# WASTEWATER FACILITY PLAN

FOR

THE TOWN OF
HACKLEBURG, ALABAMA

MARCH 31, 1995

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# WASTEWATER FACILITY PLAN
# THE TOWN OF HACKLEBURG, ALABAMA

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# WASTEWATER FACILITY PLAN
# THE TOWN OF HACKLEBURG, ALABAMA

## 1.0 General:

The following Sewer Facilities Plan was prepared by Paxton, Price, and Rider Engineering in conjunction with the Northwest Alabama Council of Local Government pursuant to an agreement between the two concerns dated November 8, 1994. This plan was funded by the Alabama Department of Environmental Management through the Clean Water Act Sections 205(j)(1) and 604 provisions.

Paxton, Price and Rider Engineering completed those sections of the plan dealing with engineering and environmental issues in accordance with the scope outlined in the contract and generally accepted engineering practices.

NACOLG prepared the physical characteristics, demographic, economic, housing, and funding sections of the plan.

The planning area is the incorporated limits of the Town of Hackleburg and the area one-half mile outside of town. The planning period is 20 years.

## 2.0 SUMMARY:

At least 50% grant funding will be required for Hackleburg to construct public sewerage and wastewater treatment facilities.

The most cost effective, environmentally sound, and implementable method of collecting sewage for the Hackleburg area is a combination of conventional gravity and low pressure sewers. The more densely populated areas which would be serviced in the first phase would utilize conventional gravity sewers. Later extensions to the outlying areas would utilize low pressure sewers.

The most cost effective, environmentally sound, and implementable method of treatment is an extended aeration type *packaged* treatment plant with tertiary filters. Discharge would be to Mixon Springs Branch near Hackleburg.

## 3.0 PHYSICAL CHARACTERISTICS:

### 3.1 General:

Hackleburg is located in the northeastern part of Marion County, as shown on the Location Map, Figure 3.1. The Town of Hackleburg was established about 1909, when the railroad was used to facilitate transportation of cotton from local gins.

The town of Hackleburg is a rural community with a population of 1161. The community is not served by a public sewer system, therefore residents use septic tank systems. The soil in the area has severe limitations for septic tank absorption fields due to slow percolation. The resulting saturated soil conditions present a health hazard as raw or partially treated sewage enters open drainage ditches. The quality of the surface water in the area is also degraded by this condition. The results of this report indicate that the problems at Hackleburg can best be eliminated by constructing a complete sanitary sewer collection and treatment system.

### 3.2 Climate:

The Town of Hackleburg is considered to have a temperate climate. Warm summers and mild winters describe the general temperature pattern for Hackleburg. To the south, the Gulf of Mexico helps to modify the temperature and is a source of abundant moisture. The temperature, during the summer, averages about 80 degrees Fahrenheit. The winter months average about 40 degrees Fahrenheit. The precipitation (mostly rainfall) averages about 53 inches per year with the largest amounts occurring during the winter months. The average frost-free period is over 200 days.

### 3.3 Topography:

The topography, in the Hackleburg planning area, ranges from generally flat terrain to gentle slopes near town with steeper slopes in the fringes of the planning area, especially the eastern portion. Elevations range from 740 to 960 feet above sea level. The Tennessee Valley Divide passes through town; the eastern portion is the Tennessee River Basin and the western portion is the Tombigbee River Basin.

### 3.4 Soils in the Hackleburg Area:

The major soils identified in the Hackleburg planning area, as shown on Figure 3.2 are the Ora soils. The other soils present are the Bama, Pikeville-Flomaton, Saffel, Savannah, Smithdale, Stough, and Ruston soils.


**FIGURE 3.1**

*MAP OF ALABAMA*

FRANKLIN COUNTY

MISSISSIPPI

LAMAR COUNTY

WINSTON COUNTY

WALKER COUNTY

FAYETTE COUNTY

R 16 W R 15 W R 14 W R 13 W R 12 W R 11 W

T 9 S T 10 S T 11 S T 12 S T 13 S

34°10′ 34°00′

Hackleburg Western HAMILTON Brilliant Gu

ILLINOIS CENTRAL

St. Louis-San Francisco

SECTIONALIZED TOWNSHIP

| | | | | | |
|---|---|---|---|---|---|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

## LEGEND

1 SAVANNAH: Deep, nearly level and gently sloping, moderately well drained soils that are loamy in the upper part of the subsoil and have a fragipan in the lower part; formed in unconsolidated beds of marine and fluvial sediment that consists of sand, silt, and clay

2 ORA-SMITHDALE: Deep, gently sloping and sloping, moderately well drained and well drained soils that have a loamy subsoil; formed in unconsolidated beds of marine sediment that consists of sand, silt, and clay

3 HECTOR-ROCK OUTCROP-PIKEVILLE: Shallow and deep, steep, well drained soils that have a loamy subsoil; formed in material weathered from sandstone that is interbedded with shale in places and in unconsolidated gravelly marine sediment

4 TOWNLEY-NAUVOO-HECTOR: Shallow and deep, gently rolling to steep, well drained soils that have a loamy or clayey subsoil; formed in material weathered from shale, sandstone, or interbedded sandstone and shale

5 SMITHDALE-LUVERNE-FLOMATON: Deep, gently rolling to hilly, well drained and excessively drained soils that have a loamy, clayey, and gravelly subsoil; formed in unconsolidated beds of marine sediment that consists of sand, silt, clay, and gravel

IUKA-MANTACHIE-STOUGH: Deep, nearly level, moderately well drained and somewhat poorly drained soils that have a loamy subsoil or underlying material; formed mostly in alluvium

Compiled 1978

*Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.*

**FIGURE 3.2**

N

ALABAMA AGRICULTURAL EXPERIMENT STATION
ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES

# GENERAL SOIL MAP

## MARION COUNTY, ALABAMA

Scale 1:190,080

1 0 1 2 3 4 Miles

## 4.3 Population Profile:

Of the Town of Hackleburg's 1990 population, males represent 47 percent of the total population, while females made up 53 percent of the total population. The largest age group in the 1990 population is the 45-54 year old. The working age group (16-64) accounted for 63 percent of the total population and the persons 65 years and older accounted for 17 percent of the population. Finally, school age children represent 20 percent of the population. Table 4.3 shows the population by age group.

