs to customers using less water. These potential water savings would be considered economically significant to the City of Wichita. In order to obtain significant reductions in customers' annual water use, and more efficient use of Wichita's water resources, the Director of Water and Sewer is empowered to negotiate and execute contracts with retail customers which provide for a significant annual water savings by customers in return for charging all water use at the retail volume conservation contract rate. Customers seeking to qualify for the conservation contract rate must make written application detailing methods to conserve water, time frame for implementing methods, and the expected annual water savings. Each year, customers report the results of their conservation initiatives. If the goals were not met then the customer must reconcile charges for the proportion of the customer's prior year total annual consumption volume that did not qualify

for the conservation rate. Customers exceeding their water conservation goals may use such excess savings as credit toward the next year's water savings goal.

Programs to be Implemented in the Future. Programs under consideration in the future include methods to encourage the recycling and/or treatment and reuse of various industrial and municipal wastewaters in nonpotable reclaimed water systems. Such reclaimed water could be used in cooling, irrigation, or other operational systems where potable water quality is not required. The use of zero liquid discharge water management systems (systems where water is reused over and over and not discharged into the waste stream) in industrial complexes to supplement available water supplies is another method available to conserve water and to reduce or eliminate liquid waste streams.

Conservation at the consumer level essentially consists of continuing to encourage more efficient use of water. For domestic consumers, this may be achieved by promoting use of flow-restricting faucets and showerheads, reducing toilet tank capacity, or restricting lawn watering or car washing activities. For commercial and industrial consumers, water conservation may be achieved by optimizing product or process water and cooling water, reducing landscape watering, recycling or treating and reusing waste streams, and installing more efficient sanitary waste handling facilities.

Regulation and enforcement efforts would also be needed for an effective water conservation program. Revisions to local building and plumbing codes, requiring installation of water conserving devices, has proven helpful in reducing use whenever new water/sanitary fixtures are required. In critical water shortage situations, prohibition of outdoor water uses for lawn watering and washing cars and reduction of sanitary water for domestic needs may be required. Enforcement of regulations or restrictions by fines or termination of water service is necessary to assure compliance by all water users.

Some water conservation will occur without specific programs because of federal regulations concerning water pollution control. These programs, which may require industrial wastewater pretreatment before discharge to the municipal sewer system, will promote industrial water recycling, treatment and reuse because of economic conditions which influence the relative cost of water and wastewater treatment.

The City of Wichita has a water supply emergency plan in the event the demand for water is greater than what the City can provide. This plan has three levels, water supply watch, warning or emergency and the implementation of voluntary and mandatory water conservation measures. There are five classes of water use, they are:

- **Class 1** - Lawn and turf grass irrigation, except for those plantings and areas included in Class 2; refilling fountains not using re-circulated water; and washing driveways
- **Class 2** - Outdoor watering, either public or private, for trees, shrubs, plants, new planting of lawn and turf grass, green and tees for golf courses, swimming pools or other recreational areas; or the washing of motor vehicles, boats, trailers, or the exterior of any building or structure

- **Class 3** - Any commercial or industrial, including agricultural, purposes; except water necessary to maintain the health and personal hygiene of bona fide employees while such employees are engaged in the performance of their duties at their place of employment
- **Class 4** - Domestic usage, other than that which would be included in either Classes 1 or 2
- **Class 5** - Water necessary only to sustain human life and the lives of domestic pets and maintain standards of hygiene and sanitation

Should the city council or city manager determine that conditions indicate the probability of a drought or other condition causing a major water supply shortage, they shall declare that a water watch exists and take steps to inform the public and ask for voluntary reduction in water use. Should conditions indicate supplies are starting to decline, the city council and city manager shall declare that a water warning exists and establish mandatory restrictions on Class 1 water usage and voluntary restriction on Classes 2 and 3. If conditions continue to deteriorate, the city council or the city manager shall declare that an emergency exists and may impose mandatory restriction of Classes 1, 2, 3, and 4 water uses.

1.3.5 PROJECTED WATER REQUIREMENTS

Based on the information presented earlier in the chapter, water supply deficits will occur in the City of Wichita as follows in Table 1-3.

