

DR 71-20 - Extension of Water
Services to Other Communities
by City Manager

ACTION

DATE

COMMITTEE

M.A.P.C.

B.C.C./B. CO. C.

Approve

4-22-71

- Strom: 1. ~~Set~~ Will later receiving H_2O continue to have to receive "[?]
~~Porter~~
Wady- 2. Contract to require H_2O to be accepted as treated by
Wash. -
-

Augusta - Endorse policy with minor exceptions to conditions
Assume cost for line extension to be Augusta's
240/9 ad apt.

May 13, 1971

James Looney, Senior Planner
Robert A. Lakin, Director of Planning

DR 71-20

As a result of the City Commission action Tuesday on our report as to extension of water services to other communities, please develop for me a memorandum which could be submitted to the Manager and the Commission dealing with the assumption and background for consumption rates utilized by Black & Veatch and by you in preparing the water plan report.

Also, please provide any specific thoughts that you may have concerning benefits to be developed by extension of such system, be they social or economic.

RAL:ber

WICHITA-SEDGWICK COUNTY

DATE

METROPOLITAN AREA PLANNING DEPARTMENT

April 16, 1971

TO Wichita-Sedgwick County Metropolitan
Area Planning Commission

FROM Robert A. Lakin, Director of Planning *rlk*

SUBJECT Extension of Water Services
to Other Communities

The City Manager has asked that the MAPC recommend a policy as to the extension of water services to other communities. He has asked that this be a matter of study and recommendation by the MAPC.

In recent months the City of Wichita has been approached by the City of Andover and others relative to the City of Wichita furnishing them with water service. Previously the City of Wichita has agreed to furnish water (with the Planning Commission's concurrence) to Rural Water District #1 lying north-northeast to the City of Wichita. Within the last year there was a discussion between the City of Goddard and the City of Wichita relative to water service. This resulted in Goddard developing their own system. Also, there have been overtures to our staff concerning water to additional rural water districts lying south and southeast of Wichita. Without a water plan completed, recommendations may be somewhat preliminary and tentative and should be subject to further evaluation and revision as the plan progresses and additional public discussion is held on the plan.

Several elements should be considered in arriving at a policy. Since the Wichita Water Department is a utility operation, it is assumed that its operation will continue to be financed and operated on that basis. It is further assumed that the residents, business and industrial users of Wichita should not be expected to subsidize other communities in any way, if provided water service.

Economies in Scale and Elimination of Duplication of Service

In dealing with utilities, particularly water as well as electrical, gas and others, it is generally conceded that economies of scale can be experienced where single or unified systems can be developed. This may not always hold true of sewer service because of the nature of the system being basically gravity flow oriented and dependent on topography. Water and other types of utilities are not so restrained by topography and can be developed to serve wide areas within a given geographical base. Although the distribution systems perhaps can be developed separately for independent jurisdictions and locales, the problem

of developing an adequate water supply source is a considerably more difficult problem. Unless developed on a unified basis one usually finds local communities and taxing districts competing with each other for rights to the water resources, or duplicating facilities (transmission lines, purification facilities, etc.). Because of the way this particular part of Kansas is developed as opposed to many of the urban and metropolitan centers, we have not had three or four more cities trying to build pipe lines out of Cheney Lake or out of the equus beds areas to the cities. Although the Cities of McPherson, Newton and others do draw from the equus beds fields, Wichita is the only major user in this area. Also, Wichita has the only major and dependable sources in the area. Thus, the treatment facilities and the major pipe lines required to carry the water from its source to the users can best be accommodated at a large scale rather than many independent and separate lines. For these reasons alone, it would seem apparent that the City of Wichita should consider providing water service to other communities, providing, however, that overall community and regional goals can be met and maintained.

Annexation Policies and Service Policies - City of Wichita

For a number of years the City of Wichita has maintained the "One Wichita" annexation policy which provides that annexation should occur when an area is developed to urban scale or is in proximity to the community or is using urban services or is needed in order to provide other areas with basic services, such as water, sewer, etc. This policy has been followed and should result in the City of Wichita annexing those areas which are provided with standard municipal type services, if water and sewer are extended into designated growth areas beyond existing corporate boundaries.

In the 1950's the City of Wichita had a different position. They refused to extend services to outlying areas for one reason or the other. The net result was a multiplicity of water and sewer districts, each with their own independent well source and treatment facilities, elevated tanks, etc. Often the system was substandard or built to a standard that was not compatible with the Wichita system which ultimately took it over. As a result, practically the only remaining facilities that are still in use are the mains and laterals lying within the streets. Even these in many instances are substandard as to what the City of Wichita would have installed had it been making the initial installations. All of the water supply sources, the treatment facilities, such as chlorinators, etc., have been abandoned, fire hydrants changed, and in most instances the water towers and storage tanks removed because they were not compatible with the Wichita system. However, the City of Wichita still had to purchase these facilities at a fair cost and at best had to assume the remaining bond and

interest obligations issued by these improvement districts for those facilities. The net result is that this was simply a loss incurred by the Wichita utility system as a result of annexation.

Potential Problems of Service to Other Communities

Supply
One of the problems that relates to providing outside service to another community is that once a service is provided you are obliged to continue that service as long as the subscriber wishes it. Thus, if a decision is made to provide the service to another city such as Andover, the long term effects must be determined so that the service to the citizens of the City of Wichita, the basic supporter of that system, are not deprived or hurt by that action.

For Andover alone, based on population, use rates, and fire protection requirements, the average gallons per day, plus fire flow, would be 650,000 in 1970 and increasing to 2 1/2 million gallons per day by 2000. Maximum day uses would be even higher. Based on a firm yield of 128 million gallons per day of the Wichita system, this would be 0.58% in 1970 and 2.3% in year 2000. Of the treatment capacity of Wichita (84 m.g.d.) this would be 0.9% in 1970 and 3.5% in year 2000.

If one were to speculate on who else might want Wichita's water by year 2000, one might expect to find the following:

City/Impr. Dist.	1970 Pop.	2000 Pop. (Est.)
Andover	1,880	6,400
Augusta	5,977	8,975
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Totals	35,373	61,538

Potential for untreated water service might be in Mt. Hope, Andale, Colwich, Maize, Garden Plain and Cheney. However, this

is more doubtful and in any event is dealing with less critical factors in terms of yield as opposed to treated water capacity. Taking the potential of population and the same procedure for estimating demand, other cities may require as much as 6.3% of yield and would be 9.7% of treatment capacity availability by 2000. Maximum use days, however, would overtax existing facilities if these types of add-ons, plus Wichita's growth, were all on the system.

However, the City by itself should be developing new water sources, transmission lines, pumping capacity, treatment facilities and storage capacity before the above becomes critical. The proper response is to have agreements such that those who purchase water adequately support the cost of these future improvements which they will have caused the City of Wichita to make new capital investment ahead of when it would ordinarily have to do so.

Secondly, there is a concern that if water supply and other services are furnished other cities, they will become as competitive or perhaps more competitive than Wichita and its urban fringe in terms of securing additional tax base through additional development. It is doubtful that this will be true over a long period of time. Any of the cities which are now growing or will grow at a rapid rate and thus which would need Wichita services are incurring the same type of growth pains as is Wichita. This will be true not only for city but for school and other governmental services. They will in all probability have a tax rate equal to or higher than that in the Wichita area.

Because of the inability to project accurately tax base of the many cities and the arguments that all cities if they furnish comparable services will have similar tax rates would result in the assumption that one city will not acquire a substantially different competitive position over any other. Further, the City of Wichita with its City Manager system should remain both efficient and more attractive because of the range of services, housing, and amenities, thus, it should be one of the strongest of competitors itself.

In this regard, all units of government will come to recognize the good of working together as city limit lines are too fragile to restrain the dynamic consequences of urban growth. Basically, an assist to the well being and growth of the region is an asset to all.

Urban Sprawl

The third concern and most critical in my opinion is the potential for using the investment of capital facilities as a method

of guiding growth and carrying out the Comprehensive Plan. It is suggested that the dollar investment in roads, utilities, and public facilities is a far greater determinant in shaping the growth and form of the City than is the use and enforcement of zoning regulations or subdivision requirements. Thus, if the City pursues a policy of extending its lines in any direction, simply to anyone that will pay the bill, we may gain as to economy of scale as it pertains to the water system but at the same time destroy our very ability to maintain a viable and livable city in terms of supplying necessary transportation facilities, bus service, school, parks and other needed public facilities. If the Commission remains committed to the guided growth concepts, some device needs to be found in order to determine where Wichita will extend lines following its projection of urban growth and what type of controls are needed in order to ensure the attainment of overall growth policies and to prevent sprawl.

If water service is extended east in an area that is basically lacking in good water, this will certainly encourage growth in that area. This is good, as we have indicated that the area to the east and northeast of the community, as well as west, is a proper area for growth. However, based on the population projections that we have made to the year 2000, we do not believe that we will see within that time period the Cities of Wichita and Andover growing together. Thus, the extension of water lines between widely spread points will in all probability lead to what we call urban sprawl. This is the dispersal of development in a scattered and random pattern along that water line. As only a given amount of land will be placed in "production" at a given time for a specific level of population and growth, "sprawl" would rob the potential for orderly growth to Wichita as well as the other communities which may be provided water.

It is not suggested that all should live in Wichita or a city under urban life styles. Some will prefer suburban life or rural living, but let it occur out of the path of urban growth and let it be in such a manner as to limit the demands for services (tax dollars) provided by general government. Sprawl like inner city decay stands for disproportionate expenditures in return for the taxes produced.

reproduce to Recs

April 16, 1971

Wichita-Sedgwick County Metropolitan
Area Planning Commission

Robert A. Lakin, Director of Planning

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Recommendation

It is recommended that as an interim policy subject to revision based on the forthcoming Water Plan, that Wichita provide other cities water provided that the City agrees to:

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April 16, 1971

- 1) Provide a rate structure which will provide no subsidy requirements from the City of Wichita and will provide for periodic review of rate structures to establish such equities.
- 2) A clause which restricts them from providing water to anyone not within their city limits, unless concurred in by the City of Wichita (and on advice by the MAPC).
- 3) Allow no hook-ups outside a city unless a municipal sewer system is available.
- 4) Provide for ~~agreement by ordinance~~ ^{contract} to consolidate in the event corporate boundaries adjoin each other.

RAL:ber

cc: Ralph Wulz, City Manager
Robert H. Hess, Director of Water
James Aiken, Director of Environmental Health
Ray Bruggeman, Director of Public Works
C. L. Perrine, Chairman, Butler County Planning Board
Gene Miller, Mayor, City of Andover

October 27, 1972

Mr. John Mercer
City Manager
City Building
Augusta, Kansas 67010

Dear John:

Attached is a copy of the Planning Commission action on the water line, which was forwarded to the Board of City Commissioners in the spring of 1971. I think this is the type of information you need, however, if additional facts are needed, please let me know.