**TABLE 4.3**
**POPULATION BY AGE AND SEX**

| | TOTAL | FEMALE | MALE |
|---|---|---|---|
| Under 1 | 9 | 5 | 4 |
| 1 to 2 years | 51 | 29 | 22 |
| 3 to 4 years | 16 | 7 | 9 |
| 5 years | 10 | 7 | 3 |
| 6 years | 17 | 12 | 5 |
| 7 to 9 years | 43 | 12 | 31 |
| 10 to 13 years | 53 | 26 | 27 |
| 14 years | 18 | 16 | 2 |
| 15 years | 20 | 6 | 14 |
| 16 years | 36 | 13 | 23 |
| 17 years | 6 | 4 | 2 |
| 18 years | 23 | 8 | 15 |
| 19 years | 14 | 7 | 7 |
| 20 years | 3 | 0 | 3 |
| 21 years | 14 | 7 | 7 |
| 22 to 24 years | 84 | 43 | 41 |
| 25 to 29 years | 62 | 24 | 38 |
| 30 to 34 years | 64 | 39 | 25 |
| 35 to 44 years | 145 | 82 | 63 |
| 45 to 54 years | 161 | 80 | 81 |
| 55 to 59 years | 54 | 30 | 24 |
| 60 to 61 years | 21 | 8 | 13 |
| 62 to 64 years | 43 | 28 | 15 |
| 65 to 74 years | 106 | 57 | 49 |
| 75 to 84 years | 77 | 53 | 24 |
| 85 and over | 11 | 7 | 4 |
| | 1161 | 610 | 549 |

### 4.4 School Enrollment:

The Town of Hackleburg is part of the Marion County School System. As of 1990, the total school enrollment was 205 students. The elementary and high school has an enrollment of 197 students. The preprimary school has an enrollment of 8 students.

## 5.0 Economy:

### 5.1 Major Employers:

There are six concerns within Hackleburg which employs 5 or more persons as shown in Table 5.1.

**TABLE 5.1**
**EMPLOYERS OF HACKLEBURG**

| MAJOR EMPLOYERS | # OF EMPLOYEES |
|---|---|
| | |
| Fincher Farm Supply | 8 |
| Wrangler Industries | 500 |
| Indies Housing Manufacturing | 140 |
| Valley Lumber | 15 |
| Boatwright Company | 17 |
| Wiginton Paper Products | 8 |

### 5.2 Labor Force:

The Town of Hackleburg has a labor force of 924 persons. Labor force is defined as persons 16 years and over. The percentage of persons actually in the labor force is 52.4 percent or 484 persons. Of the 484 persons in the labor force 6.4 percent are considered unemployed. There are 440 persons that are not in the Hackleburg labor force.

## 5.3 Income:

**TABLE 5.3**
**INCOME**
**Marion County**

| Year | Median Income |
|---|---|
| 1960 | $2,562 |
| 1970 | $5,964 |
| 1980 | $14,228 |
| 1990 | $22,394 |

**HACKLEBURG**

| Year | Median Income |
|---|---|
| 1960 | **** |
| 1970 | **** |
| 1980 | $14,279 |
| 1990 | $20,052 |

**** data is unavailable for that time period.

# 6.0 HOUSING:

## 6.1 General:

From 1980 to 1990, the total number of units increased from 366 to 528. This increase represents a 31 percent change in the number of total housing units. Mobile homes accounted for 39 percent of the increase in housing stock. By 1990, 16 percent of the housing stock was in the form of mobile homes. In 1980 there were 11 buildings with 5 or more attached units. By 1990 that number increased to 12 buildings. Table 6.1 reveals structural characteristics of housing units in the Town of Hackleburg.

**TABLE 6.1**
**STRUCTURAL CHARACTERISTICS OF HOUSING UNITS**
**1980 - 1990**

| UNITS IN STRUCTURE | 1980 | 1990 | % CHANGE |
|---|---|---|---|
| TOTAL YEAR HOUSING UNITS | 366 | 528 | 44 |
| 1, DETACHED | 296 | 361 | 22 |
| 1, ATTACHED | 2 | 11 | 450 |
| 2, ATTACHED | 20 | 33 | 65 |
| 3 AND 4 | 17 | 23 | 35 |
| 5 OR MORE | 11 | 12 | 9 |
| MOBILE HOME TRAILER | 20 | 83 | 315 |
| OTHER | N/A | 5 | --- |

Source: 1980 and 1990 Census of Housing

In 1980, the total number of attached units was 50. By 1990 that number increased to 79, representing a 37 percent increase over the 1980 figure. These units made up 14 percent of the total housing stock in 1980. Attached units accounted for only 15 percent of the total housing stock in 1990.