1.3.6 SUMMARY OF SYSTEM NEED

Net water needs (Table 1-4 and Figure 1-9) are the total water demand projections less the firm yields of potential water supply source alternatives. Based on 100 percent utilization of existing and pending water rights and a firm yield of Cheney Reservoir of 43.7 MGD, the year 2050 net need is approximately 22 MGD for the average day and 28 MGD for the maximum day. Based on firm yield, an average day usage deficit would occur about the year 2016 and the maximum day usage deficit would occur about the year 2026 (Figure 1-9).

Table 1-3 City of Wichita Water Supply Deficits

		Year Deficit Occurs
Existing Pumping Capacity:		
Average Day	91 MGD	2018
Maximum Day	182 MGD	2018
Water Rights:[1]		
Average Day	88.4 MGD	2026
Maximum Day	235 MGD	2045
Potential Pumping Capacity:[2]		
Average Day	90.0 MGD	2016
Maximum Day	194.4 MGD	2026

Notes:
[1]Based on full utilization of existing and pending water rights
[2]Based on firm capacity of Cheney Reservoir of 43.7 MGD.

1.4 DECISION TO BE MADE

The decision to be made by the City of Wichita Water and Sewer Department is whether to implement a:

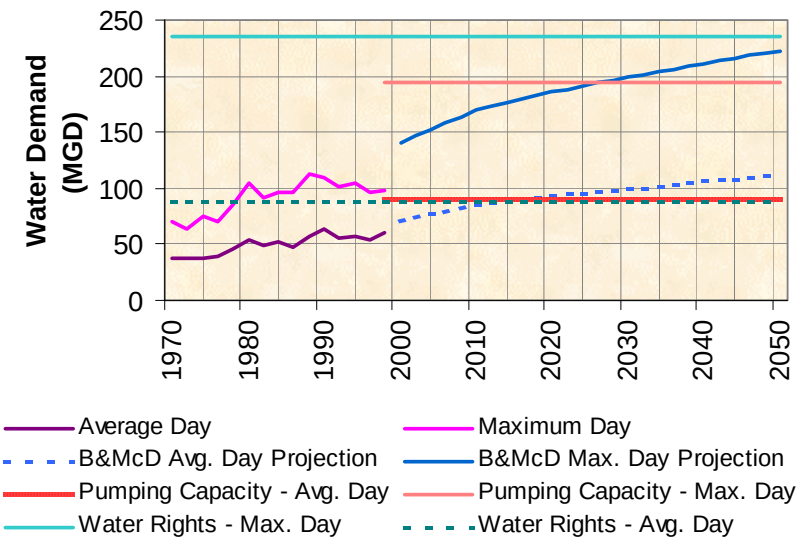
- Integrated Local Water Supply Plan with 150 MGD Capacity
- Integrated Local Water Supply Plan with 100 MGD Capacity
- Continued water conservation program and system upgrades on an as need basis (No-action alternative)

Table 1-4 Required Net Water Needs

	Water Rights		Existing Pumping Capacity		Potential Pumping Capacity	
	Avg. Day (MGD)	Max. Day (MGD)	Avg. Day (MGD)	Max. Day (MGD)	Avg. Day (MGD)	Max. Day (MGD)
Project Year 2050 Usage w/Low Range Conservation	112	223	112	223	112	223
Existing Supply Sources[1]	-88	-235	-78	-130	-79	-171
Net Need Subtotal	24	0	34	93	33	52
Undeveloped Available Sources[2]	-11	-24	0	0	-11	-24
Required Net Need	13	0	34	93	22	28

Notes:
[1]Existing supply sources include Cheney Reservoir, Equus Beds Wells, and Local (E&S) Wells.
[2]Undeveloped available sources include additional supplies from Cheney Reservoir up to a firm yield of 43.7 MGD.

Figure 1-9 Projected Water Use With Conservation



1.5 SCOPE OF THE ENVIRONMENTAL REVIEW

The National Environmental Policy Act (NEPA) of 1969 is the nation's charter for protecting the environment and establishes the nation's environmental goals and policies. It requires federal agencies to take into consideration the environmental consequences of proposed actions in the decision-making process. Regulations developed by the President's Council on Environmental Quality (CEQ) implement NEPA (40CFR 1500-1508, 1978). The CEQ regulations require that an EIS provide a detailed written statement as required by section 102(2)(C) of the Act.