Sincerely,

Robert A. Lakin
Director of Planning

RAL:ber
Attachment

April 26, 1971

Mr. Ralph Wulz
City Manager
City Building
Wichita, Kansas 67202

Re: DR 71-20 - Extension of Water
Services to Other Communities

Dear Mr. Wulz:

As requested, the Planning Commission has reviewed your request to recommend policy on extension of water service to other communities. Attached is the basic report which was submitted to the Planning Commission for their consideration. The Planning Commission by a unanimous vote has recommended that as an interim policy, subject to revisions based on the forthcoming water plan, that the City of Wichita provide other cities water, provided that the City agrees to:

1. Provide a rate structure which will provide no subsidy requirements from the City of Wichita and will provide for periodic review of rate structures to establish such equities.
2. A clause which restricts them from providing water to anyone not within their city limits, unless concurred in by the City of Wichita (and on advice by the MAPC).
3. Provide for intent to consolidate in the event corporate boundaries adjoin each other.

Respectfully submitted,

Robert A. Lakin
Secretary

RAL:ber
Attachment

cc: Robert H. Hess, Director of Water
James Aiken, Director of Environmental Health
C. L. Perrine, Chairman, Butler County Planning Board
Gene Miller, Mayor, City of Andover

gencies to such planning? And how should they be related to it?

Primary responsibility for the provision of municipal and industrial water supply is properly lodged in local agencies, public or private. State and federal planners have a responsibility to consider meeting the needs of localities in river basin or other wider-area plans and include provisions to meet such needs if this is most appropriate and payment and other requirements can be met. Local agencies, however, in line with their primary responsibility, should feel obligated to inform state and federal planners of their needs, which might best be satisfied by chemical beyond their capacity to undertake.

How local agencies should be related, organizationally, to federal-state

river basin planning is more difficult to state. Just to say that the states will represent local agencies in a commission may not be adequate. The case of the multistate metropolitan areas, for example, metropolitan Washington, most clearly indicates the problem. On the other hand, all local agencies certainly could not be made members of river basin commissions. Some arrangements, through advisory committees or through participation of designated representatives of all basin cities in task forces or committees, would seem now to be the probable means to best solve this representational problem.

The federal-state river basin commission will have to face this problem and work out appropriate solutions. In this they will need the help of water supply industry experts.

Detroit's Metropolitan Water Service— A New Dimension

Gerald J. Remus

A paper presented on Jun. 5, 1967, at the Annual Conference, Atlantic City, N.J., by Gerald J. Remus, Gen. Mgr., Detroit Dept. of Water Supply, Detroit.

A CENTURY ago, Victor Hugo said that no army can withstand the strength of an idea whose time has come. It is now time to recognize that water supply and pollution control are *one* economic problem, and, within limits, *one* administrative and *one* operational job.

Today, the trend is for people, industry, and commercial activity to concentrate in metropolitan areas—the central city and its suburban neighbors. And the trend continues. The prosperity and development of an area can progress only if proper services are provided, not only for present demands, but of greater importance, for future demands that will increase as an area develops. The most important of these services is water supply.

The future water service of an area will be affected by the adequacy and availability of raw supply, and the reliability and protection (pollution control) of the raw supply. It must be recognized that the proper use of this valuable raw product will require more complex, efficacious, and efficient methods of technical operation, financing, and vigorous administrative know-how.

Political Boundaries

The proper development of water service on sound engineering prin-

ciples, requires that it be done without respect for political borders. The growth of metropolitan areas has not resulted in a corresponding centralization of government. In the Detroit area, there are at least 221 active autonomous units of government, and the number is increasing. Water systems' demands of 1967 cannot wait for a 1975 or 1995 modern form of government.

In general, annexation cannot be forced by creating a great thirst in the suburbs. This procedure only establishes that water supply is not functioning as a true utility, but rather is entangled with other governmental functions and cannot stand alone economically.

Thus, the proper development of a water system cannot wait for modernization of government or annexation for the elimination of urban sprawl, or for equalization of wealth between the central city and suburban residents, or for elimination of the habit of diverting water funds in lieu of taxes, or for new political candidates capable of organization, or for other ancillary factors. What must be accepted is that the protection of the raw product is an integral part of the supply, and that a financing and administrative set-up and



an area program all must be developed so that the end result is a true utility.

To get entangled with issues such as: racial imbalance of the organization, creating a civil rights matter, an annexation scrap, or a lag in development, thereby reducing freeboard of extra capacity; or cause the industry to become a political election point; then progress is handicapped, if not halted entirely. A water utility should be concerned only with water supply and the protection of water supply.

antees, and these revenues added to that of Detroit provide the revenue base that supports the bond issues. This method has been well accepted in the investment market, in that we have an "Aa" bond rating. Tax money is not involved, and it is not available.

The water department acts as a wholesaler. Transmission mains are built to the city limits of the suburban communities. Water is sold to them through master meters and the suburban communities distribute the water,

TABLE 1
Population Served

Year	Water Supply			Wastewater Treatment*
	Detroit	Suburban	Total	
1940	1,623,452	389,442	2,012,894	1,600,000
1950	1,849,568	647,803	2,497,371	2,550,000
1960	1,670,144	1,408,056	3,078,200	2,634,000
1966	1,630,000	1,836,300	3,466,300	2,940,000
Estimated				
1970	1,600,000	3,208,000	4,808,000	3,490,700
1980	1,600,000	4,687,310	6,287,310	5,070,050
1990	1,600,000	5,548,100	7,148,100	5,812,950
2000	1,600,000	6,409,100	8,009,100	6,555,850

* The Water Supply and Wastewater Treatment estimated population figures do not coincide because of drainage basin factors.

Detroit's System

Detroit's operation is under the Board of Water Commissioners—four Commissioners representing the City of Detroit and three representing the suburban areas. The Commissioners are appointed by the Mayor of Detroit; the suburban Commissioners are recommended for the Mayor's consideration by the suburban counties.

Financing is accomplished entirely by revenue bonds. Contracts with the suburban districts have revenue guar-

do their own billing, and handle their own distribution system maintenance. The idea of the central city providing both water supply and wastewater treatment for the area had to be developed by educating most of the city officials, as well as their constituents, that this was the most reliable and most economical method of providing the service.

A Master Program

The water department worked very closely with a six-county committee

TABLE 2
Cost of Treatment Plants, Mains, and Wastewater Interceptors

Year	Water Supply	Pollution Control
1940	\$120,102,170	\$ 26,844,940
1945	128,834,940	26,893,849
1950	145,208,697	28,087,020
1955	190,578,262	35,816,863
1960	248,737,774	40,278,722
1965	355,163,943	53,541,449
1966	373,322,475	54,229,733
Estimated		
1970	498,400,000	160,000,000
1975	640,900,000	381,500,000
1980	783,400,000	500,400,000
1985	808,000,000	619,300,000
1990	833,000,000	738,200,000
1995	858,000,000	857,100,000
2000	883,000,000	976,000,000

made up of county supervisors, who collected money from industry, government, commercial establishments, and other utilities, to develop a master program. The National Sanitation Foundation, an organization created by industry, was asked to undertake the study and to develop the basics of the programs—water supply, and wastewater treatment. The National Sanitation Foundation hired a Board of Consultants who reported on the broad concepts of the best way to proceed. The cost of the 1957 water study was \$120,000. The cost of the 1964 sewage study was \$256,000.

The basic recommendation of each study was—"one system," with the Board of Water Commissioners as the operating agency, because some area work had been done by them, and population and rough cost data were developed. Then the water department went to work. The factors of population, financing, costs, and methods were reviewed. A refined action program involving all factors, including rates, contractual obligations, time schedules, and policy was prepared for and approved by the Mayor and Common Council of Detroit, and the Board of Water Commissioners; and on water supply, formally by the Wayne County Board of Supervisors.

The basic factors, actual and projected, that control the Detroit area's development are shown in Tables 1-5.

The data recorded here encompasses the entire operation of providing water for Detroit and 66 adjacent communities, with at least another ten communities under active negotiations—approximately 45 per cent of Michigan's population. On pollution control, sewage is now treated for Detroit and 53 adjacent communities, with another nine com-

TABLE 3
Water Pumpage in Million Cubic Feet

Year	City of Detroit	Suburban	Total
1940	8,317,822	1,756,201	10,074,023
1945	13,849,153	2,085,985	15,935,138
1950	14,667,416	3,524,884	18,192,300
1955	16,368,384	5,956,848	22,325,232
1960	15,227,145	8,389,297	23,616,442
1965	16,302,476	10,962,640	27,265,116
1966	15,902,501	11,729,569	27,632,070
Estimated			
1970	14,400,000	22,457,000	36,857,000
1975	15,000,000	28,397,650	43,397,650
1980	15,600,000	34,338,300	49,938,300
1985	15,600,000	37,342,850	52,942,850
1990	15,600,000	40,347,400	55,947,400
1995	15,600,000	43,351,950	58,951,950
2000	15,600,000	46,356,500	61,956,500

munities under resolution commitments. The number of employees in the water department was 1,381 in 1955. Today it is 1,439. The present rates are shown in Table 6.

Rate Increases

There has been one 12 per cent increase in the water rate since 1949. Under consideration is another increase of less than 15 per cent in order to protect the financial base so that the city can issue the revenue bonds necessary to do the \$198,000,000 worth of construction that is programmed for completion by 1975.

Most of the inflationary factors were overcome by increasing the load and thereby the revenue. The study shows that if we had not developed the additional revenue the rates in Detroit would have had to be at least 41 per cent higher. Detroiters own the system, and they get a dividend quarterly,

TABLE 4
Water Sales

Year	City of Detroit	Suburban	Total
1949	6,621,511	\$ 986,040	\$ 7,607,551
1951	8,116,183	1,478,347	9,594,530
1952	11,110,496	2,354,995	13,465,491
1955	11,846,504	3,943,707	15,790,211
1960	13,199,565	7,052,395	20,251,960
1965	13,363,431	11,532,095	24,895,526
1966	13,251,598	12,340,200	25,701,798
Estimated			
1970	14,600,000	17,485,000	32,085,000
1975	15,500,000	34,500,000	50,000,000
1980	16,000,000	42,000,000	58,000,000
1985	16,500,000	46,000,000	62,500,000
1990	17,000,000	50,000,000	67,000,000
1995	17,500,000	55,000,000	72,500,000
2000	18,000,000	61,000,000	79,000,000

TABLE 5
Net Capital Assets of Water Supply

Year	Depreciated Asset Value	Yearly Net Income	Total Debt
1940	\$118,064,416	\$ 251,885	\$ 66,263,739
1945	115,137,133	1,124,163	59,501,739
1950	118,498,659	3,772,303	58,533,000
1955	147,964,705	3,723,692	73,878,000
1960	160,979,554	4,751,667	77,692,000
1965	245,783,501	5,725,830	120,645,000
1966	257,176,218	6,066,789	124,128,000
Estimated			
1970	324,000,000	11,000,000	199,744,500
1975	403,800,000	15,000,000	290,200,000
1980	485,700,000	20,000,000	359,000,000
1985	492,900,000	25,000,000	297,000,000
1990	491,500,000	26,000,000	210,000,000
1995	491,500,000	26,000,000	210,000,000
2000	485,650,000	28,000,000	37,000,000

not in cash but in the form of lower water bills. The distribution of the revenue dollar is shown in Table 7.

