INTERIM REPORT — ENGINEERING/FINANCIAL

PLATTEVILLE, COLORADO

PLAN FOR WASTEWATER TREATMENT WORKS

Water Quality Management Plan

LARIMER-WELD REGIONAL COUNCIL OF GOVERNMENTS
LOVELAND, COLORADO

PREPARED BY BRISCOE, MAPHIS, MURRAY & LAMONT, INC.
BOULDER, COLORADO
AND TOUPS CORPORATION
LOVELAND, COLORADO

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208 AREAWIDE WATER QUALITY MANAGEMENT PLAN

TECHNICAL PLANNING REPORT
WASTEWATER TREATMENT WORKS
PLATTEVILLE, COLORADO

Prepared For:

Larimer-Weld Regional
Council of Governments

201 East Fourth Street
Loveland, Colorado 80537

F. A. Eidsness, Jr., 208 Program Director
Terrence L. Trembly, Assistant Director

Technical Planning By:

W. Tom Pitts, P.E., Project Director
W. R. Everest, P.E., Project Manager
W. B. Heller, P.E., Project Engineer

TOUPS CORPORATION
Loveland, Colorado

Financial Planning By:

James Murray, Ph.D.
E. W. Lewan, P.E.

BRISCOE, MAPHIS, MURRAY, AND LAMONT, INC.
Boulder, Colorado

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1.1 TECHNICAL PLANNING SUMMARY

Recently proposed Federal regulations concerning effluent standards for stabilization ponds have significantly reduced the expected cost of upgrading Platteville's wastewater facilities. Proposed discharge standards could now be met by adding disinfection.

In three to four years, Platteville's population is expected to increase to the point where more aerators will be needed to continue to meet discharge standards.

A large percentage of the cost of meeting discharge standards and discharging to the stream is in the cost of the outfall line. Fortunately, this line serves a dual purpose; it will also be used as a chlorine contact basin.

1.2 FINANCIAL PLANNING SUMMARY

Platteville's ability to raise further general purpose revenues from tax sources is not promising at this time. At the present combined mill levy, there is little remaining capacity to raise property tax funds. Further, the Town is now using two of the four cents of sales tax which is statutorily available jointly to the Town and County. Finally, the four outstanding bond issues totaling $310,000 represent a substantial repayment burden for the Town's taxpayers.

Problems that will arise as the Town attempts to garner the necessary financing for its wastewater system will demand much attention from the existing residents. However, care should be exercised not to overlook the broader problem at hand which is how a central wastewater system should be managed in the best long-run interests of the citizens. Management policies regarding the utility service area, extensions, and utility operation are equally as important, and closely related to, financial policies on new hookup and service charges. Policies in these areas should be discussed early to gain citizen understanding and to set the stage for the purely financial decisions. To assist in these areas, the Town should obtain a copy of the Utility Management Handbook (1977) available from the LWRCOG.

The most important financial concern for Platteville is the effect that financing wastewater system improvements will have on the overall tax burden of its residents. Because of the modest amount of proposed improvement costs, Platteville appears to have the option of contributing by increasing Town debt. However, in light of existing obligations, grant assistance would be desirable in order to avoid overextending the Town financially in an attempt to provide sewer system improvements.

It will be particularly important that Platteville's citizens are brought along in the process of deciding about the proposed improvements, and in the development of wastewater management policies so their acceptance of any possible changes in rate levels and management policies can be obtained.

2.0 INTRODUCTION

2.0 AREAWIDE WATER QUALITY MANAGEMENT PLANNING PROCESS

This Technical Planning Report has been prepared as part of an overall Areawide Water Quality Management Plan (208) for the Larimer-Weld Region being developed by Toups Corporation and Briscoe, Maphis, Murray, and Lamont, Inc., for the Larimer-Weld Regional Council of Governments (LWRCOG). The purpose of the Technical Planning component of the 208 plan is to assist various communities in the Larimer-Weld region in solving particular wastewater management problems be developing the best alternative project for waste treatment and disposal.

This Technical Planning Report has been prepared to provide near-term guidance for the Town of Platteville. This report (along with appropriate modifications) will be incorporated into the LWRCOG Areawide Waste Treatment Management Plan following review and approval by all governmental agencies involved.

2.2 PURPOSE AND SCOPE OF TECHNICAL PLAN

Like many other communities in the area, Platteville is experiencing a rather high rate of growth. Many of the newcomers are commuters who prefer the relative quiet and slow pace of small-town living.

Platteville leaders are far-sighted and progressive individuals who realize long-range planning is required so municipal services can keep up with this increased growth rate. They have expressed interest in the possibility of reuse of wastewater and its constituents. This will be evaluated, along with other alternatives.

2.2.1 Scope

The scope of this Technical Plan includes the following phases:

- Describe the planning area characteristics;
- Determine wastewater characteristics;
- Analyze waste treatment and discharge requirements;
- Develop, analyze, and screen alternative plans;
- Provide a detailed description of the best alternative project, including engineering, financial, and institutional programs;
- Prepare a Technical Planning Report presenting all data, and outlining a wastewater management program for the 20-year planning period.
- Assessment of current financial capabilities
- Development of a procedure for establishing a financial program;
- Analysis of the ability (and risks involved) in financing the proposed wastewater treatment program.

3.0 PLANNING AREA CHARACTERISTICS

Platteville is located in southwestern Weld County on U.S. Highway 85 approximately 18 miles south of Greeley and 35 miles north of Denver. The location of Platteville is shown on Figure 3.0-A. Platteville was surveyed and incorporated more than a century ago, in 1871. It is predominately a residential community providing housing opportunities for people working in the Denver, Greeley, Boulder, and Longmont areas. Platteville also acts as a service area for the surrounding agricultural community. The Fort St. Vrain nuclear powered generating station is located approximately 3 miles northwest of Platteville.

3.1 PRESENT AND PROJECTED POPULATION

The population of Platteville increased from 570 to 683 people from 1950 to 1970. The present population is estimated to be about 1,500, or more than double its 1970 population. The population is expected to continue to increase through the year 2000, although at a slower rate than that experienced from 1970 to the present. By 1990, the Platteville population is expected to be in the neighborhood of 2,550 people; by the year 2000 it is expected to range from 3,400 to 3,600 people. The higher figure (3,600) will be used as the population in the year 2000 throughout the remainder of this report.

A graph showing various Platteville population projections is presented on Figure 3.1-A.