## 6.2 Age of Structures:

Table 6.2 shows housing units by year built.

**TABLE 6.2**
**YEAR-ROUND HOUSING UNITS BY**
**YEAR STRUCTURE BUILT**

| Age of Structure | Number of Units | % of Total |
|---|---|---|
| 1989 to March 1990 | 6 | 1 |
| 1985 to 1988 | 36 | 7 |
| 1980 to 1984 | 46 | 9 |
| 1970 to 1979 | 157 | 30 |
| 1960 to 1969 | 108 | 20 |
| 1950 to 1959 | 67 | 13 |
| 1940 to 1949 | 71 | 13 |
| 1939 to earlier | 37 | 7 |

Source: 1990 U. S. Census of Housing

The largest percentage of the current housing stock was built between 1970 and 1979.

### 6.3 Condition of Housing Stock:

A total of only 11 occupied housing units in the Town of Hackleburg are overcrowded. Units with 1.01 persons or more per room represent only 2.3 percent of the total occupied units. This compares to the State average in 1990 of 3.5 percent.

Several sets of standards or criteria may be used as a basis for determining substandard housing conditions. One of the more widely recognized methods and the method used by the Census, involves classifying those housing units as substandard which lack complete plumbing facilities. When employing this method in Hackleburg there were only 7 units in the Town that did not have complete plumbing facilities in 1990. This accounts for only 1.3 percent of the total housing units. This figure is slightly below the statewide average of 1.6 percent.

In 1990, the median value of an owner-occupied housing unit was $34,300. In comparison, the average value of an owner-occupied unit statewide was $53,700. The median contract rent in Hackleburg was $204 per month as compared to the State average of $325 per month.

### 6.4 Subsidized Housing:

Subsidized housing in Hackleburg is provided by the Hackleburg Housing Authority and the Farmers Home Administration. The Authority has a total of 62 units in the Town. The units are located in four complexes: 1st Avenue (8 units), Cedar Heights (14 units), Old Hackleburg Road (20 units), and Ray Road (20 units). All units are in good condition. Skyline Apartments which was completed in 1985 provides for 12 units of subsidized multifamily housing through the FmHA 515 program. The facility is in excellent condition.

The subsidized housing consists of studio, one bedroom, two bedroom, three bedroom, and four bedroom units. See Table 6.4 for numerical breakdown.

**TABLE 6.4**
**NUMBER OF SUBSIDIZED HOUSING**
**BY NUMBER OF BEDROOMS**

| | Number of Units |
|---|---|
| Studio | 2 |
| 1 Bedroom | 30 |
| 2 Bedroom | 24 |
| 3 Bedroom | 16 |
| 4 Bedroom | 2 |
| Total Units | 74 |

## 6.5 Housing Trends:

Table 6.5 below illustrates the housing trend in the Hackleburg area.

**TABLE 6.5**
**HOUSING TRENDS**

| Year | Housing Units | % Change |
|---|---|---|
| 1960 | N/A | ---- |
| 1970 | 265 | ---- |
| 1980 | 366 | 38.1 |
| 1990 | 528 | 52.5 |

## 7.0 LAND USE:

### 7.1 Existing Land Use:

Land use within the Town of Hackleburg is primarily residential. There is no significant evidence of strip commercial development. There are a few industrial sites within and around the Hackleburg area that are used for mobile home and garment production. Undeveloped areas within the planning limits are used for agriculture and timber production.

### 7.2 Future Land Use:

The future growth of residential areas in Hackleburg is dependent on employment opportunities that are created with the future growth of commercial and industrial areas. These three factors are also related to the Town of Hackleburg being able to provide services that would make the town more attractive to new businesses which would include a sanitary sewer collection and treatment system. A discouraging effect on future growth and development will result from the lack of a centralized wastewater collection and treatment system.

## 8.0 Wastewater Flowrates:

### 8.1 Wastewater Flowrates Based On Existing Development:

The Town of Hackleburg currently has a total of 637 residential water users. Of these, 597 are within the corporate limits, and 40 are located outside the corporate limits. In addition, there are 31 commercial users and 6 industrial users on the system.

The largest water user is Hackleburg School which has 620 students and a faculty of 45 persons and uses an average of 4,100 gallons of water per school day.

All customers of the water system use septic tank/field line type sewage disposal systems.

The existing water usage is summarized as follows:

The Ora fine sandy loam is located throughout the Hackleburg area. The soil surface layer is brown fine sandy loam about 6 inches thick. The upper part of the subsoil is yellowish red clay loam to a depth of 26 inches. The brittle and compact fragipan is yellowish red loam with yellowish brown, red, and light brownish gray spots to a depth of 50 inches. The next layer is red loam with yellowish brown and light brownish gray spots.

The Ora silt loam is also located throughout the town. The surface layer is brown silt loam 8 inches thick. The upper part of the subsoil is yellowish red silt loam to a depth of 24 inches. The fragipan is yellowish red loam with yellowish brown and light brownish gray spots to a depth of 48 inches.

Bama soils are found at the northeast corner of the Hackleburg Planning Area. The Bama soil surface layer is brown loam about 9 inches thick. The subsoil is yellowish red loam to a depth of 31 inches, and red clay loam to a depth of 52 inches.

The Pikeville soils are widespread in the eastern and southwestern areas of Hackleburg. The surface of the Pikeville is dark grayish brown loam 4 inches thick and overlies brown loam 8 inches thick. The subsoil is yellowish red. It is loam to a depth of 30 inches, and gravely loam to a depth of 40 inches.