In the development of the system, additional capacity had to be provided. This is being done by constructing a basic 1.2 bgd station approximately 50 mi from Detroit, with an intake in Lake Huron. This is under way.

Lake Huron Plant

The purpose is to extend designed basic capacity by 1.2 bgd.

1. First section—400,000,000 gpd basic production rate, and 600,000,000 gpd maximum.
2. Tunnel length—31,000 ft, approximately 26,000 ft under Lake Huron.
3. Tunnel depth—average was 160 ft below lake's surface.
4. Tunnel diameter—16 ft.
5. Intake crib—submerged in 45 ft water.
6. Lake shaft at crib—20 ft diameter.
7. Transmission main—10 ft diameter to interchange—23.5 mi long.

TABLE 6
Water Rates per Thousand Cubic Feet

Rate Steps		Charges*†
First	10,000 cu ft per month	\$1.04
Next	90,000 cu ft per month	.84
All over	100,000 cu ft per month	.70

* Monthly service charge varies from 27 cents on a 1-in. meter to \$17.85 on a 10-in. meter.
† Monthly sewage disposal rate is 32½ cents per 1,000 cu ft.

8. Raw water quality—majority of samples taken in last 2 years show less than 0.5 coliform index, with a turbidity average of 1.6 Jackson candle units and seldom in excess of 3 Jackson candle units.

9. Time schedule—first 400 mgd section of plant, tunnel, and 120-in. diameter water main to be ready for service in approximately 3 years, but in no case later than the spring of 1971.

First bids for construction of the tunnel in the intake crib are planned for November 1967.

Education

A great deal of education is necessary, especially by the central city, to get these area programs developed. Equally, or more important, is the development of an organization and the instruction of it. A great deal of work has been done, and is still being done, so that everyone in the organization may know about the programs, and more importantly, where each individual fits so he can do his best. Of a total of 1,439 employees in the water effort, at least 40 per cent have participated in some form of departmental instructions and explanations.

An editorial that appeared in the Detroit News on Nov. 26, 1966,

stated: "Detroit water is, of course, the foundation on which the 20-year suburban boom has rested."

Future Problems

Some problems of the future are:

1. The tendency toward "rate control" by the Public Service Commission.
2. The continual demands for expansion, much of which is in undeveloped areas.
3. The need to be leaders and keep the industry developing 5-10 years ahead of demands, so it does not become necessary for political leaders to pick up the job for the water industry.
4. The necessity to recognize that water supply and pollution control are one economic problem, and, within limits, one administrative and one operational job.

5. The recognition that much must be done to improve technical knowledge, particularly in the science of wastewater treatment.

6. Recognizing that, perhaps, the time has come for AWWA seriously to consider a "marriage," even though it may be a stormy one, with its allied group, the Water Pollution Control Federation.

TABLE 7
Distribution of the Revenue Dollar
Water Supply System

Item	1955	1965
	cents	
Wages	28	24
Debt charges	29	22
Replacements and improvements	25	37
Operation and maintenance	18	17
Population served	2,870,000	3,370,000
Total assets	\$236,484,821	\$436,613,004

*Urban Sprawl as a Problem
in Consumer Economics*

Perhaps the urban-fringe home builder is not simply reflecting a different taste pattern as he elects the distinctive mix of house and lot that so distresses his critic, but is indeed in danger of erring in a consumption decision; buying a new home in a new residential subdivision is a most complicated purchase. It is more than possible that the typical fringe area home buyer is not in possession of enough information to make a rational choice, even on the very narrow grounds of self-interest. Households may buy new homes built on sites considerably larger than they would have chosen had they been

sophisticated enough to foresee the full and unending implications of their initial act. A home buyer may entrap himself in an inferior budgetary position by not anticipating the future context in which his present housing decision will place him, and a housing decision casts a die like no other consumption decision.

A city-dweller in first flight to the suburbs may in his inexperience purchase a full acre lot and complacently plant his house right in the middle of the lot, in such a way as to preclude future subdivision. This may seem to be, at the time, a quite rational act, considering the present low price of raw land and the value placed on privacy. Our naïve consumer reasons that for a few hundred dollars he can triple the width of his side yards, that is, his feeling of privacy and luxury. But with the advent of surrounding residential development and general urbanization through the community, even this low density area passes from rural to urban density. It reaches the stage when it must convert from dirt roads to paved and lighted streets, from septic tanks and well water to centrally supplied sewers and water. Then, what was gracious living on ex-urban lots becomes suburban sprawl, too densely populated to be rural and too sparsely populated to be efficiently urban, and property taxes rise to "confiscatory" levels. For example, an assessment of \$2,000 per acre for a storm drain trunk line comes to a staggering 14 per cent of the value of a \$15,000 home, with laterals and catch basins still to come and sanitary sewers to follow.

The urban land and housing market operates, for the most part, in the classical economic framework of *caveat emptor*, but even the most sophisticated buyers are only vaguely aware of the pecuniary pitfalls that dot the long and uncertain path of urban-rural fringe development. Even if the fringe area home buyer is not so unsophisticated as implied above, one could be more confident that lack of consumer knowledge is not at issue here if some private or public agency were entrusted with the responsibility to inform the prospective urban fringe home buyer, *before purchase*, of the prospective costs he assumes over the next decade.

In the case of a new home, this information could be tendered to the buyer by the building department of the relevant local government at the time of application for a building permit, and to all subsequent purchasers of that house by real estate agents at the time of signing of the purchase agreement. A booklet which contained estimates of current, imminent, and ultimate property tax rates and special assessments and utility service costs for various size lots at different stages

of urban development could be made available—a little like the "prospectus" that a corporation must make available to investors prior to offering a stock issue for public sale.

Of course we cannot know, precisely, the ultimate cost of owning various size lots because we do not know what level of public services will be demanded by the residents, so we cannot know future tax bills with neat accuracy. Nor do we now know the costs of construction of public plant at future dates under uncertain price levels and physical circumstances (e.g., storm drains or sanitary sewers that might have to be tunneled under expressways that do not now exist). Careful studies by competent research groups could provide some rough guidelines that would make the housing decision a more realistic and rational investment process than it now is. Some of the seemingly harder problems of cost estimation may well soften under the pressure of good empirical work. For example, to a considerable degree, taxes are a substitute for private housing expenditures—public water and sewage disposal bills are substitutes for depreciation and maintenance costs on private pumps and septic tanks—so that total homeownership costs may be much more predictable than the precise composition of these costs.

To the extent, however, that expenditures on public services (local taxes and assessments) are a substitute for other expenditures unrelated to housing (automobiles and travel), various probable levels of public services must be priced out for various lot sizes so that the prospective home builder in a fringe area can rationally site his home—can delicately trade-off lot size against other goods. We may well have in urban "sprawl" a very subtle and serious information and communication problem in consumer economics.

Urban Sprawl as a Price Problem

Perhaps the fringe area home builder is not unmindful of the cost entailed by his land size decision. It may be, rather, that he anticipates that he cannot or will not be held liable for them. A large lot homeowner may escape paying for the luxury of consuming space because these costs are difficult to identify and to allocate by residence. Even if some of the costs of local public services attributed to lot size can be roughly estimated, the large lot homeowner may be able to indefinitely postpone legal liability for them by various obstructionist tactics. Taxpayer lawsuits to enjoin the construction of sewers, drains,

water mains, and the like may so delay the construction of these facilities that those who desperately need these facilities, and are willing to buy peace at any price, may agree to a cost formula that greatly favors the large-lot holdouts.

The new facilities, for example, may be financed out of the general fund by increasing the general property tax rate, a levy that falls on the value of land *and buildings*. If the public service cost is primarily a function of the spatial extent of the service (e.g., the laying of pipes), recourse to the general property tax instead of a special assessment on land area alone (or frontage) clearly and unfairly favors the owner of a small house on a large lot over the owner of a large house on a small lot. Here, legal delay and hard bargaining provide a basis for arguing the economic inefficiency and inequity of urban sprawl. This is not a case that is usually made, but some careful thought and rigorous quantification might well show it to be a greater support to the urban sprawl critics than some of the slender reeds on which they now lean.

Both financial irresponsibility and institutional obstacles, such as the cumbersomeness of the legal process, stand in the way of imposing on the homeowner the full cost of his decision on size of lot. But neither of these problems may be as intractable as the sheer ambiguity of the cost accounting problems involved in allocating the joint costs of producing a collectively consumed public service. To illustrate, if a new residential subdivision on the edge of a city were to be platted in very large lots, subsequent residential subdivisions would have to be located farther out from the core of the central city than they would have been had the lots of the preceding subdivisions been smaller. With residential lots typically accounting for 50 per cent of total urban land area, the residential lot size decision dwarfs the influence of other land use decisions (e.g., streets, parks, parking space) in determining the radius of the urban area, the distance from the core of the central city to open space. Consequently, through the ensuing years the residents of each new layer of residential subdivisions will have to commute through this sparsely settled area, traveling farther and at greater time and money cost than if the large lots had never been created.

The cost of extending and impairing the lines of contact for everyone may be considerably in excess of the benefits of spaciousness derived by the homeowners from oversize lots, so that the total net social benefit is lower. Only if each property owner were both subject to some special assessment based on the increased transportation ex-

pense he imposes on other members of the total community in traversing his property and also informed, prior to making his decision, of the likely schedule of these charges over a period stretching into the future for the full life of his improvements on the property, could the resident rationally choose the proper mix of house and land to reflect not only his tastes and income but the social costs of his act as well. But, in practice, we do not assess the property owner for the construction and maintenance cost of the arterial streets that cross his area, streets that are made longer or shorter because of his lot size decision. Nor, on the other hand, do we credit him with the costs he does incur in "sprawling" which permit his neighbors to enjoy more fresh air, light, and openness than they would have otherwise. A full accounting of the social costs and benefits of large residential lots—of the external economies rendered to and diseconomies imposed on the community—is a difficult, if not impossible, labor.

Another and perhaps even more interesting aspect of sprawl applies at a grosser level: the by-passing of large blocks of vacant land. The urban fringe residential developments presumably leapfrog over potential building sites *en masse*, "despoiling" the natural countryside at an unnecessarily rapid rate by leaving half-eaten, hard-to-use patches of land behind in the race to greener and cheaper pastures.