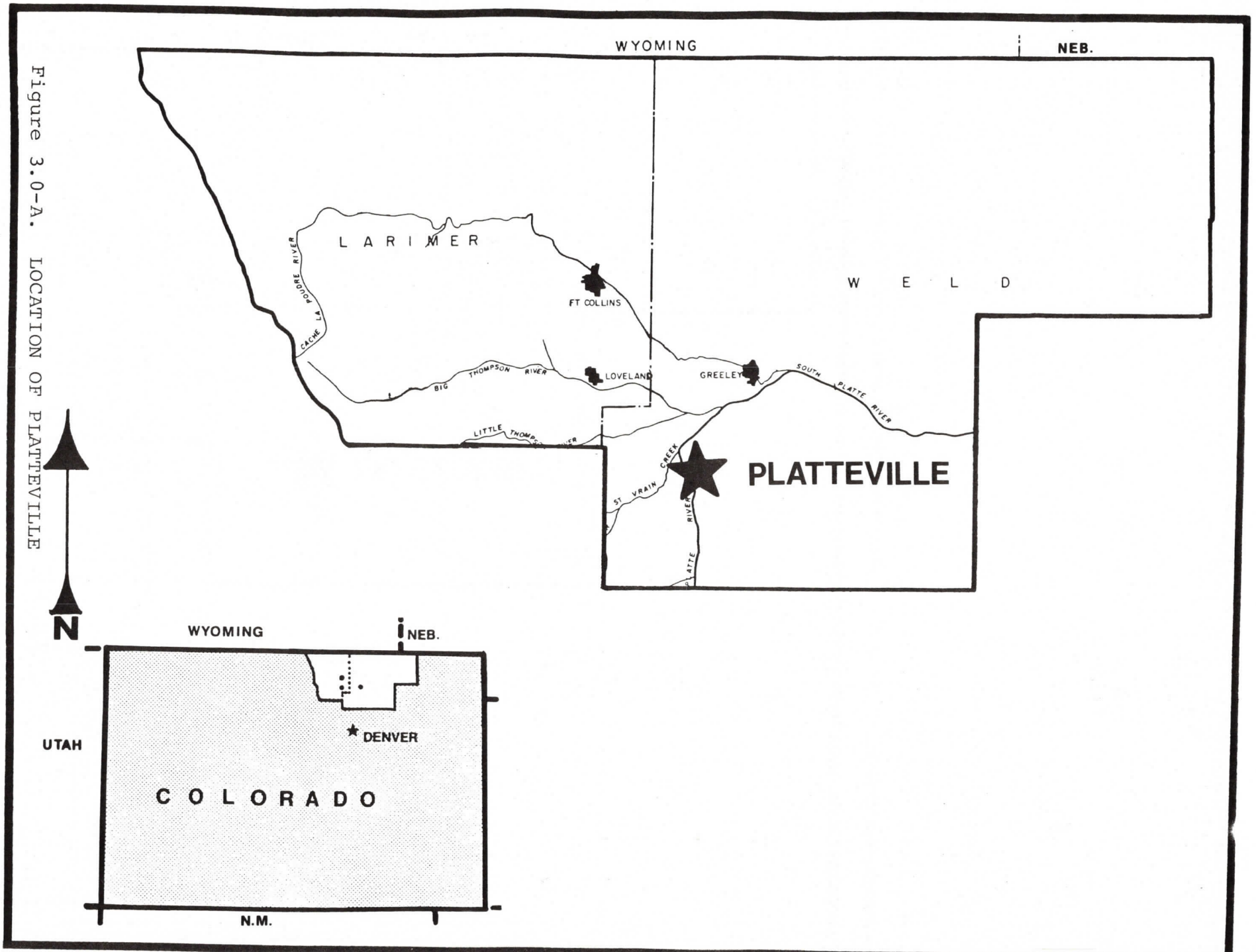

Figure 3.0-A. LOCATION OF PLATTEVILLE

LOCATION MAP - LARIMER-WELD REGION

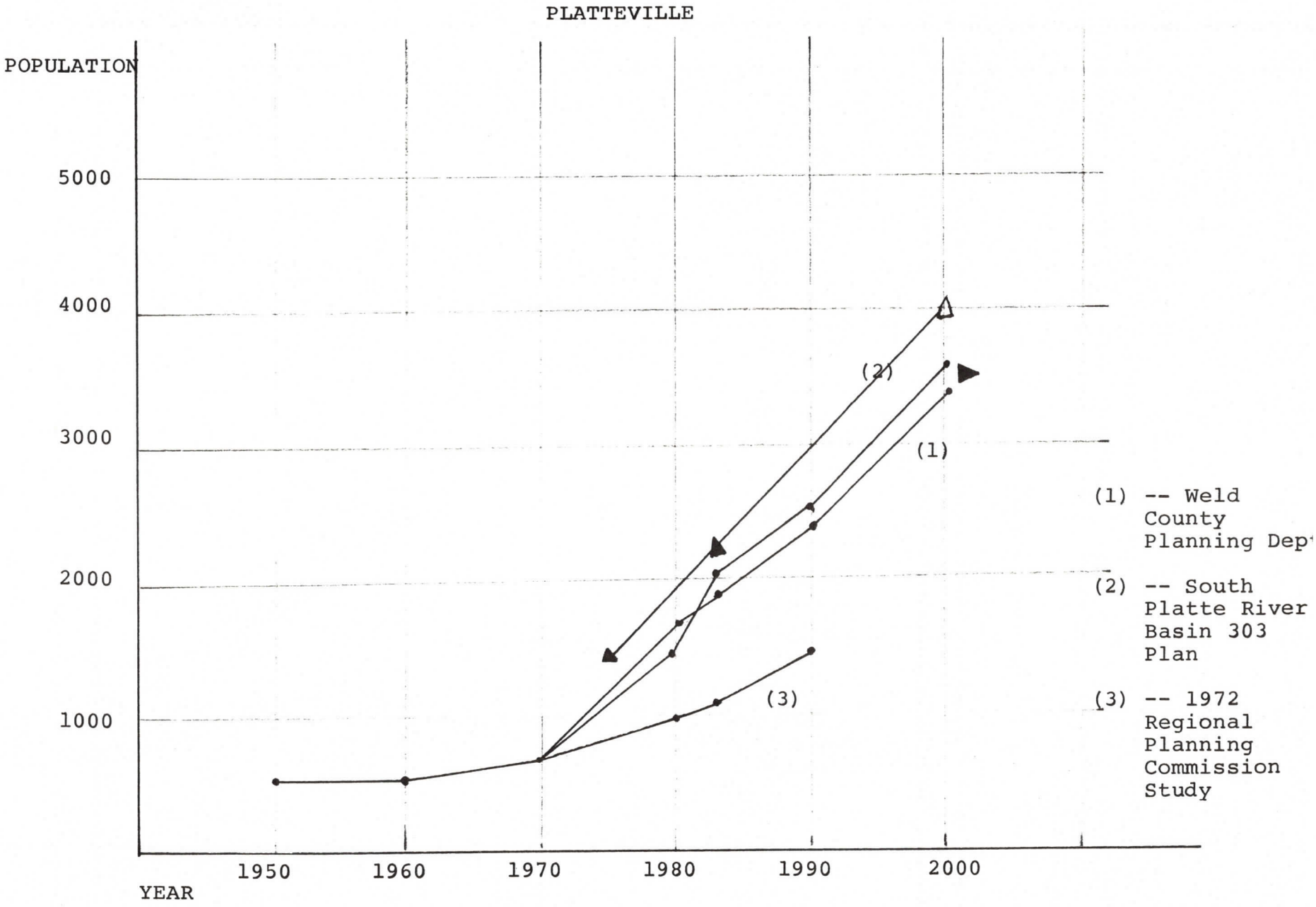

FIG. 3-1-A. POPULATION PROJECTIONS

4.0 WASTEWATER CHARACTERISTICS

The characteristics of Platteville's wastewater will be estimated based on historical data, results of a regional wastewater quality sampling program recently conducted by Toups Corporation, and on recommended design criteria published by the Colorado Department of Health (CDH). Wasteload projections will be developed based on waste characteristics and population projections.

4.1 MUNICIPAL WASTEWATER CHARACTERISTICS

In analyzing wastewater characteristics, it is necessary to investigate components affecting both the amount of wastewater and its strength and composition.

4.1.1 Flow

Platteville does not have a flow meter, so some assumptions will be made to estimate wastewater volume. The winter water use is estimated to be 135,000 gallons per day (gpd). An analysis of the power consumption at the plant, subtracting an estimated amount used for the aerators, reveals the flow is about 147,000 gpd. The national average of wastewater flow is 100 gallons per capita. Since the population is about 1,500 people, this would amount to 150,000 gpd. All three of these values are very similar; a figure of 150,000 gpd will be used for analysis purposes.

As Platteville's population increases, its wastewater volume will also increase. By the year 2000, the flow is estimated to be about 360,000 gpd.

4.1.2 Composition

Wastewater strength is generally measured in terms of biochemical oxygen demand (BOD_5) and suspended solids (SS). Evaluation of other constituents such as chemical oxygen demand (COD), ammonia (NH_3), temperature and pH are necessary in particular situations.

Influent samples were collected and analyzed at many sewage plants in the region, including Platteville. The data collected has correlated well with the national average. Influent BOD_5 is about 200 mg/l; influent suspended solids is about 140 mg/l. The organic wasteload is about 250 pounds BOD_5/day.

Historically the organic strength of sewage has also increased due to modern conveniences. Almost all homes being built have garbage disposals which have increased the strength by about 15 percent. Thus the organic wasteload on a pounds per capita per day (pcd) basis is expected to be 0.2 pounds BOD_5 per capita, and 0.16 pounds SS per capita.

4.1.3 Design Factors

A summary of unit design factors for sizing various components of the wastewater system is presented in Table 4.1.3-A.

4.2 WASTELOAD PROJECTIONS

Wasteload projections have been developed by applying the unit design factors shown in Table 4.1.3-A to the projected population of 3,600. Resulting wasteload projections are summarized in Table 4.2-A.

TABLE 4.1.3A UNIT DESIGN FACTORS

ITEM	FACTOR
Wastewater Flow	
Average flow (gcd)	100 (a)
Peak flow (% of average)	250
Wastewater Composition	
BOD_5 (pcd)	0.2
SS (pcd)	0.16
Ammonia (mg/l)	15

gcd = gallons per capita per day
pcd = pounds per capita per day
(a) Includes minimum I/I contributions

TABLE 4.2-A. WASTELOAD PROJECTIONS (YEAR 2000)

CONSTITUENT	WASTELOAD
Flow (gpd)	
Average flow	360,000
Peak flow	900,000
Average Composition (lbs/day)	
BOD_5	720
SS	576
Ammonia	45

gpd = gallons per day

5.0 DISCHARGE AND TREATMENT REQUIREMENTS

Wastewater must be disposed of in a manner which will protect the public health, maintain receiving water quality consistant with its beneficial uses, and prevent nuisance at the site of disposal. These conditions, along with economic considerations, determine the degree and type of wastewater treatment necessary prior to disposal or reuse. In this section, discharge standards are delineated, treatment requirements are outlined, an overview of alternative treatment processes are presented, and an evaluation of irrigation reuse potential is given.

5.1 WASTE DISCHARGE STANDARDS

Standards promulgated by the U.S. Environmental Protection Agency (EPA) and the Colorado Water Quality Control Commission (WQCC) for the discharge of wastes to receiving waters have been extensively discussed in the South Platte River Water Quality Management Plan [Toups - 1974]. Current standards have been refined, and further changes are presently being proposed.

5.1.1 Existing Requirements

As a minimum, planning of publically-owned wastewater treatment facilities must provide for secondary treatment by 1977 or as soon as possible thereafter, and for application of Best Practicable Waste Treatment Technology (BPWTT) prior to 1983. The levels of BPWTT and various waste management techniques available to meet those levels have been defined [EPA - 1975]. Secondary treatment and BPWTT requirements apply to discharges to all surface waters of the State. The WQCC has ruled that these standards also apply to discharges to privately-owned irrigation supply waters. More stringent standards apply to discharges to water quality limited segments of State receiving waters; however, no such segments are located in the vicinity of the City of Platteville. Table 5.1.1-A summarizes current EPA secondary treatment requirements as promulgated under the Federal Water Pollution Control Act Amendments (PL 92-500), together with current standards of the Colorado WQCC.

5.1.2 Proposed Requirements

EPA has recently proposed a relaxation of suspended solids limitations in discharge standards of communities which utilize stabilization pond systems. The proposed standards recognize the need to retain pond systems for many smaller communities because of their inherent

economical and functional advantages. Adoption of the regulations would allow the EPA Regional Administrator or state agency to grant a variance with respect to suspended solids limitations of secondary treatment requirements defined in NPDES permits, providing the community can show that: (1) waste stabilization ponds are used as the process for secondary treatment; (2) the treatment facilities have a design capacity of 1 mgd or less; and (3) performance data indicates that the facilities cannot comply with the present suspended solids limitations, even if properly operated, without the addition of treatment systems not historically considered as secondary treatment (i.e., filtration systems for algae removal).

Pond systems would still be required to meet an effluent quality achievable by "best waste stabilization pond technology" (BWSPT). BWSPT is defined as a suspended solids value which is equal to the effluent concentration achieved 90 percent of the time within a state or appropriate contiguous geographical area, by waste stabilization ponds that are achieving the levels of effluent quality established for BOD (30/45 mg/l).

TABLE 5.1.1-A. CURRENT WASTE DISCHARGE REQUIREMENTS

PARAMETER	FEDERAL PL 92-500		STATE WQCC		
	30-DAY AVERAGE	7-DAY AVERAGE	30-DAY AVERAGE	7-DAY AVERAGE	SINGLE SAMPLE
BOD_5 (mg/l)	30(a)	45	ns	ns	ns
SS (mg/l)	30(a,d)	45(d)	ns	ns	ns
pH	ns	ns	ns	ns	(b)
Total Residual Chlorine (mg/l)	ns	ns	ns	ns	0.5
Fecal Coliform (MPN/100 m/l)	ns	ns	6,000	12,000	ns
Oil & Grease (mg/l)	ns	ns	ns	ns	10(c)

ns = none specified

(a) Shall not exceed 15 percent of 30-day average influent concentration.

(b) Within the limits of 6.0 to 9.0 unless it can be demonstrated that: (1) inorganic chemicals are not added to the waste stream as part of the treatment process; and (2) contributions from individual sources do not cause the pH to exceed the 6.0 to 9.0 limits (EPA requirements).

(c) Nor shall there be a visible sheen.