Saffel soil is scattered in the southern, eastern, and northern portions of the planning area. A typical profile of the surface layer is brown fine sandy loam about 10 inches thick. The subsoil is reddish brown very gravely fine sandy loam to a depth of 15 inches and yellowish red very gravely fine sandy loam to a depth of 47 inches.

Savannah soils are found in a small portion near the center of town. The surface layer is brown loam 6 inches thick. The upper part of the subsoil is yellowish brown loam to a depth of about 24 inches. The lower level is spotted brown, yellowish brown, light brownish gray, and dark brown loam to a depth of 60 inches.

Smithdale soils, located widespread in the eastern, central, and western portion of Hackleburg, typically have a five inch thick dark brown fine sandy loam surface layer. The subsoil is yellowish red clay loam to a depth of 20 inches, and yellowish red sandy clay loam to a depth of about 50 inches.

Stough loam is found in a small section in the heart of town. The soil surface is dark grayish brown fine sandy loam about 8 inches thick. The subsoil is yellowish brown fine sandy loam with light brownish gray spots to a depth of 25 inches, and spotted yellowish brown and light gray fine sandy loam to a depth of 41 inches.

Ruston soils are located in the southeast corner of the town. The Ruston surface layer is brown fine sandy loam 6 inches thick. The subsoil is yellowish red loam to a depth of 33 inches, and yellowish red sandy loam with pale brown spots to a depth of 43 inches.

Ruston-Urban land complex is located along the eastern and southern portions of town. The surface layer is brown fine sandy loam 8 inches thick. The subsoil is yellowish red sandy clay loam to a depth of 30 inches, and dark brown sandy loam with pale brown spots to a depth of 40 inches.

Ora, the most widespread soil of the area, has severe limitation for septic tank absorption fields because of its moderately slow permeability. The soils map of the area is included in figure 3.2.

### 3.5 Geological Characteristics:

Sedimentary rock formations that outcrop in Marion County are of, Pennsylvanian, Mississippian, Cretaceous, or Quaternary age. The Pennsylvanian System includes the Pottsville Formation, which overlies the parkwood, and crops out along the stream valleys in the northern, central and southeastern parts of the county. This system consists chiefly of sandstone, conglomerate, shale, clay, and beds of coal. The Mississippian System is represented by the Parkwood Formation, which crops out along Bear Creek in the northeastern part of the county, and consists chiefly of sandstone and shale. The rocks of Pennsylvanian and Mississippian age dip at a rate of about 25 to 55 feet per mile to the south-southwest, except where disrupted by local structure. Unconsolidated sand, clay, and gravel of the Coker, Gordon, and Eutaw Formations of Cretaceous age, overlie the Pennsylvanian strata and dip at a rate of about 300 feet per mile to the southwest, except where distributed by local structure.

### 3.6 Groundwater Activity:

The aquifer underlying the Hackleburg area are the Pottsville Formation and deposits of Cretaceous and Quaternary age. These deposits consist of Coker, Gordo, and Eutaw Formations.

Ground water occurs in openings along fractures and bedding planes in beds of loosely consolidated sandstone of the Pottsville Formation. The Town of Hackleburg draws a portion of its water supply from a 300 feet deep well into the Pottsville.

Ground water of Cretaceous and Quaternary age occurs in permeable sand and gravel. West of Hackleburg, the Coker and Gordo Formations of these deposits comprise the major aquifer. Near Hackleburg, wells generally produce sufficient water for domestic and stock use from Cretaceous and Quaternary age. A spring of the Gordo Formation also helps provide municipal water to Hackleburg.

### 3.7 Natural Resources:

The most important natural resource for the Brilliant area is the soil, according to Mayor Cockran. The Marion County Office of the Soil Conservation Service was contacted regarding the identification of Hackleburg's most important natural resource. Bear Creek, and specifically the Bear

Creek floatway, was identified as a very important natural resource. The land adjacent to the floatway provides unusually nice wooded areas and rock formations which attract hikers.

Timber is also listed as a very important natural resource for Hackleburg.

### 3.8 Historical Sites:

Three areas, in or near Hackleburg, are listed as being Historical Sites by the Alabama Historical Commission. These areas include the Hackleburg Railroad Depot, Big Springs Campground, and Brush Creek Trestle.

### 3.9 Landfill Sites:

Two solid waste landfills are located in Marion County. One is Located in the Northwest Quarter of the Northwest Quarter, East One-Half of the Southwest Quarter of the Northwest Quarter and West One-Half of the Southeast Quarter of the Northwest Quarter, Section 16, Township 10 South, Range 13 West, or 1/4 mile East of Brilliant, Alabama on Alabama Highway 129. The other landfill is located in the Southeast Quarter of the Northeast Quarter, Section 7, Township 12 South, Range 11 West, or northeast of Hamilton, Alabama on U.S. Highway 43.

### 3.10 Surface Water Resources:

Surface water, in the Town of Hackleburg, consists of several streams which include Green Branch, Mixon Springs Branch, Nix Branch, Yielding Mill Creek, Baggett Branch, Bear Creek, Camp Creek, and Northfork Creek. None of these water resources are used for public drinking water.

### 3.11 Hydrologic Cycle:

Hackleburg's Hydrologic Cycle is the basic continuing atmospheric process where water is continually evaporated from the Gulf of Mexico and other bodies of water by the heat of the sun and blown by the winds across sea and land. This water is suspended in the atmosphere in the form of vapor. When certain weather conditions prevail in the atmosphere some of the water vapor forms clouds. When these clouds accumulate more water vapor than they can hold, the water is returned to the land as rain or snow. This process of moving water out of the oceans, lakes, and seas into the atmosphere, and back to the land and water bodies is called the Hydrologic cycle.