This EIS identifies, describes and evaluates the potential environmental impacts that could result from the proposed actions, as well as possible cumulative impacts. The EIS also identifies environmental permits relevant to the proposed action. The EIS describes, in terms of a regional overview or a site-specific description, the affected environment and environmental consequences of the action. Finally, the EIS identifies mitigation measures to

prevent or minimize environmental impacts.

The biophysical resources identified for the study areas are: air quality; biological, cultural, earth, water, socioeconomic, recreational, and visual resources; infrastructure/utilities; hazardous materials; and land use.

The baseline conditions used in this EIS will be the affected environment as it existed in 1997. If data is not available for 1996, information will be a 12-month period as close as possible to 1997. Calendar year 1992 may reflect the baseline conditions for some resources.

Public involvement has been emphasized throughout the development of this EIS. In order to disseminate project information to the public and solicit public participation, numerous public meetings were held in the area of the proposed project.

Over the past five years, while the Department has developed the Integrated Local Water Supply Plan (ILWSP) and implemented an Equus Beds Groundwater Recharge Demonstration Project, the public and government agencies have been kept informed through public meetings, tours, press releases, monthly and annual progress reports, project reports, and formal agency consultations. In early October 1997, through published and broadcast public notices, press releases, and direct mail, the Department invited the public and federal, state, and local agencies to participate in the scoping process for the ILWSP's environmental document.

Three public meetings were held on October 20, 21, and 22, 1997 in Wichita, Cheney, and Halstead, Kansas, respectively, to solicit input on the scope of the environmental document. A total of 36 individuals attended these meetings. Attendees had the opportunity to view displays about the proposed plan and the framework for the environmental document; ask questions about the plan with knowledgeable representatives from the Department and the Department's design and environmental consultant; and register their comments and suggestions concerning the proposed plan and the environmental document. The public was also invited to submit written comments by mail or fax by November 22, 1997.

Three similar meetings were held for cooperating government agencies. The first meeting was held in Wichita on October 21, 1997 and was attended by representatives of Reclamation, the Kansas Corporation Commission, the Kansas Department of Agriculture-Division of Water Resources, the Kansas Department of Health and Environment (KDHE), the Kansas Water Office, Groundwater Management District No. 2, and the Sedgwick County Conservation District. The second meeting was held in Kansas City, Missouri on November 5, 1997 and was attended by the U.S. Environmental Protection Agency (EPA), the U.S. Geological Survey, and KDHE. The third meeting was held in Emporia, Kansas on November 6, 1997 and was attended by the U.S. Fish and Wildlife Service (FWS) and the Kansas Department of Wildlife and Parks (KDWP). Agency representatives provided initial comments at these meetings and were requested to submit written comments by November 22, 1997.

1.6 APPLICABLE REGULATORY PERMIT REQUIREMENTS

Based on discussions with the State of Kansas, Division of Water Resources,

surface and groundwater water rights could possibly be issued to the City with conditions, allowing the use of preset quantities of water from groundwater and surface water sources. Such a permit would allow the City to manage the operations of its water supplies to maximize use of runoff from surface water sources with accompanying groundwater recovery and storage until needed during drought conditions. Permits, such as state and federal permits, will be identified during implementation of the proposed action; the City will coordinate the action for the permit(s).

1.7 ORGANIZATION OF THE DOCUMENT

This EIS contains six chapters and four supporting appendices. Chapter 1 is a statement of the purpose of and need for action; identifies the location of the proposed action; states the decision to be made and the decision maker; summarizes the analysis process; lists the applicable regulatory requirements; and describes the organization of the EIS. Chapter 2 provides alternatives selection criteria and alternatives considered including the no-action alternative; describes the proposed action; describes the no-action alternative; details other action alternatives; summarizes the environmental impacts; identifies the preferred alternative; and lists mitigation. Chapter 3 is a general description of the biophysical resources that the proposed action and alternatives could potentially affect. Chapter 4 is an analysis of the environmental consequences of the proposed action and alternatives. Chapter 5 discusses the public involvement, agency coordination, issues identified during scoping process, lists the preparers and other contributors of the document. Chapter 6 is a list of source documents relevant to the preparation of this EIS. Appendix A is a discussion of the alternative screening process including criteria used and water supply sources considered; Appendix B is a biological assessment; Appendix C is a discussion of the Operations Model developed for the ILWSP. Appendix D is the scoping summary.