In contrast to large-lot sprawl, where the land buyer underestimates the future cost of owning land when it and the adjoining land are fully developed and buys too much, leapfrog sprawl is caused more by the land seller who overestimates the future price of land and holds out too long. Gaffney¹⁹ argues that the holders of urban-rural fringe land tend both to underestimate the future supply of urban land and overestimate the future demand for it. Misjudging the land supply is not too unexpected in the almost complete absence of information on the number of lots recently subdivided or on the current trend in land prices or any other relevant statistics.

There are misinformed speculators in many markets; what special problem do they pose in the urban land market? The answer is, in part, that land is a heterogeneous product; each parcel of land is unique in its spatial position. Ordinarily, if some potential sellers of a given product hold out for a very high price, the market proceeds to clear exchanges between those who are prepared to sell at a much lower price and buyers who will not pay the very high prices demanded by

¹⁹ Mason Gaffney, "Urban Expansion—Will It Ever Stop?," *1958 Yearbook of Agriculture* (U.S. Government Printing Office, 1959), p. 517f.

the most optimistic sellers. But if we think of each land parcel as being numbered in order from the center of the urban area outward, then contiguous expansion—the avoidance of leapfrog sprawl—can occur only if the holders of the lower numbered parcels sell first. This will occur only if those who hold the lower numbered parcels are the most conservative in their estimates of land price trend and/or are the least able to hold out for a long period. Otherwise some of the more distant parcels will be developed before some of the nearer-in ones, not because the land buyers would not prefer to stay in closer but because distant parcels were held in weaker and/or less optimistic hands.

When we add to this a propensity to employ flat rate utility charges irrespective of distance from the utility system centers, we weaken a buyer's preference to stay in close to the urban center. When a water line is extended outward across an open space to tie in a noncontiguous new consumer, this remote household requires its three-quarters of an inch of cross-section piping back through the system all of the way to the pumping and filtration plants. Usually the most that we require from the customer, regardless of how far removed he is from the plant, is his pro rata share of the cost of constructing the extensions from the nearest trunk lines. Clearly, then, the near-in households are subsidizing the leapfrog sprawl of the distant ones.

The combination of land buyers who do not have to pay the full costs of being remote from the urban center and speculative holders of near-in land who are highly optimistic about the trend in land prices, sets the stage for leapfrog sprawl. Urban sprawl in each of its two major forms is, then, a problem in pricing, and not without liberal elements of poor market information.

DRAFT

Wichita
Idea
Thompson

March 3, 1971

TO: Wichita-Sedgwick County Metropolitan
Area Planning Commission

FROM: Robert A. Lakin, Director of Planning

SUBJECT: Extension of water services
to other Communities

The City Manager has asked that I prepare a "dissertation" on the subject of extension of water services to other communities. He has asked that this be a matter of study and recommendation by the MAPC.

In recent months, the City of Wichita has been approached by the Cities of Augusta, Benton and Andover relative to the City of Wichita furnishing them with water service. In addition, the City of Wichita has agreed to furnish water (with the Planning Commission's concurrence) to Rural Water District #1 lying north northeast to the City of Wichita. ^{within the last year} ~~Also,~~ there was a discussion between the City of Goddard and the City of Wichita relative to water service. ^{This resulted in Goddard developing their own system} ~~Also,~~ there have been overtures ~~on a preliminary basis~~ to our staff concerning water to additional rural water districts lying south and southeast of Wichita. Without a water plan completed and with preliminary drafts yet to be submitted from my staff to me on the subject, this particular position paper is somewhat preliminary and tentative, although I suspect that the material provided herein would be part of the basis of plan preparation as we continue work on this report. ~~Economies in scale~~ ^x ~~and elimination~~

504

Economies in Scale and Elimination of Duplication of Services.

In dealing with utilities, particularly water as well as electrical, gas and others, it is generally conceded that economies of scale can be experienced where ~~or~~ single or unified systems can be developed. This may not hold true of sewer service because of the nature of the system being basically gravity flow oriented and dependent on topography. Water and other types of utilities are no so restrained by topography and can be developed to serve wide areas within a given geographical base. Although the distribution systems perhaps can be developed separately for independent jurisdictions and locales, the problem of developing adequate water supply is a considerably more difficult problem, ~~and~~ Unless developed on a unified basis, ^{one} usually find local communities and taxing districts competing with each other for rights to the water resources, or duplicating facilities ^(transmission lines, purification facilities etc.) at the same supply source. Because of the way this particular part of Kansas is developed as opposed to many of the urban and metropolitan centers, we have not had three or four more cities trying to build pipe lines out of Cheney Lake or out of the equus beds areas to the cities. Although the Cities of McPherson, Newton and others do draw from the equus beds fields, ^{Wichita is} ~~we are~~ the only major user in this area. Thus, the treatment facilities and the major pipe lines required to carry the water from its source to the users can best be accommodated at a large scale rather than many independent and separate lines. For these reasons alone, it would seem apparent that the City of Wichita should consider providing water service to other communities, ^{however} generally providing that overall community and regional goals can be met and maintained.

Annexation Policies and Service Policies - City of Wichita

For a number of years the City of Wichita has maintained the

"One Wichita" annexation policy which provides that annexation should occur when an area is developed to urban scale or is in proximity to the community or ^{is using urban services or} is needed in order to provide other areas with basic services, such as water, sewer, etc. This policy has been followed and in my view will generally result in the City

of Wichita ^{annexing} ~~acquiring~~ those areas which are provided with standard municipal type services, ^{if water, sewer are extended in growth areas beyond existing corporate boundaries.} ~~as they are going to be inheriting their own districts.~~

^{Since the 1950's} Prior to 1900, the City of Wichita had a different position of refusing to extend services to outlying areas for one reason or the other. The net result was a multiplicity of

water and sewer districts, each with their own independent well source and treatment facilities, elevated tanks, etc. ^{and most of the system was either substandard or}

often built to a standard that was not compatible with the Wichita system which ultimately took it over. As a result, practically

the only remaining facilities that are still in use are the mains and laterals lying within the streets. Even these in many instances are substandard as to what the City of Wichita would have installed had it been making the initial installations. All of the water

supply sources have been abandoned, the treatment facilities, such as chlorinators, etc. abandoned, ^{the hydraulics changed} and in most instances the water towers and storage tanks removed because they ^{were not} ~~would not withstand the~~

~~pressures developed within the City of Wichita system or compatible with the Wichita~~ from other engineering standpoints with that system. However,

the City of Wichita still had to purchase these facilities at a fair cost ^{and at the least had to} ~~or should at least by~~ assuming the remaining bond and interest obligations issued by these improvement districts for those facilities. The net result is that this was simply a loss

incurred by the Wichita utility system as a result of annexation,
~~and more properly as a result of failure of the City of Wichita~~
~~to provide adequate service standards or of the area to build~~
~~systems compatible with the Wichita area.~~

Potential Problems Outside Service

One of the problems that relate to providing outside service to a given area is that once a service is provided you are obliged to continue that service as long as the subscriber wishes it. An example of this is the City of Eastborough. The City of Wichita could probably not withdraw water and sewer service to the City of Eastborough, thus, perhaps forcing consolidation under current law. Thus, if a decision is made to provide the service ~~outside~~

~~the City, and first, the area is other than unincorporated, such as~~
~~a city, Andover, etc.~~ ^{to another city such as} ~~the long terms~~ ^{must be} ~~firmly established~~ ^{affected} ~~and employment~~ ^{delegated}

so that the service to the citizens of the City of Wichita, the basic supporter of that system, are not deprived or hurt by that action. ^PSecondly, there is a concern that if water supply and

other services are furnished other cities they will become as competitive or perhaps more competitive than Wichita and its urban fringe in terms of securing additional tax base through additional residential development and/or industrial development, ~~and employment~~ ~~basis.~~

It is doubtful that this will be true in the long haul, as any of the cities which are now growing at a rapid rate and thus which would need Wichita services are incurring the same type of ^{expenses} ~~expenses~~ ^{growth pains their}

~~and needing to make the same type of physical plant improvements~~
~~that are needed in Wichita, not only for city but for school and~~
~~other governmental services, and thus either have a tax rate equal~~ ^{as is} ^{They will in all probability}

to or higher than that in the Wichita area. However, this may not always be true. ^{This is particularly true if all cost allocable}

^{to providing other cities water are passed on and if such action}
^{resulted in Wichita having to make substantial capital investment}

* to maintain and improve the service

The third ~~major~~ ^{and most critical} concern in my opinion is the potential for using the investment of capital facilities as a method of guiding growth and carrying out the Comprehensive Plan. I have always maintained that the dollar investment in roads, utilities, public facilities were far greater determinants in shaping the growth and form of the City than ~~was~~ ^{is use and} the enforcement of any zoning regulation or subdivision requirement. Thus, if the City pursues a policy of extending its lines ^{in any direction} ~~any and every place~~, simply to anyone that will pay the bill, we may gain an economy as to scale of the water system but destroy our very ability to maintain a viable and livable city in terms of supplying necessary transportation facilities, bus service, school, parks and other needed public facilities. If ~~the~~ Commission remains committed to the guided growth concepts, some device needs to be found in order to determine ~~in what areas water lines will be extended in order to provide the basis of urban growth and~~ ^{where Wichita will extend lines following the projection} ~~what type of controls are needed in order to~~ ^{maintain} ~~pursue~~ the overall growth policies.

Urban Sprawl

If water service is extended east in an area that is basically lacking in good water, this will certainly encourage growth in that area as opposed to other areas. This ^{is good} ~~is not bad~~, however, as we have indicated that the area to the east and northeast of the community as well as west ^{is} ~~is~~ proper area for growth. However, based on the population projections that we have made to the year 2000, we do not believe that we will see in that time period the Cities of Wichita, and Andover joining together and certainly not the Cities of Wichita and Benton or Wichita and Augusta joining together. Thus, the extension of water lines between these points will in all probability ^{lead} ~~lead~~ to what we call urban sprawl. ^{This is} ~~the~~

results. Once the ratios were established they were used to obtain Sedgwick County Employment by multiplying the ratio times the SMSA employment for each SIC Code for the years 1965 through 1969.

Special attention was given the aircraft and parts segment of manufacturing because of its great influence on employment in Sedgwick County. The four major aircraft manufacturers, Boeing, Beech, Cessna and Lear, were contacted and personal interviews were conducted. The future aspirations and product lines of the companies were discussed as well as the prospects for the entire industry. The information provided was used as a basis upon which judgments were made as to the future levels of employment in this specific sector.

Methodology

The primary methodology utilized in arriving at the employment figures was to compute a regression line using the annual average employment figures for each year from 1950 through 1969 for each employment sector and projecting these values into the future. When regression analysis is used for projection purposes, it is important to select a time period of long enough duration that will average out any short run fluctuation that may occur.