### 3.12 Floodprone Areas:

None of Hackleburg's Incorporated Area is in the 100 year floodplain. Since the town lies on the divide between the Tombigbee and Tennessee Valleys, no major flooding is expected. The soils map reveals only small amounts of alluvial soils in the Hackleburg area.

### 3.13 Prime Farmland:

The town of Hackleburg is not considered a large agricultural producing area due mainly to manufacturing employment in the area.

The undedeveloped areas within the city limits and planning area are used mainly for growing corn, soy beans, cattle, and for timber production.

### 3.14 Air Quality:

Air Quality is considered good, in Marion County, according to a study done by Tennessee Valley Authority. The total suspended particulate, carbon monoxide, sulfur dioxide, nitrogen dioxide, and ozone are all within the National Ambient Air Quality Standards and have been for the past 10 years.

### 3.15 Water System Analysis:

Hackleburg's first public water service was developed in 1939. A fresh water spring served as the Town's source for nearly two decades. There were occasions, particularly during the early fall season, when the spring proved inadequate. As a result of the Town's recognition of the need for a second source of water, a deep well was dug in 1957 adjacent to the old water tank near the center of Town. In the 1980's, problems began to develop with the town's well. In 1989, a project was constructed to extend a water main with a pumping station from the Town of Bear Creek's system to connect to Hackleburg. Hackleburg now purchases all of its water from Bear Creek which in turn purchases it from the Upper Bear Creek Water & Fire Protection Authority grid system.

The Bear Creek water booster station delivers 175 gallons per minute to Hackleburg. Operating sixteen hours per day, the booster station will provide approximately 5,000,000 gallons per month. The Hackleburg water system presently sells a little over 3,000,000 gallons per month.

The water distribution system for the Town of Hackleburg consists of a network of 6" and 8" distribution mains serving a smaller distribution system of 1-1/2", 2-1/2", and 3" mains. There are approximately 28 miles of distribution mains in the Hackleburg system.

There are presently three water storage tanks in the Hackleburg system. The oldest of these tanks is a 30,000 gallon elevated tank constructed in 1939. Another elevated tank, having a capacity of 100,000 gallons was constructed in the 1960's. In 1993, a 150,000 gallon standpipe was constructed adjacent to County Road 12 south of the downtown area. All of the tanks have an overflow elevation of 1040 feet above mean sea level.

### 3.16 Roads:

Hackleburg is served by U.S. Highway 43 and State Highway 17, to the north and south of town. Alabama Highways 172 and 253 and County roads 71 and 12 also serve the Hackleburg area. Most of the paved roads within the planning area are in fair condition. According to a 1992 four year road maintenance plan, Alabama DOT is in the process of widening and resurfacing parts of highways 172 and 253. Resurfacing is also planned for Highway 17.

### 3.17 Drainage:

The town of Hackleburg has relatively good drainage characteristics due to the topography and system of ditches, culverts, and gullies. Runoff from the town flows to Camp Creek to the south, Bear Creek to the north, and Northfork Creek to the
northwest.

### 3.18 Recreation:

The town of Hackleburg has two parks consisting of Heath Bob Hudson Park (18 acres) and Hackleburg City Park (5 acres). These facilities include, two softball fields, a basketball court, a walking/jogging trail, two pavilions, two lighted tennis courts, a swimming pool and playground equipment. A Community Center, which houses a combined basketball and volleyball court, has recently been constructed in Hackleburg.

## 4.0 POPULATION

### 4.1 Population Trends:

The Town of Hackleburg has experienced varying population trends since its incorporation. The Town's total population in 1960 was 527 and in 1980 it rose to 726, a gain of 37.8 percent. The Town continued to grow between 1970 and 1980. The 1980 Census indicated the population increased by 21.6 percent to 883. In 1990 the population increased by 31.5 percent to 1,161. Table 4.1 shows the population trends for the Town of Hackleburg.

**TABLE 4.1**
**Town of Hackleburg**
**Changes in Population**
**1960-1990**

| Year | Population | % Change |
|---|---|---|
| 1960 | 527 | ---- |
| 1970 | 726 | 37.8 |
| 1980 | 883 | 21.6 |
| 1990 | 1161 | 31.5 |

## 4.2 Population Projection:

**Table 4.2**
**Population Projections**
**Town of Hackleburg**

| | 2000 | | | 2010 | | |
|---|---|---|---|---|---|---|
| **1990 Population** | **Low** | **Med** | **High** | **Low** | **Med** | **High** |
| 1161 | 1173 | 1196 | 1219 | 1208 | 1256 | 1292 |
| % Increase | 1.0 | 3.0 | 5.0 | 3.0 | 5.0 | 6.0 |
| Increase | 12 | 35 | 58 | 35 | 60 | 73 |

Population projections for the Town of Hackleburg show a slight increase in the Town's total population. Projections are shown from a low to high percentage rate. The low end showing the minimum growth projected and the high end showing the maximum projected.

Projections on the medium to high end gave considerations to possible new developments and road projects that are possible in the near and distant future. Other factors considered in projections were past population trends.