(d) Conditional relaxation of these standards now proposed by EPA for communities utilizing stabilization ponds systems with a design capacity of 1 mgd or less.

5.2 OVERVIEW OF ALTERNATIVE DISPOSAL OPTIONS

There are three general classes of disposal options available today: treatment and discharge, treatment and reuse (land treatment), and land disposal. The first two alternatives will be discussed in detail while the third--land disposal--will be discussed in general.

5.2.1 Treatment and Discharge

There are many methods of treating municipal wastewater to a quality at which it can be discharged. As indicated previously, the City of Platteville is not situated on a water quality limited receiving water segment. Therefore, discharge levels must only comply with secondary treatment and BPWTT requirements of EPA. A thorough analysis of the numerous treatment processes available to meet these standards is presented in a later section of this report.

5.2.2 Treatment and Reuse

Four factors prerequisite to wastewater reclamation for reuse of treated wastewater are: 1) the availability of a wastewater reuser (industry or irrigation operation located in close proximity to source of reclaimed water); 2) storage facilities or alternate disposal site for wastewater during periods of non-reuse; 3) capability of producing reclaimed water of required quality; and 4) legal ownership of the wastewater by the municipality.

The State of Colorado currently does not have water quality standards for reuse of wastewater for irrigation purposes. Assuming that the applicable standards will be no less stringent than the existing recommended Federal standards, it will be necessary for the plant to produce secondary effluent. Since this standard is identical to the quality requirements for discharge, no additional treatment facilities would be required for irrigation reuse than if the water were discharged directly to a receiving water. An exception is probable higher levels of disinfection to insure the protection of public health at the reuse site. An identical discharge standard also eliminates the requirement for effluent storage during non-irrigation periods. If it is desired to maximize the amount of wastewater reuse, a reservoir would be required for seasonal storage of reclaimed water. This alternative will be further discussed later in the report.

5.2.3 Land Disposal

Percolation of wastewater through the soil provides additional treatment of the applied wastewater. Suspended solids, bacteria, BOD and phosphorous are all effectively removed by filtering and straining action of the soil [EPA - 1975]. Nitrogen removal, however, is poor. In addition, EPA requirements for secondary treatment do not apply to this alternative. However, to control such things as odors, prudent engineering judgment requires that, as a minimum, secondary treatment as defined by EPA be achieved prior to land disposal.

If a crop is grown in conjunction with a land disposal operation, the project is effectively one of agricultural reuse. The factors which affect the cost of such a system most directly is the area of land required for the design flowrate of the community. Both the size of the application equipment and the land capital costs are directly related to the required area which is determined by the allowable hydraulic loading rate. The allowable hydraulic loading rate for a high-rate irrigation process is dependent only upon the soils' capacity for transmitting water and not on crop irrigation requirements. The maximum hydraulic loading rate is the sum of soil moisture depletion plus the quantity which can be transmitted through the root zone. The soil moisture depletion for the local climatic conditions is approximately 12 inches for the season while the soil transmission rate can range between 10 and 600 inches per year depending on soil type and surficial geology. Total hydraulic loading rates can therefore range between 22 and 612 inches per year which correspond to area requirements of 610 acres/million gallons and 20 acres/million gallons, respectively.

The suspended solids concentration of the water also affects the hydraulic loading rate by clogging the soil. The rates discussed above must be considered maximum. There is also a "buffer area" requirement which increases the necessary amount of land.

5.3 POTENTIAL FOR WASTEWATER RECLAMATION

Analysis indicates that irrigation is essentially the only potential method of reclamation within the Platteville area. Wastewater from the city treatment facility is indirectly reused for agricultural irrigation through downstream diversions. Additionally, agricultural interests in the general vicinity of the city plant may find it to their advantage to consider irrigation with reclaimed water. One restraint on any wastewater reclamation project in Colorado, and particularly Platteville, is the impact of such a program on water rights. This will be discussed in more detail in a later section of this report.

5.3.1 Potential Irrigation Demand

Irrigation of landscape or agriculture with reclaimed water must consider both the annual and seasonal irrigation requirements of the area. As indicated on Figure 5.3.1-A, irrigation use is highly seasonal, with monthly rates varying from 0 to 350 percent of yearly average.

Irrigation requirements for crop irrigation are based on a unit factor of 19 inches per year (1.6 acre-feet/gross acre/year). Considering these rates and seasonal variations, there is sufficient wastewater production at the city treatment facility to irrigate approximately 100 acres of land without the need of providing seasonal storage. Maximum daily reclaimed water demand would approximate 770 gpm to irrigate the 100 acres. With increasing flows, and provisions for reclaimed water storage to meet peak irrigation demands, additional area could be irrigated with city reclaimed water.

A factor which greatly decreases the amount of water available for irrigation is the quantity which seeps out of these ponds to groundwater. This is discussed in the analysis of existing facilities.

5.3.2 Quality Requirements for Reuse

Probably the most important consideration in evaluating the reuse potential of wastewater for irrigation is the quality requirements for the irrigation water. Quality requirements are determined by bacteriological regulations for wastewater reclamation, plus evaluation of the possible adverse effects on the irrigated crop by individual constituents contained in the water. The specification of non-injurious chemical constituent concentrations is a difficult and involved task requiring an extensive review and evaluation of available literature and other data prepared and compiled by numerous agronomists.

5.3.2.1 Public Health Guidelines

Additional precautions are necessary in a reuse program for the protection of public health. Such precautions have been documented as guidelines issued by the California Department of Health. Particular specific documents are of interest to the Platteville project:

- Guidelines for Use of Reclaimed Water for Landscape Irrigation
- Guidelines for Use of Reclaimed Water for Surface Irrigation of Crops
- Guidelines for Worker Protection at Water Reclamation Use Areas

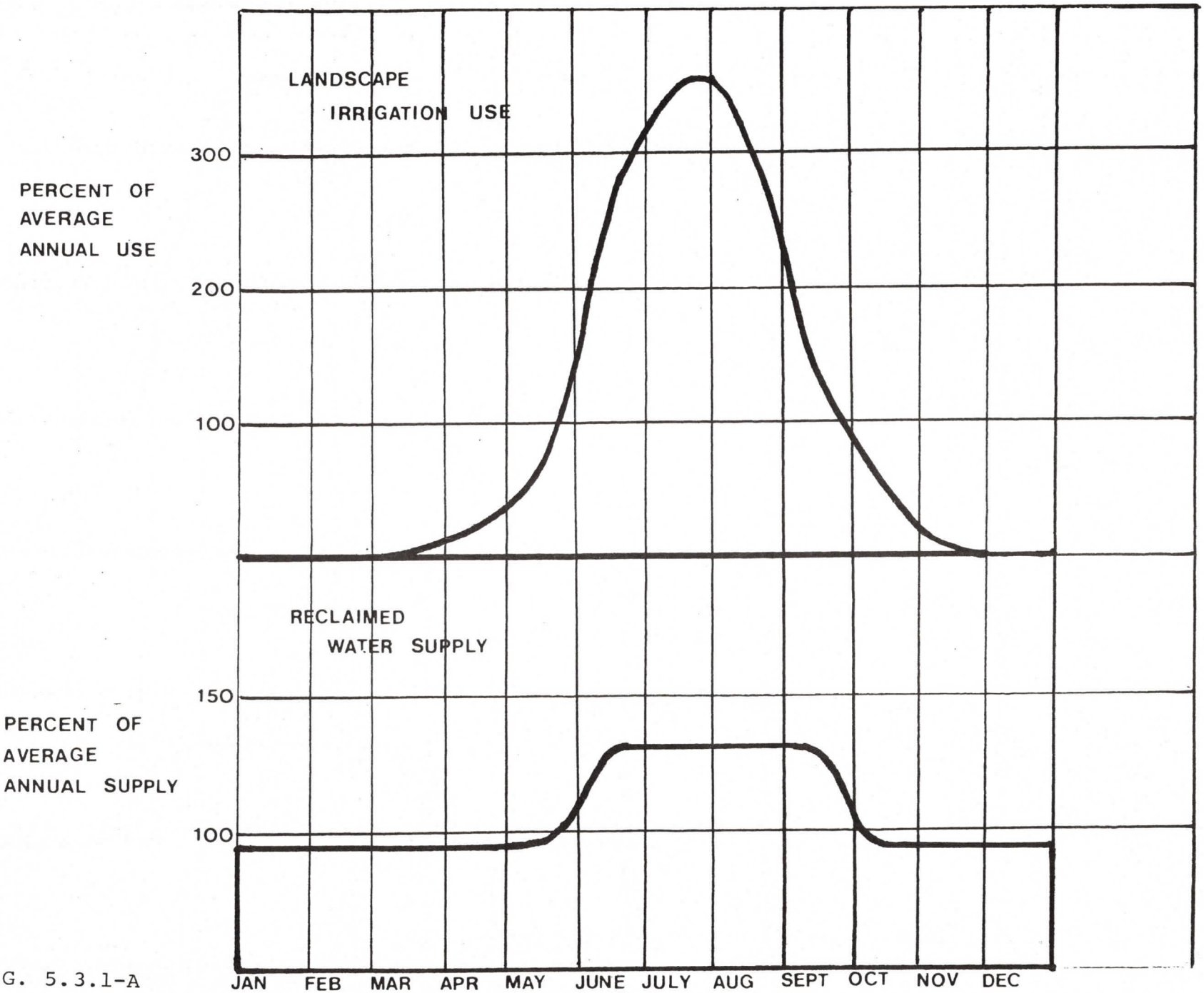

FIG. 5.3.1-A

SEASONAL VARIATIONS OF IRRIGATION USE AND RECLAIMED WATER SUPPLY

These guidelines are reproduced in entirety in Appendix B. In addition to general guidelines concerning pipeline coding, on-site water control and use of reclaimed wastewater, the guidelines address such factors as protection from cross-connections, prevention of unauthorized public use, identification tags, minimized exposure of drinking fountains and picnic tables, public notification of the reclamation operation, and precautionary measures concerning employee contact with reclaimed wastewater.

5.3.2.2 Mineral Constituents

In considering the potential for reusing wastewater for irrigation, it is necessary to consider the effects of the specific chemical constituents of the water and their relation with the soil and with plant metabolism. Extensive studies have been conducted in efforts to determine specific acceptable water quality criteria for irrigation waters.

Probably the most encompassing attempt to determine water quality criteria for agriculture has been conducted by the University of California, Cooperative Extension, Committee of Consultants. The results of their analyses have been published in "Water Quality Guidelines for Interpretation of Water Quality for Agriculture". These guidelines are intended for use in estimating the potential hazards to crop production associated with long-term use of the particular water being evaluated.