After careful evaluation the time period 1950 through 1969 was selected as representative for most SIC classifications.

The third major concern in my opinion is the potential for using the investment of capital facilities as a method of guiding growth and carrying out the Comprehensive Plan. I have always maintained that the dollar investment in roads, utilities, public facilities were far greater determinants in shaping the growth and form of the City than was the enforcement of any zoning regulation or subdivision requirement. Thus, if the City pursues a policy of extending its lines any and everywhere, simply to anyone that will pay the bill, we may gain an economy as to scale of the water system but destroy our very ability to maintain a viable and livable city in terms of supplying necessary transportation facilities, bus service, school, parks and other needed public facilities. If the Commission remains committed to the guided growth concepts, some device needs to be found in order to determine in what areas water lines will be extended in order to provide the basis of urban growth and/or what type of controls are needed in order to pursue the overall growth policies.

If water service is extended east in an area that is basically lacking in good water, this will certainly encourage growth in that area as opposed to other areas. This is not bad, however, as we have indicated that the area to the east and northeast of the community as well as west is proper area for growth. However, based on the population projections that we have made to the year 2000, we do not believe that we will see in that time period the Cities of Wichita and Andover joining together and certainly not the Cities of Wichita and Benton or Wichita and Augusta joining together. Thus, the extension of water lines between these points will in all probability lead to what we call urban sprawl, the

* As only a given amount of land will be placed in
"production" at a given time for a specific level of population
and growth, "sprawl"

of dispersal development ^{in a} scattered and random pattern along
that water line, ~~which would~~ ^{which will then} rob the potential for orderly
growth to Wichita as well as the communities of Andover, Augusta
and Benton. Some possible alternatives and solutions to this
point will be made later in the paper. However, first, I think
an extract from a book entitled "A Preface to Urban Economics"
by Wilbur R. Thompson, published in 1965, is appropriate in terms
of dealing with sprawl as a problem of pricing. This extract
is a firm base in my opinion as to why we should not countenance
sprawl in this area.

(Copy page 322 starting with the major
sub category at the bottom of the page
through page 327 down to the next
starting category toward the bottom
of the page.

cc: Ralph Wulz
Hess
Bruggeman
Aiken
Anderson
Brenner

Fackitt

Taking that the potential of population and the same good procedure for estimating demand other city services might ~~be~~ require as much as % of capacity ~~by 2000~~ ^{yield} &

would be over of treated capacity availability by 2000.

However, the City by itself should be developing new water sources, transmission lines, pumping capacity, treatment ~~facilities~~ ^{facilities} and storage capacity before the above become critical. The proper response is to have agreements such that those who ~~just~~ purchase water ~~adequately~~ ^{adequately} support the cost of those future improvements which they will have caused the City ~~to~~ ^{of Wichita} to make ~~its~~ ^{new capital} investment ahead of when it would ordinarily have to do so.

Lower Tax Base to other City's

Because of the inability to project accurately tax base of the many cities ~~with~~ ^{with} the arguments that that all cities if they furnish comparable services will have similar tax rates ~~the~~ ^{the} would result in the assumption that one city ~~is~~ ^{is} will not acquire a substantially different ~~competitive~~ ^{competitive} position over any other. Further

the City of Wichita with its City Manager system should remain both efficient and more attractive because of the range of services, housing, and amenities than it should be the toughest of competitors itself.

Finally in this regard, ~~the Wichita~~ ^{all} units of government will come to recognize the good of pulling together as ~~the~~ city limit lines are too fragile to restrain the dynamic consequences of urban growth. Basically an asset to the well being + growth of the region is an asset to all.

Urban Sprawl

Let it be understood, I do not claim all should live in Wichita or a City under urban life styles. Some will prefer suburban ~~life~~ life for rural living. Best let it occur out of the path of urban growth and let it be in such a ~~the~~ manner as to limit the demand for services (tax dollars) provided by general government. Sprawl like inner city decay stands for disproportionate expenditure in return for the taxes produced.

To enhance guided growth & control of land, the following suggestions are offered for consideration:

- 1) ~~San~~ Name agreements with other cities who purchase water ~~to~~ contain a clause which restricts them from providing water to anyone not within their city limits unless concurred in by the COW (and on advice by the MPR)
- 2) Allow no hook up ^{outside a city} unless a municipal sewer system is available.
- 3) Allow no hook up ^{outside a city} ~~and~~ ^{except} where single residential residential units existed prior to the date of the contract.
- 4) Provide for agreement by ordinance to consolidate in the event corporate boundaries adjin each other.

Water Wells

Currently, the City of Wichita obtains about 70 percent of its raw water requirements from 55 water wells in the equus beds area. (See Map 2A) The estimated firm yield⁽¹⁾ from these water wells is 70.2 million gallons a day. This is based on pumping 52 wells at an average yield of 1.35 m.g.d. per well. It is estimated that a maximum yield of 110. m.g.d. may be obtained by pumping all 55 wells simultaneously at an average volume of 2.0 m.g.d. per well. Water from the equus beds is of very good quality.

Eighteen water wells are located in the Sims Park area near the water treatment plant. It is estimated that a firm yield of 20.0 m.g.d. could be obtained from these wells, based on pumping from 16 wells^{at} an average volume of 1¼ m.g.d.

Cheney Reservoir

A second major source of water supply became available to the City when construction of Cheney Reservoir was completed in 1965. The reservoir is located on the North Fork of the Ninnescah River about 25 miles west of Wichita (See Map 2A). A firm yield of 38-million-gallons-a-day (m.g.d.) is available; however, as much as 60 m.g.d. may be withdrawn for municipal use when the reservoir is full or nearly full.

(1) Firm Yield. The maximum volume of water that can be obtained from the supply source during drought conditions and with one or two pumps or wells out of service.

The reservoir was planned and constructed as a multi-purpose facility to provide for flood control, recreation, and fish and wild life conservation; however, maximum use and benefit may be obtained through the use of this reservoir primarily for municipal water supply and flood control.

Cheney Pumping Station

A pumping station with pre-treatment facilities for the removal of taste and odor from the water is located near the Cheney Dam. Water is drawn from the lake through an intake structure connected to the pump station by a 72-inch gravity flow pipeline. The combined pumping capacity of four large pumping units installed in the station is 60 million gallons per day.

Adequacy of Supply Sources

As a result of preceding statements pertaining to water supply sources for Wichita and its urbanizing area, it is concluded that:

A. A firm yield is available as follows:

Cheney Reservoir	38.0 m.g.d.
Equus beds	70.2 m.g.d.
Total firm yield	<u>108.2 m.g.d.</u>

B. An estimated maximum yield may be supplied as follows:

Cheney Reservoir	60.0 m.g.d.
Equus Beds	110.0 m.g.d.
Estimated maximum yield	<u>170.0 m.g.d.</u>

Production from the emergency water wells in Sims Park is not included with either the firm yield or estimated maximum yield in "A" and "B" above because: (1) the water quality is poor; (2) they are intended primarily for emergency use, and (3) they would likely be unable to produce an appreciable supply of water after prolonged pumping during drought conditions.

In the past, consulting engineers have based their analysis of the water works system on maximum water requirements. On this basis, the firm yield from existing supply sources would be adequate up to the year 1980 or until the population to be served is about ^{346,900} ~~347,000~~ people. Maximum water requirements at this time (1980) are estimated at 119.0 million gallons a day. This total includes the estimated maximum day demand for 346,990 people (90.2 m.g.d.), plus fire flow of 28.8 million gallons a day.

It is estimated that the maximum day demands, plus fire flow, will amount to 159.8 million gallons a day by the year 2000 or when the population to be served reaches 436,900 people. It appears, then, that by 1980, additional quantities of raw water must be made available by:

1. Increasing the yield from Cheney Reservoir,
2. Increasing the yield from the equus beds; or
3. Locating and constructing new water supplier sources.

Transmission Mains

Water is transported from the equus beds well field to the water treatment plant through a 48-inch and 66-inch pipeline. (See Map 2A) Construction of the 48-inch pipeline was completed in 1940. The 66-inch pipeline and the 42-inch tie line were completed in 1957. However, the 66-inch pipeline is superior to the 48-inch pipeline which has a record of breaking at inopportune times. The 66-inch pipeline has a capacity of 72 million gallons per day (m.g.d.) and the 48-inch carries 36 m.g.d. Their combined capacity is a total of 108 m.g.d. However, it's doubtful that this volume of water could be delivered by the two pipelines because the majority of water wells are on the 48-inch pipeline and the 42-inch cross tie line restricts the volume of water that can be pumped into the 66-inch pipeline.

The 42-inch cross tie pipeline is too far north to serve the 66-inch pipeline adequately. The yield from the equus beds well field could be increased by tying the 66-inch and 48-inch pipelines together with a new cross tie pipeline constructed south of Bentley. (See Map 2A) With this proposed improvement, the full capacity of the 66-inch pipeline would be available and the total capacity of both pipelines would then be 108 m.g.d.

Water is transported from Cheney Reservoir through a 60-inch pipeline which can carry 60 million gallons of water a day. This transmission pipeline connects into the 66-inch pipeline from the equus beds at about 21st Street and Hoover Road. With this arrangement, a total of 108 million gallons a day can be delivered to the water treatment plant. However, a failure in the 48-inch pipeline from the equus beds would reduce this volume to about 72 m.g.d. which is the capacity of the 66-inch transmission pipeline from the well field. In case such a failure occurred and there was a demand for more than 72 m.g.d. of water, the emergency water wells located in the Sims Park area could supplement the above quantity by supplying approximately 20 million gallons a day of poor quality water. However, such an emergency would be of relatively short duration because breaks in the 48-inch pipeline are usually repaired within 24 to 36 hours.

The combined capacity of the 66-inch and 48-inch transmission pipelines from 21st and Hoover Road to the water treatment plant are sufficient to transport the combined firm yield obtainable from Cheney Reservoir and the equus beds. However, they will be inadequate to transport 119 million gallons of water a day which is the estimated maximum requirements by 1980 or when the population reaches 346,990 people. This deficiency can be remedied by disconnecting the 60-inch pipeline from the 66-inch

line at 21st and Hoover Road and extending it to a direct connection with the water treatment plant as shown on Map 2A. Rerouting the 60-inch transmission pipeline to a direct connection with the water treatment plant would provide the following pipeline capacity:

48-inch pipeline from equus beds	36 m.g.d.
66-inch pipeline from equus beds	72 m.g.d.
60-inch pipeline from Cheney Reservoir	<u>60 m.g.d.</u>
Total	168 m.g.d.

This capacity would be adequate to transport maximum water demands through the year 2000 or when the population to be served reaches 436,900 people.