**Table 8.1**
**Water Usage - Hackleburg, Alabama**

| Category | No Of Customers | Total Average Daily Usage | Average Water Usage Per Customer |
|---|---|---|---|
| Residential | 637 | 87,022 | 137 |
| Commercial | 31 | 3,445 | 111 |
| Industrial | 6 | 11,450 | 1,909 |
| School | 1 | 4,128 | 4,128 |

**Table 8.2**
**Large Water Users**
**Hackleburg, Alabama**

| Customer | Water Consumption (Gals/day) | Estimated Wastewater Generated (Gals/day) |
|---|---|---|
| Wrangler Sewing | 3,434 | 3,262 |
| School | 4,128 | 3,922 |
| Boatwright Sawmill | 2,483 | 2,359 |
| Valley Lumber | 2,363 | 2,245 |
| Wrangler Warehouse | 2,123 | 2,017 |
| Eddie Vickery Chicken Houses | 1,974 | 0 |
| Indies Trailer Plant | 1,436 | 1,364 |

Assuming that 95% of the water used is generated into wastewater, the estimated existing wastewater flowrates are as follows:

**Table 8.3**
**Estimated Existing Wastewater Flow**
**Town of Hackleburg**

| Type Customer | No. of Customers | Total Wastewater Generated | Average Wastewater Generated per Customer (GPD) |
|---|---|---|---|
| Residential | 637 | 82,671 | 130 |
| Commercial | 31 | 3,273 | 106 |
| Industrial | 6 | 10,878 | 1,813 |
| School | 1 | 3,922 | 3,922 |

## 8.2 Future Wastewater Flowrate:

The total flow to be treated by the proposed wastewater treatment facility will include residential, commercial, industrial, public/semipublic, and non-excessive infiltration/inflow.

**Table 8.4**
**Future Residential Consumption**
**Hackleburg, Alabama**

| No. of Units In Year 2010 | Wastewater Generated Per Unit (GPD) | Total Wastewater Generated (GPD) |
|---|---|---|
| 688 | 130 | 89,440 |

The theoretical wastewater flow from **commercial, industrial, and public/semipublic** is (see Table 8.3 above) 18,073 GPD. A ten percent (10%) increase during the planning period will result in a projected flow of 19,880 in the year 2010.

A design allowance of 200 GPD per inch diameter per mile of sewer will be used for infiltration/inflow. It is estimated that 25 miles of sewer will be needed to completely service the Hackleburg study area.

200 GPD per inch per mile x 8 inch diameter x 25 mile = 40,000 gallons

**8.3 Estimated Total Future Flowrate:**

The Estimated future wastewater flowrate for Hackleburg is as follows:

**Table 8.5**
**Future Wastewater Flowrate**
**Hackleburg, Alabama**

| Activity | Flowrate (GPD) |
|---|---|
| Residential | 89,440 |
| Commercial, Industrial, Public | 19,880 |
| Infiltration/Inflow | 40,000 |
| Total Future Flowrate | 149,320 |

**9.0 Alternatives:**

Separate alternatives have been considered for the collection and treatment systems and these alternatives have been evaluated on the basis of initial costs, environmental impacts, land requirements, operation and maintenance (O&M) costs and other known advantages and disadvantages.

**9.1 Collection System Alternatives:**

The following alternatives for collection of wastewater for Hackleburg were considered:

1. Conventional Gravity Sewer - Where feasible conventional gravity sewer systems should be utilized because of low operation and maintenance cost and long expected life. However, where there is low population density, or hilly terrain, or land underlain with rock, other alternatives must be considered.

2. Low Pressure Sewers - Pressure sewers have been found to be viable alternatives to conventional gravity sewers for areas described in (1.) above. There are basically two types of low pressure sewer systems. Septic Tank Effluent Pump (STEP) Systems utilize a septic tank to remove larger solids from the wastewater and an effluent pump to lift the liquid wastewater into a network of relatively small diameter PVC pipes. Another design of low pressure sewer system eliminates the use of the septic tank and utilizes grinder pumps to transport a slurry.
3. Individual Holding Tanks With Community Owned and Operated "Honey Wagons" - This type system has not been used in the Hackleburg area. This system would have a very high operating cost and it is doubtful that this type system would be publicly acceptable.
4. Septic Tank Absorption Systems - This is the type system which is in existence in Hackleburg. Many of the absorption systems are not operating properly and therefore continued use is not a viable alternative.
5. Septic Tank Mound Systems - Septic tank mound systems can be constructed where relatively large lot sizes (one to two acres) are available. The mounds have been found to cost from $6,000 to $8,000 per household. This type system is not a practical alternative for Hackleburg.
6. Septic Tank - Evapotranspiration System - This system utilizes a septic tank and evapotranspiration pond at each residence. Like the mound system, it requires large lot sizes and also is practical only in dry climate areas. . This type system is not a practical alternative for Hackleburg.
7. Septic Tank - Sand Filter Surface Discharge - This system, as the name implies is an onsite sewer system which includes a septic tank and a sand filter for each customer. The effluent from the septic tank is intermittently discharged onto a sand filter. The filtrate from the sand filter is then discharged into a local ditch or stream. Major problems with this type system for a community the size of Hackleburg would include high initial costs, high operation and maintenance costs, and very complicated monitoring and administrative requirements. This type system is not a practical alternative for Hackleburg.