These guidelines are used in developing the landscape irrigation water quality standards shown in Table 5.3.2-A. As shown in that table, existing wastewater at the Platteville treatment facility is suitable for irrigation.

TABLE 5.3.2-A. COMPARISON OF MINERAL WASTEWATER QUALITY WITH IRRIGATION WATER QUALITY CRITERIA

CONSTITUENT	EXISTING WASTEWATER QUALITY (a)	IRRIGATION CRITERIA (b)
Electrical Conductivity (umho/cm)	1600 (c)	2800
Total Dissolved Solids (mg/l)	1208	2000

(a) Sample collected September 9, 1976.
(b) Level at which crop yield will not be reduced--based on bluegrass.
(c) Mathematically determined from TDS value.

5.3.2.3 Water Rights Implications

While evaluating the feasibility of irrigation with wastewater in Colorado, the legal implications must be thoroughly explored. Platteville is committed to discharge 5 percent of its groundwater extractions to the streambed. Most municipalities satisfy this obligation by joining an augmentation program.

Platteville has a water well adjacent to its waste treatment lagoon. 1.2 cfs was adjudicated in 1952 to irrigate 17 acres of land. In order to be used out of priority, this well also must be in an augmentation plan. This quantity of water could irrigate about 100 acres of cropland if the full adjudicated volume could be used.

Platteville would not be able to sell or trade its wastewater, although if they use it in their own system again, they will have a chance of obtaining approval [Dugan Wilkinson - 1976]. This indicates that possibly the water could be used to irrigate a community park or golf course.

5.3.2.4 Conclusions Regarding Water Rights

If the wastewater were used to irrigate more than 17 acres, considerable legal problems could develop. If Platteville irrigated a community-owned park or golf course, the legal problems could possibly be solved.

6.0 ANALYSIS OF EXISTING FACILITIES

This section will describe Platteville's existing collection and treatment facilities, and will determine the growth capacity of its treatment works.

6.1. COLLECTION SYSTEM

The first sewers were installed in the 1950's. The system consists of 6-, 8-, 10-, and 12-inch lines. The main outfall line is 12-inch VCP. There are two lift stations, one in town and one at the lagoon site.

The lift station at the lagoon site pumps all of the sewage to the first cell. It is a package lift station with a wet well and a dry well. One pump is a 3 horsepower pump; the other is 5 horsepower. This size lift station is sufficient to satisfy the needs of Platteville through the year 2000 at projected population figures.

The second lift station serves the Bella Vista Subdivision. It is a wet well only type, although the pumps are separated from the wet well by an iron sheet. There is no alarm or warning system, should the lift station fail, although the operators check the station regularly.

Neither lift station has an auxiliary source of power. There is no ventilation fan at the Bella Vista lift station.

6.2 TREATMENT PLANT

Sewage treatment is accomplished with three stabilization ponds in series. Three floating, 5 horsepower aerators aerate the first lagoon. This cell presently has a detention time of about 6 days. The second cell is an "L" shaped pond with a detention time of about 53 days. There is a valved effluent structure from this pond which appears to have been used in the past as evidenced by the erosion around the outlet pipe. Even if this structure is used, it is doubtful that a discharge to a stream would occur. The water would flood the roadside ditch and adjacent field, but not get to waters of the State. The third cell is a square pond with a detention time of about 52 days. This cell has a concrete discharge structure which would allow effluent to flow through a pipe to Farmers Independent Ditch.

There is a water well on the south edge of the second cell. This is used as supplemental water should any of the cells get too shallow.

A flow schematic is shown on Figure 6.2-A. The flow schematic reveals that there is some flexibility with regard to direction of flow, although the schematic is somewhat misleading. The main flexibility is in regard to which lagoon would be the primary pond, although only the lagoon currently being used as a primary pond is lined. The pipe at the south end of the number one pond is above the present water level. It cannot be used without flooding out the electrical controls for the aerators. Consequently, the valved line is used to get wastewater from the first to the second pond. Although this schematic is not to scale, the distances are relatively correct. As can be seen, there is a short circuit condition from the first pond to the second, and from the second to the third. The effect of this short circuiting is that the full treatment capacity of these two cells is not fully utilized.

6.2.1 Discharge Analysis

The sewage plant does not discharge effluent to surface waters; consequently, Platteville has no NPDES permit. The two means of eliminating a surface discharge are seepage and evaporation. The annual net evaporation in this area is about 33 inches per year. This indicates that evaporation accounts for about 18 percent of the influent volume. The rest, or about 123,000 gallons per day, is lost as seepage. If Platteville desired to irrigate a crop with effluent, it would be to their advantage to line all the cells so this water would not be lost.

6.3 OPERATION AND MAINTENANCE

There are two maintenance men at Platteville who are responsible for all of the city's equipment. Neither of these men is a certified sewage treatment plant operator.

6.3.1 Plant Operation and Maintenance

Some of the problems at the plant are design problems over which the operators have no control. The short circuiting flow pattern is an example of this. The flow pattern has been optimized as much as possible without changing the system.

Since most of the operational controls are set, the main duties of the city's employees are to maintain the equipment and lagoons. Lagoon maintenance is predominately control of weeds and rodents. Weed growth often occurs in the shallow water at the edge of ponds. It is especially important to control these weeds, as the stagnant water in these areas is very good breeding ground for mosquitoes and other insects which potentially could carry disease.

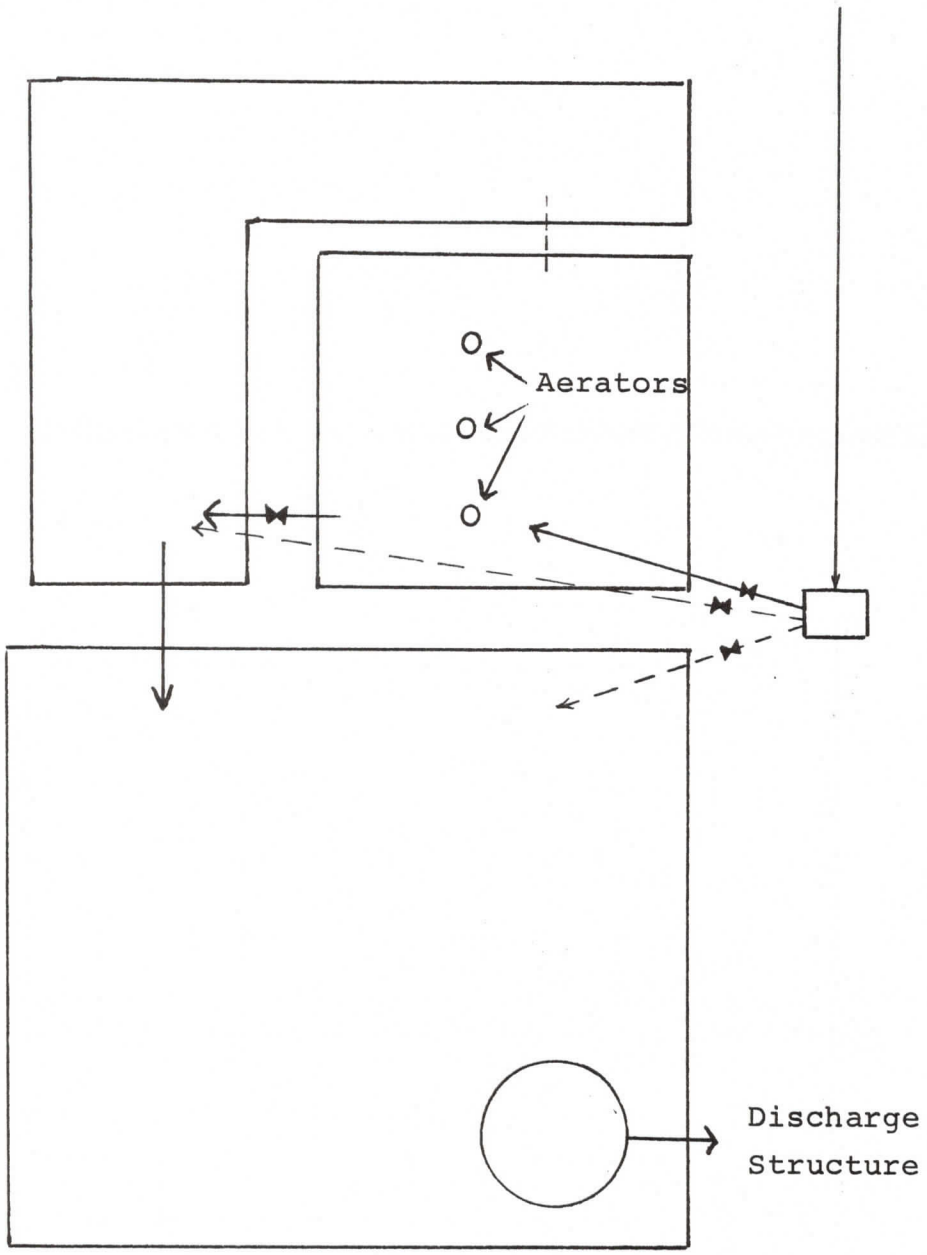

FIG. 6.2-A. EXISTING FLOW DIAGRAM

←——— Indicates currently used piping and direction of flow.

- - - - - - Indicates alternate flow pattern.

⋈ Valve

Weeds can be controlled by cutting, burning, or pulling them. Herbicides or soil sterilants are not recommended. Herbicides also kill algae, which are beneficial. Vegetation on the dikes is good because it helps control erosion. Burning weeds with an agricultural burner is the most common method of control, and is especially effective in controlling weeds growing out of the water. If burning is to be done, a permit should be obtained from the Weld County Health Department. Rodents burrow into dikes and eventually can cause the dikes to fail. Rodents are not believed to be a problem at Platteville, although operators should be prepared to set traps if they notice an influx of the animals.

6.3.2 Lift Station Maintenance

The lift stations appear to have been fairly well maintained. Recently there has been a problem with losing prime at the Bella Vista lift station. The operators are aware of this problem.

Good maintenance of equipment is common throughout the region. This is probably because most men that work for the cities and towns are mechanically oriented. They enjoy working on pumps and motors. Other problems such as weeds are commonly neglected, but are also important.

6.4 CAPACITY OF WASTEWATER TREATMENT PLANT

An analysis of the organic waste (BOD_5) removal capability of the stabilization ponds indicates that about 1,700 people can be served if the aerators are run 24-hours per day. By increasing the aeration capacity, the projected population of 3,600 can be served.