The limiting factor, then, in the supply and transmission works are the 48-inch and 60-inch transmission pipelines from 21st and Hoover to the water treatment plant.

In 1970, the maximum day demands plus fire flow (69.0 m.g.d. + 28.8 m.g.d.) are estimated at 97.8 million gallons a day. In case of failure of the 48-inch transmission pipeline, this quantity of water cannot be delivered to the treatment plant.

In 1975, the maximum day demands plus fire flow (78.4 m.g.d. + 28.8 m.g.d.) are estimated at 107.2 m.g.d. Capacity of the 48 and 60-inch pipelines exceed this requirement by only 0.8 m.g.d. which is too narrow a margin for safety.

From the foregoing, it is concluded that:

1. The 48-inch transmission pipeline from the equus beds to the treatment plan can and does fail during periods of heavy water demand.

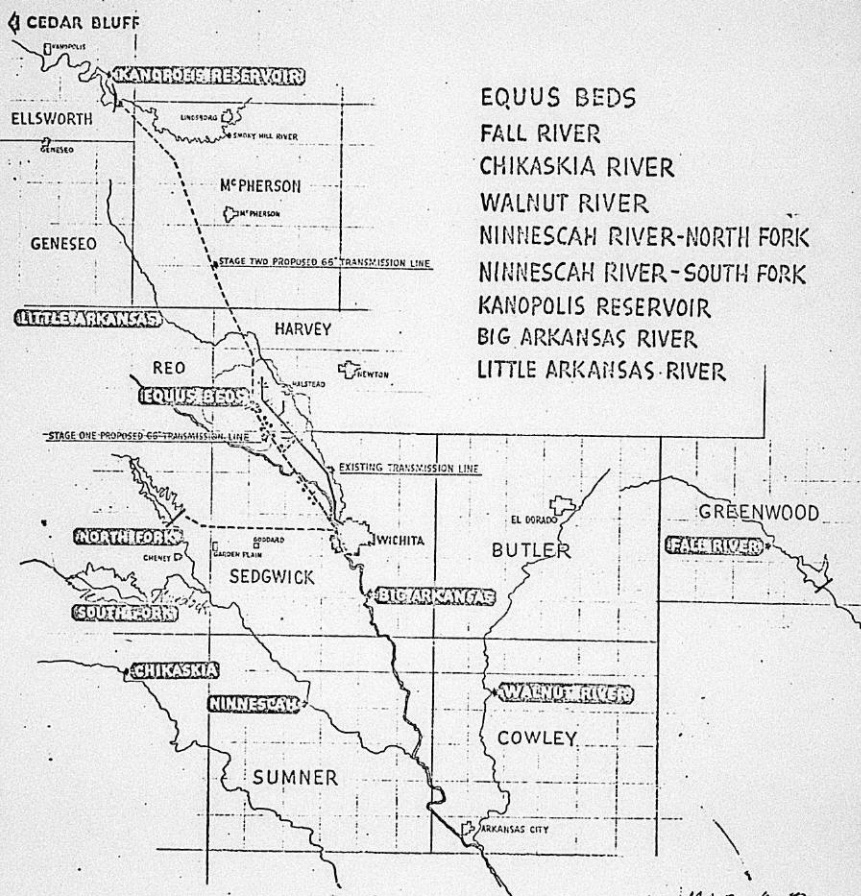
2. The section of transmission pipeline from 21st Street and Hoover Road to the water treatment plant should be reconstructed by 1975 to have a capacity of 160 m.g.d. which is the maximum day demand plus fire flow requirement for the year 2000.

Future Water Supply Sources

As a result of water shortages during the drought years of 1953 and 1954, the Mayor of Wichita appointed a committee in 1955 to undertake a major study of the Wichita water system and to recommend a short and long-range program which would provide an adequate future water system for the City. As a part of this work, the Committee located and investigated nine possible water supply sources which are shown on Map 2B. Of the nine sites studied, three were recommended as future water supply sources and two of the three (the equus beds and Cheney Reservoir) have been constructed and are currently supplying water to the Wichita water system.

Murdock Reservoir

The third source of water supply recommended by the Mayor's Advisory Committee is a reservoir constructed near Murdock on the South Fork of the Ninnescah River. This potential site is included in the Bureau of Reclamation long range multi-purpose program which would provide additional water supply for Wichita and urbanizing areas and also multi-use facilities such as recreation, fish and wild life conservation, flood control and irrigation.



EQUUS BEDS
 FALL RIVER
 CHIKASKIA RIVER
 WALNUT RIVER
 NINNESCAH RIVER-NORTH FORK
 NINNESCAH RIVER-SOUTH FORK
 KANOPOLIS RESERVOIR
 BIG ARKANSAS RIVER
 LITTLE ARKANSAS RIVER

MAP 2 B
 POSSIBLE WATER SUPPLY SOURCES
 CITY OF WICHITA

Source: Mayors Advisory Committee Water Report.
 1955.

It is estimated that the Murdock Reservoir would have a total capacity of about 94,000 acre feet of water. Of this total, about 75,000 acre feet of water would be allocated for the purpose of providing a water supply for municipal, industrial and irrigation uses. It is anticipated that the reservoir could yield approximately 58 million gallons per day. This water would be transported to Wichita through a pipeline having a capacity of at least 58 m.g.d.

In 1955 it was estimated that construction of the reservoir would cost about 14 million dollars. Construction of the pipeline was estimated at 10.5 million dollars. Prices have risen at a rapid rate since 1955 and the above cost estimates are totally unrealistic now. As time passes, the cost of constructing and developing this facility will increase. Except for the equus beds and the Cheney and Murdock Reservoirs, the other sites were rejected by the Mayor's Advisory Committee on the grounds they were too distant or the water quality was poor or for both reasons.

At one time, Kanapolis Reservoir was seriously considered as a possible water supply source. This is reflected on Map 2A by the proposed extension of the 66-inch transmission pipeline from the equus beds to Kanapolis. However, after an exhaustive study by the Mayor's Advisory Committee, it was concluded that there were too many obstacles, that too much cost was involved and too long a time required to develop this source of supply⁽¹⁾.

(1) The Mayor's Advisory Committee Water Report, compiled by A. E. Howse & Committee, 1955, pp. 30-4, 30-5.

Findings of the Mayor's Committee are still valid.

In the mid 1950's there was a great deal of antagonism between City officials and residents in the equus beds area. Because of this, there was no attempt to drill additional water wells in the area. Now, however, as a result of efforts by the Wichita Water Department, the antagonism seems to have disappeared and relationships have improved materially. It is expected there will continue to be an improvement in this area as time goes on and it appears highly probable additional water wells can now be constructed in the area. Consequently, it is recommended that: (1) a program of land acquisition be implemented (purchase farms) in the equus beds area, preferably where a high yield of good quality water is known to exist; (2) file an application for appropriation of additional water rights in the area; (3) construct enough water wells to make full use of existing water rights.

Water Treatment Facilities

In 1940, Wichita's first water treatment plant was placed in operation. It had the capability of treating about 32 million gallons of well water a day. As a result of increased water demands, plant capacity has been expanded to treat 112 million gallons of well water a day. However, surface water from Cheney Reservoir is blended with well water from the equus beds and this combination of surface and well water reduces the plant's treatment

capability to a capacity of 84 million gallons per day. This is almost two and a half times the approximate 1968 average daily water usage of 35.9 million gallons a day. (1)

Capacity of the water treatment plant is determined by the rate water passes through the filters. Currently, there are fourteen (14) rapid sand filters having an effective area of 1400 square feet each.

Filter rates for rapid sand filters were established several years ago for the purpose of providing a basis for designing and analyzing the capacity of a water treatment plant. These rates are:

Surface water - 3 gallons/square foot/minute
Well water - 4 gallons/ square foot/minute

By actual operation of the Wichita Treatment Plant, it has been determined that water can be passed through the filter system at a rate of from 6 to 9 gallons/square foot/minute and still produce a very good quality of water which would in no way be detrimental to public health. This means that plant capacity can be quickly and easily increased by merely manipulating the valve system which controls the filters. Table 2E shows the effect on plant capacity when the rate of flow through the filter system is increased.

(1) Report on Water Treatment Plant Waste Disposal, Black & Veatch, Consulting Engineers, May, 1969, p. 3.

Table 2E
Filter Rates and Plant Capacity

Filter Rate gallons/square ft./min.	Plant Capacity m.g.d.
3	84.7
4	112.9
5	141.1
6	169.3
7	197.5
8	225.8
9	254.0

From the foregoing, it is concluded that the water treatment plant has sufficient capacity to supply the average day requirements of treated water until such a time as the demand approaches 84 million gallons per day. However, there is insufficient plant capacity to supply the maximum day demand (90.2 m.g.d.) plus fire flow requirements (28.8 m.g.d.) which total an estimated 119.0

m.g.d. for 1980. *By increasing the filter rate to 5 gal./sq. ft./min. the treatment plant can produce about 141.1 m.g.d. which more than satisfies ^{the} requirement. On the assumption that sufficient quantities of raw water will be available at the treatment plant, it appears that by increasing the rate of flow through the filters, the plant capacity can be increased to supply both the average day and maximum day demands of treated water. Treated water is used to backwash the filters and then discharged to ~~sub~~ a disposal area. By constructing filter backwash recovery facilities approximately 150 ~~to~~ million gallons of water can be recovered annually.*

Additional water treatment capacity could be constructed at the Cheney Reservoir pumping station. However, consideration of this possibility reveals that:

- A. It does not appear feasible to plan on constructing full water treatment facilities at the Cheney Pumping Station between now and the year 2000 because:
1. Communities in the vicinity of the Pumping Station are small and population projections do not indicate sufficient growth to justify the high costs of constructing complete water treatment facilities.
 2. Construction costs of water transmission pipelines to these communities would be high because of their scattered location and distance from treated water supply.
 3. Only one source of raw water supply is available to the Cheney Pumping Station.
 4. The 60-inch water transmission pipeline from Cheney Pumping Station to Wichita does not have the capacity of transporting ^{in a continuous} 76 million gallons per day of treated water needed by Wichita and the nearby urbanizing area by the year 2000 or when the population reaches 436,900.

5. The hub of the distribution system is in the Sims Park area where the new high service ~~pressure~~ pumping station will be built. Water of equal quality can be distributed in all directions ^{from here} however, the ~~induction~~ induction of a different quality of water into the distribution system at some point other than Sims Park could lead to the distribution of unequal quality of water which may ~~have far reaching ramifications~~ create extreme difficulties for the water utility. 46

The ^{Wichita} water treatment plant has been well maintained and as a result the 30 year old facility appears to be in good condition. Because of its age, it's reasonable to expect structural and mechanical deterioration. Maintenance and repair costs will increase and worn out equipment will need to be replaced. The practice of examining the water works system biennially by consulting engineering firms should reveal any needed structural repair or equipment replacement in the water treatment plants. ~~It is~~ recommended that for the short range program the Utility continue to:

1. Maintain the structure and related facilities in top condition, and
2. Replace worn out machinery and motors, and
3. Construct filter backwash water recovery facilities to provide for recovery of water previously lost during washing of filters.
4. Modify and improve the water treatment plant facilities in accordance with recommendations resulting from biennial engineering surveys of the system.