### 9.1.1 Conventional Gravity Sewer System Analysis:

#### 9.1.1.1 Construction Costs:

Based on a preliminary layout and design and current construction costs for similar gravity sewer projects in the North Alabama area, the estimated cost for a sewer system of completely conventional gravity design would be:

## Table 9.1
## Preliminary Cost Estimate
## Gravity Sewage Collection System
## Hackleburg, Alabama

| Item # | Description | Est. Qty. | Unit | Unit Price | Amount |
|---|---|---|---|---|---|
| 1. | 10" PVC Sewer (10'-12' Cut) | 4000 | L.F. | $20.00 | $80,000 |
| 2. | 8" PVC Sewer (0'-6' Cut) | 6700 | L.F. | $15.00 | $100,500 |
| 3. | 8" PVC Sewer (6'-8' Cut) | 13400 | L.F. | $17.00 | $227,800 |
| 4. | 8" PVC Sewer (8'-10' Cut) | 13400 | L.F. | $20.00 | $268,000 |
| 5. | 8" PVC Sewer (10'-12' Cut) | 16750 | L.F. | $22.00 | $368,500 |
| 6. | 8" PVC Sewer (12'-14' Cut) | 33500 | L.F. | $24.00 | $804,000 |
| 7. | 8" PVC Sewer (14'-16' Cut) | 16750 | L.F. | $26.00 | $435,500 |
| 8. | 8" PVC Sewer (16'-18' Cut) | 13400 | L.F. | $28.00 | $375,200 |
| 9. | 8" PVC Sewer (18'-20' Cut) | 13400 | L.F. | $30.00 | $402,000 |
| 10. | 8" PVC Sewer (20'-22' Cut) | 6700 | L.F. | $34.00 | $227,800 |
| 11. | Standard Manholes (0'8' deep) | 475 | EA. | $950.00 | $451,250 |
| 12. | Manhole Extra Depth | 2400 | V.F. | $100.00 | $240,000 |
| 13. | 8" x 4" Wye Connections | 650 | EA. | $100.00 | $65,000 |
| 14. | 4" Schedule 40 PVC Service Pipe | 24000 | L.F. | $10.00 | $240,000 |
| 15. | Pavement Patch | 3500 | S.Y. | $12.00 | $42,000 |
| 16. | Crushed Limestone Backfill | 2000 | TONS | $12.00 | $24,000 |
| 17. | Road Bore For 8" Gravity | 400 | L.F. | $60.00 | $24,000 |
| 18. | Sewage Lift Stations | 12 | EA. | $45,000 | $540,000 |
| 19. | 4" SDR 21 PVC Forcemain | 30000 | L.F. | $4.00 | $120,000 |
| | **Total Estimated Construction** | | | | **$5,035,550** |
| | Contingencies | | | | $125,889 |
| | Engineering | | | | $276,955 |
| | Inspection | | | | $125,889 |
| | Additional Testing Services | | | | $15,000 |
| | **Total Estimated Project Cost** | | | | **$5,579,283** |

### 9.1.1.2 Operation and Maintenance Costs:

The following is a projection of the operation and maintenance costs associated with the gravity sewer system alternate:

**Table 9.2**
**Projected O&M Costs**
**Gravity Sewer System Alternate**
**Hackleburg, Alabama**

| Item | Monthly | Annually |
|---|---|---|
| | | |
| Electricity | $2,000 | $24,000 |
| Line Maintenance | 400 | 4,800 |
| Lift Station Repairs | 1,000 | 12,000 |
| | | |
| Total | $3,400 | $40,800 |

### 9.1.1.3 Land Requirements:

It is anticipated that about 25% of the sewer mains would be in easements with the remainder in public rights-of-way. Also, a 30' x 30' square parcel would be required for each of the lift stations. It is anticipated that a total of about 14 acres of land would be required.

### 9.1.1.4 Environmental Impacts:

The only anticipated impacts anticipated relevant to the gravity sewer system alternate are:

- Energy consumption by lift stations
- Land disturbance associated with construction of the sewers and pump stations
- Noise associated with the construction of the sewers and pump stations

### 9.1.2 Low Pressure Sewer System:

Based on a preliminary layout and design and current construction costs for similar low pressure sewer projects in the North Alabama area, the estimated cost for a sewer system completely of low pressure design would be:

## Table 9.3
## Preliminary Cost Estimate
## Low Pressure Sewer System
## Hackleburg, Alabama

| Item # | Description | Est. Qty. | Unit | Unit Price | Amount |
|---|---|---|---|---|---|
| 1. | 10" PVC Sewer (10'-12' Cut) | 4000 | L.F. | $20.00 | $80,000 |
| 2. | Standard Manholes (0'8' deep) | 15 | EA. | $950.00 | $14,250 |
| 3. | Manhole Extra Depth | 60 | V.F. | $100.00 | $6,000 |
| 4. | 4" SDR 21 PVC Low Pressure Sewer Main | 34000 | L.F. | $4.00 | $136,000 |
| 5. | 3" SDR 21 PVC Low Pressure Sewer Main | 113000 | L.F. | $3.00 | $339,000 |
| 6. | Low Pressure Sewer Clean-outs | 500 | EA. | $250.00 | $125,000 |
| 7. | Individual Grinder Pump Units | 650 | EA. | $5,500.00 | $3,575,000 |
| 8. | Pavement Patch | 1500 | S.Y. | $12.00 | $18,000 |
| 9. | Crushed Limestone Backfill | 1200 | TONS | $12.00 | $14,400 |
| 10. | Road Bore For 4" Low Pressure | 300 | L.F. | $30.00 | $9,000 |
| 11. | Road Bore For 3" Low Pressure | 500 | L.F. | $25.00 | $12,500 |
| | Total Estimated Construction | | | | $4,329,150 |
| | Contingencies | | | | $108,229 |
| | Engineering | | | | $238,103 |
| | Inspection | | | | $108,229 |
| | Additional Testing Services | | | | $15,000 |
| | Total Estimated Project Cost | | | | $4,798,711 |

### 9.1.2.2 Operation and Maintenance Costs:

The following is a projection of the Operation and Maintenance costs associated with a low pressure sewer system to serve the entire Hackleburg area.