Due to the short circuiting, more people could not be served without modifying the flow pattern. However, by modifying the flow pattern, up to 10,000 people can be served by the Platteville treatment plant. These modifications will be further discussed in Chapter 8.0.

In order to meet current discharge standards, the effluent will have to be disinfected. This also will be discussed in Chapter 8.0.

7.0 BASIS OF PROJECT DEVELOPMENT

In subsequent chapters, specific treatment alternatives and costs will be discussed. A best alternative and recommended course of action will be derived from those discussions.

The treatment processes discussed will be evaluated in accordance with the Colorado Department of Health's design criteria.

The cost of constructing and maintaining the facilities required for each of the alternative plans considered in this report includes the capital outlay necessary for initial funding plus continued expenditures for operation throughout the lifetime of the project. The data presented in the following sections will provide sufficient information for comparison of alternative plans.

8.0 ALTERNATIVE PLANS FOR UPGRADING AND DISPOSAL

As has been stated in Chapter 6.0., Platteville can meet anticipated discharge standards with only minor expenditures. The possibility of using an entirely different treatment process is not recommended because this would cost at least $350,000. Platteville is interested in the possibility of using this "waste" product as a resource if economically feasible. For these reasons this chapter will deal only with means of upgrading to meet discharge standards and with means of resource recovery.

8.1 UPGRADING TO MEET DISCHARGE STANDARDS

In order to satisfy the oxygen demand at a population of 3,600, more aerators will be required. An additional 20 horsepower aeration capability will be needed. According to Figure 3.1-A, Platteville will reach the population of 1,700 in about 1980, at which time additional aeration will be required.

Disinfection is also required so that the fecal coliform standard can be met. The detention time in the chlorination basin should be 30 minutes. This is the only unit which must be added now in order to meet existing discharge standards. The cost of this facility is shown in Table 8.1-A. This cost assumes the outfall line (described below) will be used as a contact basin. If the outfall line is not built, chlorination facilities will cost about $20,000 more.

8.1.1 Outfall Line

The outfall line from the discharge structure would carry treated wastewater to the Farmers Independent Ditch. This ditch does not carry water during most of the year, so a discharge here could cause nuisance conditions during those periods. This potential problem can be alleviated by discharging to the South Platte River.

The least expensive way to accomplish this would be to construct an outfall line from the lagoons to the new storm sewer. The estimated cost of this is also shown in Table 8.1-A.

Although no surveying has been done, it is not believed that effluent can flow by gravity through the outfall line to the storm sewer. If the waste can flow to the storm sewer by gravity, the cost of the lift station can be saved.

TABLE 8.1-A COST OF UPGRADING

ITEM	COST
Chlorination Facility	$25,000
Outfall Line	25,000
Lift Station	20,000
1977 Construction Cost	$70,000
Engineering, Legal, and Contingencies (30%)	21,000
TOTAL 1977 Project Cost	$91,000

8.1.2 Lift Station Modification

The lift stations need minor upgrading to comply with safety recommendations of the Colorado Department of Health. Standby power is required to protect against power outages. This is often done by obtaining power from a separate service system, or by using portable generators. Public Service Company or REA should be contacted to aid in the solution of this problem.

The Bella Vista lift station should have a fan installed so harmful gases can be removed. This is to protect an operator, should he need to perform maintenance work in the lift station. It is anticipated that this can be done inexpensively by force account.

8.2 REUSE POSSIBILITIES

As had been previously stated, Platteville is interested in resource recovery. Two such methods are discussed.

8.2.1 Anaerobic Digestion

The possibility of building an anaerobic digester which could produce recoverable methane gas was investigated. This is a facility which reduces pollutants in wastewater and sludge in the absence of dissolved oxygen. The methane is produced as a by-product. Unfortunately, methane produced in this manner has an energy value of only about 600 BTU/ft^3 because of other non-combustible gases associated with it. By comparison, natural gas has an energy content of 1000 BTU/ft^3. The amount of gas produced is about 0.6 to 1.0 ft^3/capita. Thus, the useable heat recovered would be about equal to the amount of power required to operate a mechanical treatment plant.

Sludge from this process could be used as a soil conditioner on agricultural land, and treated wastewater could be used for irrigation. This sludge has very little monetary value, and most other communities have found that sludge disposal is a problem, rather than a benefit.

Finally, capital and operation and maintenance costs would be high for this system, especially in light of the fact that very little is needed to upgrade the existing plant. For these reasons, this possibility was not further explored.

8.2.2 Irrigation with Effluent

If water rights problems discussed in Chapter 5.0 can be solved, reclaimed wastewater could be used for irrigation. The stabilization ponds would be upgraded as discussed above. Because it is very doubtful that the water rights problems can be inexpensively resolved, this possibility will not be further explored.

8.3 RECOMMENDED ACTION

It is recommended that the existing plant be upgraded to meet anticipated discharge standards. The cost of this is shown in Table 8.1-A.

8.4 IMPLEMENTATION PROGRAM

The minimum practical timetable for implementing the proposed project is presented in Table 8.4-A. Many of the steps are dependent on previous steps, so if any are delayed, the others should be set back accordingly.

TABLE 8.4-A. ESTIMATED IMPLEMENTATION SCHEDULE

PROJECT TASK	IMPLEMENTATION DATE
Approval by Council	May, 1977
Authorize and Process Site Application	June-August, 1977
Finalize Financial Program	June 1977
Prepare Engineering Plans & Specifications	August-September, 1977
Review and Approval of Plans by Colorado Department of Health	October 1977
Advertise for Bids & Award Contract	October-December, 1977
Construction of Facilities	December-March, 1977-78
Start-Up of Facilities	March, 1978

9.0 FINANCIAL PROGRAM

9.1 EXISTING CONDITIONS IN PLATTEVILLE

9.1.1 Financial Capabilities

The 1976 estimated population of Platteville was 1,500, an increase of slightly over 800 people, or 114% from the 1970 census figure.

The community's current (1977) financial picture can be briefly summarized as follows:

- Assessed Valuation: $1.49 million
- Anticipated Town Revenue from Property Tax (1977): $35,972
- Combined Mill Levy on Platteville Taxpayers: 85.90 mills

Town	24.11 mills
County	21.13 mills
School District	40.66 mills

- Total Sales Tax: 5% (3% State, 2% Town)
- Additional Sales Tax Capability (County and Town): 2%
- Town's Bonded Indebtedness (January 1, 1977):

General Obligation Bonds - Water	$ 16,000
- Street Improvement	136,000
Revenue Bonds - Sewer	28,000
- Storm Sewer	130,000
Total	$310,000

- Town's General Obligation Bond Capacity (10% of Assessed Valuation): $149,000 of which $136,000 has been used with the street improvement bonds.
- Median Family Income: $8,200

Platteville's ability to raise further general purpose revenues from tax sources is not promising at this time. At the present combined mill levy, there is little remaining capacity to raise property tax funds. Further, the Town is now using two of the four cents of sales tax which is statutorily available jointly to the Town and County. Finally, the four outstanding bond issues totaling $310,000 represent a substantial repayment burden for the Town's taxpayers.

9.1.2 Sewage Handling Facilities and Proposed Improvements

In January, 1977 an estimated 460 users were connected to the sanitary sewer system. An average of 16 new taps each year were added to the system in 1974 and 1975. Sewer

charges are on a flat rate basis, totaling $48 per year. Tap fees are $500.

For 1977, the Town is budgeting $13,033 for sewer system operating and maintenance costs. In addition, $4,040 is budgeted for capital improvements. Further financial demand is placed on the fund to service the sewer revenue bonds ($4,031) and to pay $10,987 interest on the storm sewer bonds. Because no principal payments are now being made on the $130,000 storm sewer bond issue, the financial position of the sewer fund is not expected to improve in the near future. Monies to fund these outlays are budgeted as follows:

Sewer charges	$21,000
Tap fees	10,000
Interest	2,000
Revenue sharing	2,000

Thus, the cash inflow to the fund of $35,000 will slightly exceed cash outlays of $32,091. Thus, there is potential for a slight year-end fund balance of $2,909. This fund balance may be very useful in putting immediate local funding into an expanded/upgraded sewer system.

The technical analysis for Platteville recommends upgrading of the sewage treatment facilities, by construction of a chlorination facility, an outfall line, and a lift station. The estimated capital cost of this upgrading is $91,000. Estimated annual operations and maintenance costs are expected to increase by $3,500 annually when the improvements have been made.

9.2 RECOMMENDATIONS FOR SEWER UTILITY MANAGEMENT

The following are suggested general principles for a balanced utility program. This management process has proven successful in preventing construction and operation of sewer systems from posing an unreasonable burden on residents of growing communities, and is the basis for determining optimum financing capabilities.

9.2.1 Utility Service Area

The community should lead, not merely follow, development. The community should decide where it is most economical and efficient to provide services, and make known where it prefers growth to take place. By not annexing or extending utility lines outside the Town into areas it does not want to see grow, it can avoid having to serve those areas. Conversely, for those areas in which it wishes to encourage growth, it can build trunk lines into them and save potential developers that front end cost. This approach must be tied to other community goals, programs, and strategies in order to be successful.

9.2.2 Financial Policies

Utility financing for growing communities should be designed so that "he who benefits pays". This approach may be tempered by other community policies, such as a desire to keep or attract an industry unable to pay its fair share, or to assist development of low income housing which could not be built if a full tap fee were required.

This philosophy can be implemented by applying the following policies:

- Establish service fees based on all costs of operation including employees' wages and benefits, maintenance, depreciation. Additional costs may be included, such as a reasonable fee paid into the General Fund for services or facilities, provided to the sewer utility by other municipal departments, such as office space and vehicles.

- Establish plant investment or tap fees (PIF) for all new customers or expansions of service, proportionate to treatment plant and trunk capacities the customer is expected to use. (See 9.3.1.1)

- Charge all direct costs of attaching to the system directly to the customer; e.g., costs of tapping into the line, and laterals and pipe from the street to the building.

9.2.3 Service for New Developments

Internal or lateral lines or pumps required to serve new developments should be provided by the developers. They may directly finance and build them, passing on costs to future occupants; or, where occupancy is relatively assured, the community may permit a special improvement district to be formed with the bonds paid back over an extended period of years through added mill levies on the properties benefiting. The cost of these localized facilities should not be borne by the community at large.

All extensions of lines past undeveloped areas to a development should be financed by the development seeking the service. Some of these costs can be paid back as intervening property is developed and attached to the system. The community should not be committed to providing such lines on request.