72 @@@

By 1985, the water treatment plant facilities will be 45 years old and will have reached that point in time when they may become obsolete and unreliable. Because it takes considerable time to plan, design and construct this type of facility and because the present facilities cannot be expected to serve indefinitely, it is recommended that;

1. By the year 1975, an in-depth engineering study and analysis of the water treatment plant and related facilities be made by a nationally recognized, consulting engineering firm, experienced in the design and operation of water works systems and more specifically versed in the design of water treatment plants and related facilities.

a) It is anticipated that the study will develop a program of recommended improvements which may include modernization or retirement of existing facilities.

Clear Water Storage

If there was no "clear water storage" capacity, it would be necessary to exactly match the rate of flow through the water treatment plant with the output from the high service pumping units. Present storage facilities have the capacity to provide protected storage for 12.6 million gallons of filtered water until it can be pumped into the distribution system. Engineers have stated that the amount of water withdrawn from storage should not exceed 50 percent of the total storage volume and the remaining 50 percent should be retained for emergency use.⁽¹⁾ This criteria would be applicable to "ideal operating conditions". It is estimated that about 12 percent of the maximum day water use should be available for withdrawal from storage⁽²⁾ and an additional 12 percent should be left in storage for emergency use. Based on ideal conditions, future storage requirements are shown in Table 2F.

Table 2F
Projected Storage Requirements

Year	Max Day m.g.	Estimated Storage m.g.
1970	69.0	16.6
1975	78.4	18.8
1980	90.2	22.0
1985	99.7	24.0
1990	110.0	26.4
1995	120.7	29.0
2000	131.0	31.5

- (1) Report on High Service Pumping, Wichita, Kansas, Black & Veatch, Consulting Engineers, July, 1969, p. 11.
(2) Ibid.

According to the above estimated storage requirements, the system is currently deficient in clear water storage capacity. Plans are in progress for building a new 7.5 million gallon reservoir within the next 1½ years. Upon its completion there will be a total of 20.1 million gallons of clear water ^{storage} available. This should be adequate through 1975 or perhaps 1980.

The arrangement of the clear water storage reservoirs and the piping system from them to the high service pumping station are all illustrated in Figure 1. The filtered water is delivered to clearwells number 1 and 2 below the filters and to the three underground concrete storage reservoirs. These storage facilities permit the treatment plant and the high service pumping station to operate at different rates of flow for limited periods of time.

Major problems exist in the system because the suction piping is at too high an elevation between reservoir number 5 and the pumping station. To remedy this problem all existing piping in the vicinity of reservoir number 5 and the pump station would have to be reconstructed to a lower elevation. Extensive modification of this nature is extremely difficult and expensive. This problem should be remedied when the new high service pumping station is constructed.

COLUMB WHITE

1970 PERCENTAGES

of supply @ 128 mgd.

Aver Day = 2.2% of 128 mgd
Max Day = 3.5% " " "

of Treatment plant Capacity of 84 mgd.

Aver Day = 3.3% of 84 mgd.
Max Day = 5.3% " " "

2000 - PERCENTAGES

Supply
Aver Day 6.3% of 128 mgd
Max Day 9.4% " " "

Treatment
Aver Day 9.7% of 84 mgd
Max Day 14.3% " " mgd

COLUMBIA WHITE

ANDOVER REQUIREMENTS.
Percent of Wichita Supply

Based on firm yield of 128 mgd.

1970. 0.58 %

1980

1990

2000

2.3 % of firm yield

— # —

Percent of Treatment Capacity
Andover

1970

0.9 % of 84 mgd.

2000

3.5 % of 84 mgd.

WHITE
HAMELE & ASSOCIATES
ENGINEERS & PLANNERS

813 825-0015

137% S. SANTA FE AVE. SALINA, KANSAS 67401

KENNETH N. WHITE P.E.
ALVIN F. HAMELE A.I.R. P.E.
HARRY HUNSLEY P.E.

January 5, 1971

Mr. Gene Miller, Mayor
City of Andover
City Hall
Andover, Kansas 67002



Dear Mr. Miller,

Since our last meeting with you on November 10, we have been researching the problems involved in setting up a regional sewer system in eastern Sedgwick and Western Butler Counties which would include the city of Andover. On December 17, we met with Mr. Paul Walker and Mr. Walt Robohn of the Environmental Protection Agency in Kansas City. We also met with Mr. Howard Duncan, Director of the Water Pollution Control Agency in Topeka, Kansas and have assembled the following information.

1. The formation of a regional sewer district set up under state statutes would be necessary in order to allow funding of the studies and construction of the project.
2. This project would fall under the new requirements of the E.P.A. in regard to Regional and Metro plans and Basin plans and would require coordination and approval of the Wichita (Sedgwick and Butler County) Metropolitan Planning Commission.
3. It is possible that the initial comprehensive planning could be eligible for a 50% grant under the Federal Water Pollution Control Act (Section 3 (c), PL 84-660, as amended).
4. Construction of the intercepting sewers, treatment facility and outfall sewers would be eligible for from 30% to 80% grant depending on possible state participation and location in an Economic Development Area. The collection system would be eligible for a 50% grant from F.H.A.
5. This project would most likely be encouraged by the various agencies because of the regional concept and the fact that it could be the first project to fall under the new E.P.A. requirements (sort of a pilot project).
6. Funding of the local portion of the planning study could be made under a 1907 Drainage District Law that allows a county to assess a one mill levy for one year to fund such a study. An alternate way to fund the study would be for the people served by the district

to contribute a predetermined amount to the sewer district for the purpose of covering the costs incurred in formation and performing the study.

We have prepared a rough draft of a proposal to perform the planning and engineering for the project and a copy is included with this letter for your review. We also have assembled a library of the Grant Application Procedures Documents and Requirements; the new E.P.A. requirements and the various grant application forms.

At your convenience we would like to discuss with the City Council more fully the steps that should be taken to initiate this project. We also are inclosing with this letter a map showing the potential sewer district (outlined in yellow) and plant locations (in red) that might be helpful to you in visualizing the project.

Very truly yours,

WHITE, HAMELE AND ASSOCIATES

Kenneth N. White

Kenneth N. White, P.E.

KNW/tlm
enc.

A PROPOSAL FOR
PLANNING AND ENGINEERING SERVICES

REGIONAL SEWAGE COLLECTION
and
TREATMENT FACILITIES

REGIONAL SEWER DISTRICT
ANDOVER, KANSAS

December 1970

W
HITE
HAMELE & ASSOCIATES
ENGINEERS & PLANNERS

913 825-0015

137 1/2 S. SANTA FE AVE. SALINA, KANSAS 67401

KENNETH N. WHITE P.E.
ALVIN F. HAMELE A.I.P. P.E.
HARRY HUNSLEY P.E.

December 8, 1970

Andover, Kansas
Regional Sewer District

Gentlemen:

We are presenting herewith our proposal for planning and engineering services for the proposed Regional Sewer District located in eastern Sedgwick and western Butler counties near the city of Andover, Kansas. We thank you for your consideration of our firm for selection to perform this assignment.

White, Hamele and Associates is a consulting firm consisting of two departments: Engineering and Planning; with principal offices located in Salina, Kansas. We have all the necessary facilities "in-house" or in association with specialists to perform sewage system testing, survey, sub-surface investigations, aerial photography, design, drafting, printing and preparation of plans and specifications. Our associations include sewer system design engineers, geologists, inspectors, architects and planners who are well-experienced in project planning, design, operation and rate analysis of sewer districts.

We encourage your favorable consideration of the selection of White, Hamele and Associates as your consultants on this project and assure our full cooperation with the Sewer District and the city of Andover.

Very truly yours,

WHITE, HAMELE & ASSOCIATES

Kenneth N. White, P.E.

KNW/tlm
enc.

PROPOSAL FOR PLANNING AND
ENGINEERING SERVICES

PURPOSE AND SCOPE

- I. Purpose: The preliminary planning, final design, construction plans and specifications are necessary to ensure eventual development of properly designed facilities that will meet the requirements of the State and Federal Agencies concerned with the project. It is important that the facilities be planned to conform to certain basic principles that will assure Environmental compatibility. The consultant shall prepare reports, plans and specifications and obtain the approval of the district and the Kansas State Department of Health for the construction of the project.
- II. Scope: The consultant shall perform the following services under Phase I - Preliminary:
 - a. Conduct preliminary investigations required to determine project feasibility, regionalization, and environmental compatibility.
 - b. Prepare a preliminary engineering report that will include the following information.
 1. Waste treatment system of sufficient capacity to serve the proposed project and meeting all FWQA, State, and Interstate requirements, including approved water quality standards and protecting the designated uses of receiving waters.
 2. Anticipated removal efficiency of BOD and suspended solids. Total pounds of BOD, suspended solids and other significant constituents to be discharged per day.
 3. Provisions for ultimate disposal of sludge in accordance with interstate, State and FWQA requirements and having the least impact on the environment.
 4. Project planning so as to provide for maximum reliability at all times.
 5. Project planning to provide for satisfactory operation during power failures, flooding, peak loads, equipment failure, and maintenance shutdowns and providing a minimum of primary treatment at all times.

6. A study of ways to eliminate excessive infiltration in the proposed sewerage system to eliminate unnecessary capital and operating costs and avoid inefficient treatment.
 7. A study of pretreatment of wastes that would otherwise be detrimental to the collection system, treatment facilities or processes.
 8. A thorough analysis of operation and maintenance requirements including laboratory testing. Recommendations shall be given for plant staffing, including operator qualifications, and annual budget needs of the proposed facility.
 9. A review of growth potential and provision for adequately providing for increased waste loadings that are expected to develop in the future.
 10. Estimates of cost and an assessment of project feasibility.
- c. Furnish twenty (20) copies of the preliminary engineering report, cost estimates and layout maps.
 - d. Attend conferences with the city, the district, representatives of government agencies and planning groups involved in the project.

The consultant shall perform the following services under Phase II - Final Design and Construction Plans:

- a. Review and update all items studied in the preliminary Engineering report as described under Phase I - Preliminary.
- b. Prepare a design summary to include the following items.
 1. Flow diagram showing major features and nature of flow in plant.
 2. Hydraulic profile through treatment plant, indicating peak flows without back-up, flooding or submerging weirs and permitting discharge into receiving waters during periods of flood stage.
 3. Identification of receiving waters and point of effluent discharge.
 4. Initial population and anticipated flows to the treatment facility and design year, population and flow.
 5. Study major industrial wastes identifying expected strength and affect upon the facility.
 6. Design efficiency, physical characteristics and any deviations from FWQA requirements.
 7. Provide the routine maintenance of treatment units without deterioration of the plant effluent.
 8. Sub surface investigations shall be made to identify underground conditions such as the presence of rock or unsuitable soils.