9.3 ANALYSIS OF PLATTEVILLE'S ABILITY TO FINANCE WASTEWATER SYSTEM IMPROVEMENTS

The major questions a community must ask itself when considering its capabilities to finance and operate a sewer

utility are:

- Can the community raise enough money to cover capital cost requirements?
- Can the community support the system on a continuing basis (operating and maintenance costs)?
- What are the utility financing implications of whether or not the population in the community increases?

In developing a financing program, sewer utility needs for financing should always be placed in the context of total community funding needs. Because locally generated funds all come from the same taxpayer or user, a more moderate commitment to sewer costs may be necessary in order to achieve other community goals. Considering that there are many ways to accomplish funding goals, financing strategy must be used to develop the most equitable system for the users with a minimum of future risk.

Table 9.3-A illustrates how much cost to maintain the improved system and retire debt would fall upon each system user (tap) annually under various assumptions of borrowing and population growth. The table shows that if the Town borrows $75,000 for capital improvements, and experiences growth of 10 taps per year, the total burden per tap would be $72 measured in 1981. If only $50,000 were borrowed, and growth were 15 taps per year, the 1981 burden per tap would be $59.

The remainder of this section addresses questions of how capital and operating funds for the system might be raised.

9.3.1 Financing the Proposed Capital Improvements

A total capital investment of $91,000 would be required to implement the improvements proposed in the engineering analysis. Major sources of capital funding are plant investment fees (PIF's), grants, and borrowing.

9.3.1.1 Plant Investment Fees

A plant investment fee is normally set by dividing the total capital cost of the system by its capacity, and determining the pro rata share. For example, a $100,000 system to serve 100 units would indicate a PIF of $1,000 per unit. Where a community is large and wealthy enough to generate the proportionate shares of the capital cost, PIF's could fully finance its system.

The availability of revenue from PIF's depends on when and on the extent of new development that occurs. However,
(9.3.1.1 continued on page 31 .)

TABLE 9.3-A *

TYPICAL ANNUAL COST FOR EACH UNIT ON THE SYSTEM

Annual Growth Every Year Through 1996

Growth Rate Relative to 1975 Population	New Population Each Year	New Taps	Funds Borrowed by Town For Sewer System Improvements				
			$ 0	25,000	50,000	75,000	100,000
0%	0	0	75	80	86	91	96
1	16	5	66	71	76	81	86
2	33	10	58	62	67	72	77
3	49	15	50	55	59	64	69
4	60	20	43	48	52	57	61
5	82	25	37	42	46	50	54
7	98	30	32	36	40	44	48
8	114	35	27	30	34	38	42
9	130	40	22	25	29	33	37
ANNUAL COSTS:							
Operations and Maintenance (1981):			15,841	15,841	15,841	15,841	15,841
New System Operations and Maintenance:			3,500	3,500	3,500	3,500	3,500
Existing Debt (1981 Payments)			15,018	15,018	15,018	15,018	15,018
New Debt			0	2,453	4,906	7,359	9,812
TOTAL ANNUAL COSTS			34,359	36,812	39,265	41,718	44,171

* See notes page 30 .

Source: Murray; Briscoe, Maphis, Murray & Lamont, Inc., March, 1977.

NOTES ON TABLE 9.3-A

- All costs are calculated for 1981, but nevertheless are close enough estimates of any year through 1996.

- The operation and maintenance (O&M) costs are inflated for price and wage increases to 1981. For 1977, the total operations and maintenance cost is budgeted at $13,033. Inflated at 5% annually, this would rise to $15,841 by 1981.

- New debt is figured at being retired in 20 years and paying an interest rate of 7-1/2%. Actual terms will be closely related to local financial conditions and bond market conditions upon issue.

- Tap or Plant Investment fees are figured at $500. These are used to retire as much new debt as possible. For instance, with the addition of 50 taps at $500 each, as much as $25,000 in new debt could be retired. In some cases where the growth rate is high and borrowing low, tap fees are applied to the cost of old debt and/or O & M costs.

- The yearly growth rate necessary to achieve the annual costs shown on the chart would have to occur every year. For example, if $100,000 were borrowed, 20 new taps would have to be added every year for the next five years (or a total of 100 new taps added to the system over the five-year period) for the annual cost to be $61 per unit by 1981. To maintain that annual charge, the growth would have to continue by that rate beyond 1981.

- The source of revenue to pay the annual costs is a local decision. The Table simply indicates the amount needed.

- The Table may be adjusted as new information becomes available by using the following basic formula:

$$\text{Annual Cost Per Unit} = \frac{\text{Annual O\&M + Annual Debt Service - Tap Fees}}{\text{Number of Units on the System}}$$

- Note that the Table shows the remaining cost, over and above that paid by tap fees, to be shouldered by system users. It may be determined that the maximum or "worst case" figure shown in the top row of the Table is not unreasonable in terms of user's ability to pay. This is the case if no growth occurs and only current residents are available to pay the full cost. If the figure is unreasonable, funds from other sources should be sought to cover the total cost. An alternative would be initially to scale down the amount of borrowing, if possible.

(Continuation of Notes on Table 9.3-A)

to generate some immediate capital funds through this charge, the Town may be able to find proposed developments that will prepay some of their PIF's. This approach is particularly appropriate if new taps might be unavailable if sewer facilities are not improved. Otherwise, PIF's cannot be expected to provide a significant portion of capital funding that will be initially required.

9.3.1.2 Grants and Subsidized Loans

Grant funds may be available to assist with the costs of capital construction. Because the availability of such funds will be important in figuring the remaining burden on the local residents, this source of funding should be investigated early in the process of deciding if and how the Town should proceed.

Determine the approximate amount of grants (and/or subsidized loans) available from various government sources. For smaller communities such as Platteville, these are the most likely sources at this time:

- Farmers Home Administration
- The Colorado Department of Local Affairs
- HUD Community Development discretionary funds for service lines

In order to gauge a community's eligibility, these funding agencies typically evaluate the locality's ability and efforts to finance its own system. For example, the Colorado Department of Local Affairs takes into consideration for each community requesting assistance the following:

- Legal ability to tax
- Assessed valuation
- Median family income
- Current bonded indebtedness
- Total tax effort
- Number of people on fixed incomes
- Level of user charges

The key element considered by the Department of Local Affairs and the Farmers Home Administration, other factors being equal, is the state guideline that a community's annual user charge for sewer service should be at least 1-1/2% of the median family income. This guide is used to determine if a community is doing its fair share to pay for the system. The figure can be lowered for a number of reasons: for example: if a town is in a weak financial condition, or has a large number of people on fixed incomes. But as a general guide, this tells a community how it will stand in potential aid levels from the various funding sources.

The state guideline that 1-1/2% of a community's median family income represents a reasonable annual user fee, indicates

TABLE 9.3.1-A
SOURCES OF POTENTIAL FINANCIAL AID

	FHA COMMUNITY FACILITY LOANS/GRANTS - FEDERAL	CONSTRUCTION GRANTS FOR SEWERAGE WORKS (STATE OF COLORADO) STATE	FOUR CORNERS REGIONAL COMMISSION, SUPPLEMENTAL GRANT-REGIONAL	COMMUNITY DEVELOPMENT ACT (HUD)-DISCRETIONARY FUNDS FEDERAL	EPA CONSTRUCTION GRANTS - FEDERAL	PREDESIGN ENGINEERING GRANTS (STATE OF COLORADO) STATE	ECONOMIC DEVELOPMENT-ADMINISTRATION (EDA) - FEDERAL
PROGRAM DESCRIPTION							
FUND USAGE	TO CONSTRUCT, ENLARGE, EXTEND, OR IMPROVE SEWERAGE SYSTEMS.	TO CONSTRUCT, EXPAND, OR MODERNIZE SEWAGE TREATMENT FACILITIES	PROGRAM IS GEARED FOR ECONOMIC DEVELOPMENT TYPE PROJECTS. HOWEVER ECONOMIC DEVELOPMENT HAS A VERY BROAD DEFINITION.	TO CONSTRUCT SEWAGE COLLECTION LINES NOT TREATMENT FACILITIES.	TO PLAN, DESIGN, AND CONSTRUCT SEWERAGE COLLECTION AND TREATMENT FACILITIES.	PREDESIGN ENGINEERING FOR THE EXPANSION, CONSTRUCTION, OR MODERNIZATION OF SEWAGE TREATMENT SYSTEMS INCLUDING COLLECTION OF FACILITIES	THE PROGRAM IS CURRENTLY BEING RECONSIDERED BY THE CONGRESS. IT IS ANTICIPATED THAT THE QUALIFICATION REQUIREMENTS WILL NOT CHANGE. THE BASIC REQUIREMENT BEING HIGH UNEMPLOYMENT RATE AND HIGH NUMBER OF UNEMPLOYED.
FORM OF ASSISTANCE	MAY BE EITHER LOAN OR GRANT, GRANT OR LOAN 50% OF PROJECT. LOAN 40 YEARS AT 5%.	ASSISTANCE IS GIVEN IN THE FORM OF A GRANT. THE AMOUNT VARIES UPON THE FINANCIAL NEED OF THE COMMUNITY	ASSISTANCE IS IN THE FORM OF A GRANT. MAXIMUM SUPPLEMENTAL GRANT IS 60% OF OTHER FEDERAL FUNDING OR $150,000.	GRANT FROM DISCRETIONARY FUNDS FOR ALL PORTION OF PROJECT.	ASSISTANCE IS IN THE FORM OF A 75% GRANT.	NORMAL STATE GRANT OF 30%, APPLICANT MATCHING FUNDS OF 20%. THE APPLICANTS SHARE IS VARIABLE DEPENDING UPON FINANCIAL NEED.	
AMOUNT OF ASSISTANCE	LOAN/GRANT RANGE: $20,000-$200,000.	AVG. GRANT: $50,000 MAX. GRANT: $500,000	AVG. GRANT: $75,000	AVG. GRANT: $130,000 GRANT RANGE: $50,000-$300,000	AVG. GRANT: N/A GRANT RANGE:	AVG. GRANT: $3,000	
CURRENT FISCAL YEAR APPROPRIATION	$4.8 MIL LOANS, .9 MIL GRANTS	$2.3 MIL	$2.5 MIL	$2.5 MIL FISCAL YEAR 1977 (COLORADO NONMETROPOLITAN)		$200,000	
ANTICIPATED APPROPRIATION NEXT FISCAL YEAR	ABOUT THE SAME AS PRIOR YEAR.	$2.9 MIL	$1.7 MIL	MINOR INCREASE FOR FY 1978		$200,000	
ELIGIBILITY REQUIREMENTS							
ELIGIBLE ENTITIES	MUNICIPALITIES AND DISTRICTS	ANY MUNICIPALITY OR SPECIAL DISTRICT	ANYONE WHO CAN GET FEDERAL BASIC FUNDING	A FORM OF GENERAL PURPOSE GOVERNMENT, E.G. INCORPORATED MUNICIPALITIES, COUNTIES, THE STATE OR INDIAN TRIBES.	SEE ATTACHED NOTICE OF FINAL ADOPTION OF FEDERAL CONSTRUCTION GRANT PRIORITY SYSTEM, DATED AUG. 20, 1975.	ANY MUNICIPALITY OR SPECIAL DISTRICT.	
ELIGIBILITY REQUIREMENTS	MUST NOT HAVE THE CAPABILITY TO FINANCE THE PROJECT THROUGH AVAILABLE COMMUNITY RESOURCES. HAVE POP. LESS THAN 10,000 AS OF LAST CENSUS	APPLICANT'S POPULATION MUST BE 5,000 OR LESS, AS OF THE LATEST CENSUS.	MUST HAVE RECEIVED ANOTHER SOURCE OF FEDERAL AID.	N/A	N/A	APPLICANT'S POPULATION MSUT BE 5,000 OR LESS, AS OF THE LATEST CENSUS.	
DISCRIMINATING FACTORS	FINANCIAL NEED, THE ENTITY MUST BE AT OR NEAR THEIR LIMIT ON BONDING INDEBTEDNESS.	FINANCIAL NEED, BONDED INDEBTEDNESS, ASSESSED VALUATION, MEDIAN INCOME, ETC.	THE PROJECT MUST PROMOTE ECONOMIC DEVELOPMENT.	EXTENT TO WHICH: COMMUNITY HAS POVERTY, SUBSTANDARD HOUSING, BENEFITS LOW-MODERATE INCOME HOUSING, NEEDED FOR HOUSING STOCK, ALLEVIATING HEALTH,SAFETY, & WELFARE PROBLEMS AND GRANTS FROM OTHER AGENCIES.	N/A	FINANCIAL NEED, SERIOUSNESS OF POLLUTION PROBLEM.	
APPLICATION MECHANICS							
APPLICATION PROCESS	BEGIN WITH COUNTY FHA REPRESENTATIVE.	A. SUBMIT GRANT APPLICATION TO DIRECTOR OF LOCAL GOVERNMENTS AND APPLY FOR SITE APPROVAL FROM THE COLORADO WATER POLLUTION CONTROL COMMISSION. B. DIVISION OF LOCAL GOVT. THEN ISSUE A CERTIFICATE OF FINANCIAL NEED STATING AMOUNT OF GRANT AND THAT THE APPLICANT MUST OBTAIN SITE APPROVAL. C. SUBMIT SITE APPROVAL, FINAL PLANS AND SPECIFICATIONS TO THE DIVISION OF LOCAL GOVERNMENTS. D. SUBMIT TWO SETS OF FINAL PLANS AND SPECIFICATIONS TO COLORADO DEPARTMENT OF HEALTH.	DETERMINE A SOURCE OF FEDERAL FUNDING OR POSSIBILITY THEREOF. ARRANGE A PRE-APPLICATION CONFERENCE WITH THE FOUR CORNERS REGIONAL COMMISSION REPRESENTATIVE. ARRANGE FOR AN A-95 REVIEW OF PROJECT.	APPLICATION PROCESS WAS PUBLISHED IN THE FEDERAL REGISTER ON OCT. 13, 1976. COMPETITION IS VERY STIFF FOR THESE FUNDS.	THE STATE HEALTH DEPARTMENT WILL CONTACT THE MUNICIPALITY WHEN FUNDING BECOMES AVAILABLE.	A. OBTAIN LETTER FROM LOCAL HEALTH DEPARTMENT OFFICIAL CERTIFYING THAT SYSTEM IS CURRENTLY IN VIOLATION OF STATE STANDARDS. B. OBTAIN ENGINEERS PROPOSAL FOR WORK. C. OBTAIN APPLICATION FORM LG-PS275. SUBMIT ALL OF THE ABOVE TO THE DIVISION OF LOCAL GOVERNMENTS.	
APPLICATION DEADLINES	FIRST COME, FIRST SERVED UNTIL APPROPRIATION RUNS OUT.	FUNDING IS ON A FIRST COME, FIRST SERVE BASIS.	NO DEADLINES. FUNDING IS ON A FIRST COME, FIRST SERVE BASIS.	TO BE DETERMINED	N/A	FUNDING IS ON A FIRST COME, FIRST SERVE BASIS.	
TIME REQUIRED TO EVALUATE APPLICATION	3 MONTHS	1-3 MONTHS. THIS INCLUDES TIME REQUIRED FOR HEALTH DEPARTMENT REVIEW OF PLANS AND SPECIFICATIONS.	VERY FAST, AS FUNDING IS TIED TO ALREADY APPROVED FEDERAL FUNDING.	TO BE DETERMINED 5-6 MONTHS, EXCEPT FOR EMERGENCY SITUATIONS	N/A	2 MONTHS	
MISCELLANEOUS		IF FUNDING IS NOT RECEIVED UPON INITIAL APPLICATION, IT IS REVIEWED MONTHLY UNTIL IS IS FUNDED OR THE APPROPRIATION IS EXHAUSTED. THESE FUNDS MAY BE USED IN CONJUNCTION WITH OTHER LOANS OR GRANTS. THE COMMUNITY MUST BE PREPARED TO USE 1.5% OF ITS MEDIAN FAMILY INCOME PER CUSTOMER PER ANNUM TO OPERATE ITS EXISTING SYSTEM AND/OR PAY FOR ITS SHARE OF THE NEW PROJECT.			CURRENTLY THERE IS A LARGE EMPHASIS ON STEP 1 AND 2 GRANTS. HOWEVER, AS COMMUNITIES BECOME READY FOR STEP 3 GRANTS, THE AMOUNTS AVAILABLE FOR STEP 1 AND 2 GRANTS WILL BE GREATLY DIMINISHED.	THESE FUNDS MAY BE USED IN COMBINATION WITH OTHER LOANS/ GRANTS.	
CONTACTS	JOHN MEIKLE, FHA, 337-4717	BILL PEED, STATE OF COLORADO, DIVISION OF LOCAL GOVERNMENTS 892-2156. JEB LOVE, STATE HEALTH DEPT. 388-6111	IVO ROOSPOLD, DEPT. OF LOCAL AFFAIRS, RURAL DEVELOPMENT 892-2651	ARMAND SEDGELEY, HUD-DENVER 837-4666	RON SCHUYLER, STATE DEPT. OF HEALTH, 388-6111 JERRY BURKE, SAM BERMAN FEDERAL EPA, 837-3961	BILL PEED, STATE OF COLORADO DIVISION OF LOCAL GOVERNMENTS 892-2156	PAUL RENNE, ALL PROGRAMS, JOHN ZENDER LOCAL PUBLIC WORKS ACT, 337-4714

BRISCOE, MAPHIS, MURRAY & LAMONT, INC. MARCH 3, 1976

that Platteville's fee level could be up to $123.00 per tap per year (1-1/2% X $8,200) and still be considered "reasonable" under the state guideline. Comparing this figure with annual costs projected in Table 9.3-A indicates that with no grant assistance, Platteville would be able to borrow the $91,000 for the system improvements, repay the debt from user fees, and still fall within the "reasonable" guideline. Grant assistance from the state consequently may be hard to achieve.

9.3.1.3 Town Borrowing

To determine estimated borrowing needs, deduct anticipated grant amounts and any immediate local funds that might be allocated to the project from the capital cost estimates for the proposed system.

Whenever possible, revenue bonds should be used to finance sewer system improvements. If a community must borrow to finance utility improvements, it is desirable to protect its general obligation bonding capacity (tied by state law to assessed valuation) for uses where revenue bonding is not feasible. This is because numerous community needs usually cannot be financed from revenue bonds (e.g., parks, libraries, or police facilities). Therefore, any revenue generating operation, such as a sewer system, should borrow on the direct ability of the system to retire the debt.

There are limitations to this financing method; i.e., cases where the cost of the system exceeds its ability to generate revenue, or where general obligation bonds are not limited by state statute (e.g., bonds for water improvements). Even in these cases, the maximum reasonable revenues should be raised from PIF and user fees to retire at least a portion of the debt. Other sources must then supplement system revenues if the project is to occur.

Borrowing appears to be a reasonable and financially feasible means by which Platteville can raise all or the major part of needed capital funds.

As Table 9.3-A illustrates, even meeting a 100% loan with no population growth would not cause Platteville to require an unreasonable annual user fee (according to the state guideline).

9.3.2 Sources for Financing System Operating Costs

Funds to pay annual operating costs can be obtained from a number of sources. Most typically, these sources are service or user rates, property taxes and sometimes other general fund revenues.

Service or user rates can be the most equitable source of funds. The beneficiary pays in proportion to the amount of benefit received. Rates should be pegged to reflect the full cost of operation, maintenance, and depreciation, and

perhaps some portion of debt service where borrowing to provide a plant for existing customers remains unpaid. Tap or plant investment fees can also be used if necessary, but this is not considered a desirable practice for paying operating costs, as it defeats the purpose of the tap fee. Rather, tap fees should be applied to repay bonds issued to finance the added plant capacity serving the new taps.

Because of historical precedent, many communities do not charge users in proportion to their use, but keep a low user rate by subsidizing costs with mill levies on property. This is particularly true in special districts where high user rates would discourage potential hookups. The argument against this use of property tax revenues is that it depletes an important source of funding general purpose, non-revenue producing facilities.

A community can choose to subsidize rates from its general fund monies. These might be composed, for example, of revenue sharing funds, sales tax, fees or licenses, or cigarette taxes. The same drawback as with using property taxes applies.

Most generally, however, operations and maintenance costs are covered by annual user rates. To determine if a community can generate sufficient user rate revenue to support the system, the state guideline of 1-1/2% of the median family income can be used as a general guide. While a community can certainly charge more than 1-1/2%, anticipated user fees far in excess of this figure may indicate that the residents of the community will find the sewer utility extremely difficult to support.

Can Platteville provide continuing support to the system? Additional operating costs of some $3,500 (at current price levels) have been identified for the upgraded facilities. These must be added to the current operating costs of $13,033 budgeted for 1977. This alone will require an increase in user fees. When the debt is added, it still appears that if it is politically feasible, the user fees can accommodate the costs. The $96 figure from the table covers both debt retirement and the operation costs.