- c. Furnish contract documents which include all FWOA administrative requirements including labor standards, wage rates, civil rights, competitive bidding, notice to bidders, proposal form, contract agreement form, general conditions, special conditions, payment bond and performance bond. The notice of award and notice to proceed shall also be prepared by the Engineer.
- d. Provide six (6) copies of the detailed plans, specifications, and contract documents for the use of the city and governmental funding agencies prior to the advertisement for bids. Additional copies of the plans, specifications and contract documents needed to secure the approval of Federal, State and local agencies will also be provided within the basic compensation paid to the Engineer.
- e. He will furnish additional copies of plans, specifications, and contract documents as required by prospective bidders, material suppliers, and other interested parties, but he will be allowed to charge for the actual cost of such copies. Upon the award of the contract, he will furnish five sets of the plans, specifications, and contract documents for execution and signatures at no additional cost. The cost of these copies to be included in the basic compensation paid to the Engineer. Original documents, survey notes, tracings, and the like, except those furnished to the Engineer by the client are and shall remain the property of the Engineer.
- f. He shall also furnish "center-line type" descriptions for easements that are required for sewage lines, provided such descriptions may be developed from the design surveys and construction plans. He shall also assist the city when requested in negotiating for easements, rights-of-way, and property needed to construct the facility. In connection with such negotiations, he shall furnish such maps and plans as are necessary provided such maps and plans may be developed from the design surveys and the construction drawings. The cost of such services shall be included in the basic compensation paid to the Engineer.
- g. He will attend the bid opening and tabulate the bid proposals, make an analysis of the bids, and make recommendations for awarding contracts for construction.

The Consultant shall perform the following services under Phase III - Inspection:

- a. He will check any necessary shop and working drawings furnished by contractors and suppliers.
- b. He will interpret the intent of the plans and specifications to protect against defects and deficiencies in construction on the part of the contractors. He will not, however, guarantee the performance of any contractor.
- c. He will provide general engineering inspection of the work of the contractors as construction progresses. Detailed construction inspection will be paid as a separate item if the Engineer is retained to perform detailed construction inspection.

- d. He will cooperate and work closely with the State Board of Health and any governmental agencies involved in the project.
- e. He will prepare estimates for progress and final payments.
- f. He will make final inspection of all construction and certification of final inspection to the city.
- g. He will provide the city with one (1) set of reproducible "as-built" plans, and two (2) sets of prints, on paper, at no cost to the city.
- h. He will prepare notices and advertisement of final payments.
- i. He will be available to furnish engineering advice and consultation necessary to perfect the system for a period of one year after the date of final inspection and acceptance of the facility by the city and governmental agencies involved.

TIME SCHEDULE

- I. The Consultant, when notified to proceed with the services defined in Phase I, on execution by both parties of an Agreement, shall promptly commence work and shall complete the services of Phase I in a period of one hundred and eighty (180) calendar days after notice to proceed and, after approval and funding of the project and notice to proceed, shall complete the services of Phase II, items a. through f., in a period of two hundred and forty (240) calendar days, after notice to proceed.
- II. The services described as Phase III are optional and the Consultant shall proceed to perform the services of Phase III only upon written notice following award of a construction contract.

The Consultant shall provide a resident inspector at the start of construction and shall provide adequate, timely inspection in compliance with the construction schedule. The per diem rate shall include the Consultant furnishing a competent inspector in connection with construction. The compensation assumes consecutive period of service for a minimum of five (5) days per week from commencement to completion of construction. Should the work be discontinued for any reason, one (1) additional day of service shall be paid on discontinuance and one (1) day on resumption of construction work.

COMPENSATION

- I. It is agreed that the compensation to the Consultant for services rendered shall be as follows:

Phase I	--	Lump Sum	
Phase II	--	Lump Sum	In accordance with the Kansas Consulting Engineers fee curve (based on actual construction costs)
Phase III	--	Resident Inspection	Optional at per diem rate of per day of service.

- II. Payment shall be made to the Consultant by the city within thirty (30) calendar days of submission of proper billing by the Consultant as follows:

- Phase I -- Upon submittal of preliminary Engineering Report
- Phase II -- Monthly - based on percentage of completion.
- Phase III -- On completion of each month of resident inspection service.

MISCELLANEOUS PROVISIONS

- I. Change in Scope: The scope of work described herein shall be subject to modification or supplement upon the written agreement of the contracting parties. Any such modifications in the scope of the work shall be incorporated in this contract by supplement agreement. At the time of such modification of work, equitable adjustments will be made by the parties to the contract.
- II. Conferences: Representatives of the district may arrange for such conferences and visits as may be deemed necessary or desirable during the progress of the work.
- III. Termination: The right is reserved by the district, acting as a body, to terminate this contract upon the completion of any of the phases included in the work, should the results show that further work is not warranted. In such an event, written notice shall be given to the Consultant and payment shall be made for the completed phases of the contract. The district further reserves the right to terminate the contract at any time, upon written notice in the event the services of the Consultant are unsatisfactory, or upon failure to prosecute the work with due diligence or to complete the work within the time limits specified by this agreement; provided, however, that in any such case the Consultant shall be paid the reasonable value of the services rendered up to the time of termination on the basis of the payment provisions of this agreement.
- IV. Arbitration: Arbitration of all questions in dispute under this agreement shall be at the choice of either party and the dispute will finally and conclusively be settled by the decision of the arbitrators, one to be appointed by the district, one by the Consultant, and a third to be chosen by the two appointed. In case these three arbitrators thus chosen fail to agree, two additional arbitrators shall be appointed by the presiding judge of the United States Court of Appeals having jurisdiction over the region which includes the project area. By the decision of these arbitrators, or by the majority of them, both parties to this agreement shall be finally bound.
- Arbitrators shall be men capable by training and experience to understand and pass upon the problems to be considered. No one shall serve as arbitrator who has or has had any financial or pecuniary interest with any of the parties or who is or ever has been employed by any of the parties. No arbitrator shall be an advocate for any of the parties.

from: *JH* date: *2-1-71*

admins. adv. plans com. dev. graphics

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royje
 all staff

remarks: *Attached is most of the information you wanted on Andover and Dexter. Let me review this with you and find out what additional info. you need.*

CITY OF ANDOVER

WATER REQUIREMENTS

Year	Popul.	Aver g/d	Max. g/d	Average Day g/d	Average Day + F.F. g/d (3)	Max Day g/d	Max Day + F.F. g/d
1970	2000 ⁽¹⁾	100	150	200,000	650,000	300,000	750,000
1980	3500 ⁽¹⁾	120	180	456,000	1,191,000	685,000	1,420,000
1990	5400 ⁽¹⁾	144	216	779,000	2,079,000	1,166,000	2,466,000
2000	6400 ⁽²⁾	155	230	980,000	2,480,000	1,470,000	2,970,000

(1) Burgwin Martin, Engineers

(2) MAPD Projection.

CITY OF BENTON

WATER REQUIREMENTS
WITH FIRE FLOW

Year	Population	Average Day g/d	Average Day + F.F. g/d (3)	Max Day g/d	Max Day + F.F. g/d
1970	495 ⁽¹⁾	49,500	199,500	74,400	224,400
1980	550 ⁽²⁾	66,000	216,000	99,000	249,000
1990	610 ⁽²⁾	88,000	238,000	132,000	282,000
2000	680 ⁽²⁾	105,000	255,000	156,000	306,000

(1) Burgwin Martin, engr.

(2) MAPD Projection

(3) Fire Flow: 500 gpm for 4 hrs - for cities under 1000 pop.

CITY OF WICHITA.

1				
2	<u>SUPPLY.</u>		<u>Firm</u>	<u>Max</u>
3			<u>yield</u>	<u>yield</u>
4			<u>mgd.</u>	<u>mgd.</u>
5	Cheney.		38.0	60.0
6	Equus Beds.		70.2	110.0
7	Emergency wells		20.0	27.0
8	<u>Total</u>		<u>128.2</u>	<u>197.0 mgd</u>
9				
10				
11	<u>Transmission Pipelines.</u>			
12	Maximum to Filter plant -		108. mgd.	
13				
14				
15	<u>Treatment plant Capacity</u>			
16	Surface water		84 mgd	
17	Well Water		112 mgd.	
18	Combination Surface & well -		84 mgd.	
19	Increase Filter Rate to 6 g/10' m. -		Capacity = 169.5 mgd.	
20				
21				
22				
23	<u>Existing - High Service Pumping Station</u>			
24				
25	Rated Capacity		118 mgd.	
26	Actual pumping Capability		88 mgd.	
27				
28				
29				
30	<u>New High Service Pumping station</u>			
31				
32	Initial capacity -		130 mgd	
33				
34	Additional pump -		30 mgd	
35	<u>Total</u>		<u>160 mgd.</u>	
36				
37				
38				
39				
40				

THE CITY OF WICHITA

OFFICE OF Administration

DATE March 2, 1971

TO Robert E. Finch, Executive Assistant

FROM Don E. Anderson, Director of Administration

SUBJECT Agenda Item--Gene Miller,
Mayor of Andover

Mr. Gene Miller requested that an item be placed on the City Commission agenda for March 9 to review the question of Andover's purchasing water from the City of Wichita. He indicated that he had discussed this item with the City Commission and they would be willing to review the matter again officially on the City Commission agenda.

I pointed out to Mr. Miller that the City Manager had requested a position paper from the Director of Planning regarding this subject and that we would have to await this report before the matter was placed on the City Commission agenda. I advised him that as soon as the report was available and had been reviewed by the City Commission I would contact him on the further developments in the matter regarding the City Commission's official review of this subject.

DEA:mg

cc: Ralph Wulz, City Manager
Robert Lakin, Director of Planning ✓



THE CITY OF WICHITA

OFFICE OF

CITY MANAGER

DATE February 3, 1971

TO Robert A. Lakin, Director of Planning

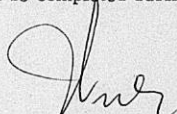
FROM Ralph Wulz, City Manager

SUBJECT Extension of Water Service
to Other Communities

As you know, we have had contact from the communities of Augusta, Benton and Andover relative to the City of Wichita providing them with water service.

Prior to meeting with officials from these communities, it is my desire that the Planning Department develop a dissertation on this subject for study and recommendation by the MAPC.

It is hoped that this assignment can be completed during the month of February 1971.


Ralph Wulz
City Manager

RW:fjh

cc: Robert H. Hess, Director of Water