However, it should be borne in mind that $96 is considerably higher than Platteville's current $48 annual fee. While a lower level of borrowing and/or continued population growth would allow a smaller fee increase, residents on fixed incomes may be significantly burdened by even a moderate increase in the annual user fee. The Town should be aware of special problems that a fee increase might create for this part of the population. But as the brief financial review (9.1.1) indicates, user fees appear to be the most reasonable and logical source of increased revenues.

9.3.3 Effects of Population Growth

Consider the implications of population growth. Increased population can provide increased revenue through PIF's, user fees, and taxes, all of which can ease the burden of supporting the sewer utility on existing residents.

A realistic anticipation of growth might encourage the community to borrow more money to finance its system, and will influence the size and/or type of system the community decides to use.

However, bear in mind that increased population may also generate needs for system expansion (necessitating further borrowing) and that projected growth which does not occur on schedule may seriously burden existing residents with higher annual payments than had been planned. Recognizing the possibility for growth--without counting on it to carry the community's financing needs--is a necessary component of evaluating the community's capabilities to support the sewer utility.

Table 9.3-A illustrates impacts for Platteville of various combinations of borrowing levels and growth rates. It can be used to evaluate risk and anticipated cost per user should the Town borrow money to upgrade its system.

9.4 CONCLUSIONS AND RECOMMENDATIONS FROM FINANCIAL ANALYSIS

9.4.1 Conclusions

Platteville is presently relying heavily on property and sales taxes and has outstanding debt of $310,000. Care must be taken so that additions to these obligations do not overextend the Town's taxpayers.

Because of the modest amount of proposed system improvements, and associated operating costs, Platteville appears to have the alternative of contributing to their cost by increasing its Town borrowing. On the other hand, grant assistance would be desirable in light of the existing burden of taxes and Town debt borne by the taxpayers.

9.4.2 Recommendations

It is recommended that Platteville assemble data on its fixed income residents before developing its financing plan. Special income-related provisions or rebates in the annual fee structure may be necessary. The information will also influence Platteville's ability to obtain assistance through grants.

Careful consideration should be given to educating the community as to the need for system upgrading and the importance of the annual user fee, to prepare them for fee increases which may need to be made.

Grant assistance agencies should be contacted by Town representatives to get an idea of the likelihood of obtaining financial aid.

Finally, the Town should agree on policies regarding its overall approach to management of a central wastewater system. A recommended approach is discussed in detail in the Utility Management Handbook (1977), available from the Larimer-Weld Council of Governments.

APPENDIX A

LIST OF REFERENCES

Colorado Department of Health, Water Quality Control Division, Comprehensive Water Quality Management Plan - South Platte River Basin, Colorado, Engineering Consultants, Inc., Toups Corporation, October, 1974.

Colorado State Engineers Office, Division I Engineer, Dugan Wilkinson, Private Communication

Environmental Protection Agency, Alternative Waste Management Techniques for Best Practical Waste Treatment, EPA 430/9-75-013, October, 1975

Metcalf & Eddy, Inc., Wastewater Engineering: Collection, Treatment, Disposal, New York; McGraw-Hill Book Company, 1972

APPENDIX B

CALIFORNIA DEPARTMENT OF HEALTH - WASTEWATER RECLAMATION GUIDELINES

STATE OF CALIFORNIA DEPARTMENT OF HEALTH

GUIDELINES FOR USE OF RECLAIMED WATER FOR SURFACE IRRIGATION CROPS

1. Reclaimed water shall meet the Regional Water Quality Control Board requirements and the quality requirements established by the State of California Department of Health for health protection.

2. The discharge shall be confined to the area designated and approved for disposal and reuse. Irrigation should be controlled to minimize ponding of wastewater and runoff should be contained and properly disposed.

3. Maximum attainable separation of reclaimed water lines and domestic water lines shall be practiced. Domestic and reclaimed water transmission and distribution mains shall conform to the "Separation and Construction Criteria" (see attached).

   a. The use area facilities must comply with the "Regulations Relating to Cross-Connections," Title 17, Chapter V, Sections 7583-7622, inclusive, California Administrative Code.

   b. Plans and specifications of the existing and proposed reclaimed water system and domestic water system shall be submitted to State and/or local health agencies for review and approval.

4. All reclaimed water valves and outlets should be appropriately tagged to warn the public that the water is not safe for drinking or direct contact.

5. All piping, valves, and outlets should be color-coded or otherwise marked to differentiate reclaimed water from domestic or other water.

6. All reclaimed water valves and outlets should be of a type that can only be operated by authorized personnel.

7. Adequate means of notification shall be provided to inform the public that reclaimed water is being used. Conspicuous warning signs with proper wording of sufficient size to be clearly read shall be posted at adequate intervals around the use area.

8. The public shall be effectively excluded from contact with the reclaimed water used for irrigation.

   a. The irrigated areas should be fenced where primary effluent is used.

   b. Irrigated areas must be kept completely separated from domestic water wells and reservoirs. A minimum of 500 feet should be provided.

9. Adequate measures should be taken to prevent the breeding of flies, mosquitoes, and other vectors of public health significance during the process of reuse.

10. Operation of the use area facilities should not create odors, slimes, or unsightly deposits of sewage origin.

11. Adequate time should be provided between the last irrigation and harvesting to allow the crops and soil to dry.

    a. Animals, especially milking animals, should not be allowed to graze on land irrigated with reclaimed water until it is thoroughly dry.

12. There should be no subsequent planting of produce on lands irrigated with primary effluent.

13. Adequate measures shall be taken to prevent any direct contact between the edible portion of the crops and the reclaimed water.

STATE OF CALIFORNIA DEPARTMENT OF HEALTH

GUIDELINES FOR USE OF RECLAIMED WATER FOR LANDSCAPE IRRIGATION

1. Reclaimed water shall meet the Regional Water Quality Control Board requirements and the quality requirements established by the State of California Department of Health for health protection.

2. The discharge shall be confined to the area designated and approved for disposal and reuse. Irrigation should be controlled to minimize ponding of wastewater and runoff should be contained and properly disposed.

3. Maximum attainable separation of reclaimed water lines and domestic water lines shall be practiced. Domestic and reclaimed water transmission and distribution mains shall conform to the "Separation and Construction Criteria" (see attached).

   a. The use area facilities must comply with the "Regulations Relating to Cross-Connections," Title 17, Chapter V, Sections 7583-7622, inclusive, California Administrative Code.

   b. Plans and specifications of the existing and proposed reclaimed water system and domestic water system shall be submitted to State and/or local health agencies for review and approval.

4. All reclaimed water valves, outlets and/or sprinkler heads should be appropriately tagged to warn the public that the water is not safe for drinking or direct contact.

5. All piping, valves, and outlets should be color-coded or otherwise marked to differentiate reclaimed water from domestic or other water.

   a. Where feasible, differential piping materials should be used to facilitate water system identification.

6. All reclaimed water valves, outlets, and sprinkler heads should be of a type that can only be operated by authorized personnel.

   a. Where hose bibbs are present on domestic and reclaimed water lines, differential sizes should be established to preclude the interchange of hoses.

7. Adequate means of notification shall be provided to inform the public that reclaimed water is being used. Such notification should include the posting of conspicuous warning signs with proper wording of sufficient size to be clearly read. At golf courses, notices should also be printed on

score cards and at all water hazards containing reclaimed water.

8. Tank trucks used for carrying or spraying reclaimed water should be appropriately identified to indicate such.

9. Irrigation should be done so as to prevent or minimize contact by the public with the sprayed material and precautions should be taken to insure that reclaimed water will not be sprayed on walkways, passing vehicles, buildings, picnic tables, domestic water facilities, or areas not under control of the user.

   a. Irrigation should be practiced during periods when the grounds will have maximum opportunity to dry before use by the public unless provisions are made to exclude the public from areas during and after spraying with reclaimed water.

   b. Windblown-spray from the irrigation area should not reach areas accessible to the public.

   c. Irrigated areas must be kept completely separated from domestic water wells and reservoirs. A minimum of 500 feet should be provided.

   d. Drinking water fountains should be protected from direct or windblown reclaimed water spray.

10. Adequate measures should be taken to prevent the breeding of flies, mosquitoes, and other vectors of public health significance during the process of reuse.

11. Operation of the use area facilities should not create odors, slimes, or unsightly deposits of sewage origin in places accessible to the public.

STATE OF CALIFORNIA DEPARTMENT OF HEALTH

GUIDELINES FOR WORKER PROTECTION AT WATER RECLAMATION USE AREAS

1. Employees should be made aware of the potential health hazards involved with contact or ingestion of reclaimed water.

2. Employees should be subjected to periodic medical examinations for intestinal diseases and to adequate immunization shots.

3. Adequate first aid kits should be available on location, and all cuts and abrasions should be treated promptly to prevent infection. A doctor should be consulted where infection is likely.

4. Precautionary measures should be taken to minimize direct contact of employees with reclaimed water.

    a. Employees should not be subjected to reclaimed water sprays.

    b. For work involving more than a casual contact with reclaimed water, employees should be provided with protective clothing.

    c. At crop irrigation sites, the crops and soil should be allowed to dry before harvesting by employees.

5. Provisions should be made for a supply of safe drinking water for employees. Where bottled water is used for drinking purposes, the water should be in contamination-proof containers and protected from contact with reclaimed water or dust.

    a. The water should be of a source approved by the local health authority.

6. Toilet and washing facilities should be provided.

7. Precautions should be taken to avoid contamination of food taken to areas irrigated with reclaimed water, and food should not be taken to areas still wet with reclaimed waer.

8. Adequate means of notification shall be provided to inform the employees that reclaimed water is being used. Such notification should include the posting of conspicuous warning signs with proper wording of sufficient size to be clearly read.

    a. In some locations, especially at crop irrigation use areas, it is advisable to have the signs in Spanish as well as English.

9. All reclaimed water valves, outlets, and/or sprinkler heads should be appropriately tagged to warn employees that the water is not safe for drinking or direct contact (direct contact is allowed at non-restricted recreational impoundments).

10. All piping, valves, and outlets should be color-coded or otherwise marked to differentiate reclaimed water from domestic or other water.

    a. Where feasible, differential piping materials should be used to facilitate water system identification.

11. All reclaimed water valves, outlets, and sprinkler heads should be of a type that can only be operated by authorized personnel.

    a. Where hose bibbs are present on domestic and reclaimed water lines; differential sizes should be established to preclude the interchange of hoses.