**Table 9.4**
**Projected O&M Costs**
**Low Pressure Sewer System Alternate**
**Hackleburg, Alabama**

| Item | Monthly | Annually |
|---|---|---|
| | | |
| Electricity | $7,800 | $93,600 |
| | | |
| Pump Station Repairs | $1500 | $18,000 |
| | | |
| **Total** | **$9,300** | **$111,600** |

### 9.1.2.3. Land Requirements:

It is anticipated that most of the low pressure sewer mains would be located in existing street or highway rights-of-way. The 650 grinder pump stations would need to be located on 20' x 20' square parcels dedicated to the Hackleburg Sewer Board. Therefore, it is expected that a total of 650 x 20 x 20 = 260,000 square feet or approximately 6 acres of land would be required for this alternate.

### 9.1.2.4. Environmental Impacts:

It is anticipated that the environmental impacts of this project will be less than the impacts for the gravity sewer system in that construction disturbances will not be as great, since depths of cuts will be much less. However, the electricity requirements will be significantly greater for the low pressure sewer alternate.

## 9.1.3. Combination Gravity and Low Pressure Sewer:

As an alternate to either a completely gravity, or completely low pressure sewer system design, a design utilizing the advantages of each has been developed. With this combinations design, the more densely populated areas of *downtown* Hackleburg will be serviced by a conventional gravity sewer system. The more sparsely populated outlying areas will be serviced utilizing low pressure sewers. Based on current costs for each type of sewer, the following cost estimate for a combination gravity and low pressure sewer has been developed:

### 9.1.3.1 Construction Costs:

**Table 9.5**
**Preliminary Cost Estimate**
**Combination Gravity and Low Pressure Sewer System**
**Hackleburg, Alabama**

| Item # | Description | Est. Qty. | Unit | Unit Price | Amount |
|---|---|---|---|---|---|
| 1. | 10" PVC Sewer (10'-12' Cut) | 4000 | L.F. | $20.00 | $80,000 |
| 2. | 8" PVC Sewer (0'-6' Cut) | 3450 | L.F. | $15.00 | $51,750 |
| 3. | 8" PVC Sewer (6'-8' Cut) | 6900 | L.F. | $17.00 | $117,300 |
| 4. | 8" PVC Sewer (8'-10' Cut) | 6900 | L.F. | $20.00 | $138,000 |
| 5. | 8" PVC Sewer (10'-12' Cut) | 8625 | L.F. | $22.00 | $189,750 |
| 6. | 8" PVC Sewer (12'-14' Cut) | 17250 | L.F. | $24.00 | $414,000 |
| 7. | 8" PVC Sewer (14'-16' Cut) | 8625 | L.F. | $26.00 | $224,250 |
| 8. | 8" PVC Sewer (16'-18' Cut) | 6900 | L.F. | $28.00 | $193,200 |
| 9. | 8" PVC Sewer (18'-20' Cut) | 6900 | L.F. | $30.00 | $207,000 |
| 10. | 8" PVC Sewer (20'-22' Cut) | 3450 | L.F. | $34.00 | $117,300 |
| 11. | Standard Manholes (0'8' deep) | 245 | EA. | $950.00 | $232,750 |
| 12. | Manhole Extra Depth | 1225 | V.F. | $100.00 | $122,500 |
| 13. | 8" x 4" Wye Connections | 500 | EA. | $100.00 | $50,000 |
| 14. | 4" Schedule 40 PVC Service Pipe | 12500 | L.F. | $10.00 | $125,000 |
| 15. | 4" SDR 21 PVC Low Pressure Sewer Main | 15000 | L.F. | $4.00 | $60,000 |
| 16. | 3" SDR 21 PVC Low Pressure Sewer Main | 50000 | L.F. | $3.00 | $150,000 |
| 17. | Low Pressure Sewer Clean-outs | 220 | EA. | $250.00 | $55,000 |
| 18. | Individual Grinder Pump Units | 150 | EA. | $5,500.00 | $825,000 |
| 19. | Pavement Patch | 3000 | S.Y. | $12.00 | $36,000 |
| 20. | Crushed Limestone Backfill | 1500 | TONS | $12.00 | $18,000 |
| 21. | Road Bore For 8" Gravity | 200 | L.F. | $60.00 | $12,000 |
| 22. | Road Bore For 4" Low Pressure | 100 | L.F. | $30.00 | $3,000 |
| 23. | Road Bore For 3" Low Pressure | 100 | L.F. | $25.00 | $2,500 |

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| | | | | |
|---|---|---|---|---|
| 24. | Sewage Lift Stations | 3 EA. | $45,000.00 | $135,000 |
| 25. | 4" SDR 21 PVC Forcemain | 16000 L.F. | $4.00 | $64,000 |
| | Total Estimated Construction Cost | | | $3,623,300 |
| | Contingencies | | | $90,583 |
| | Engineering | | | $199,282 |
| | Inspection | | | $90,583 |
| | Additional Testing Services | | | $15,000 |
| | Total Estimated Project Cost | | | $4,018,747 |

## 9.1.3.2 Operation and Maintenance Costs:

The following is a projection of the Operation and Maintenance costs associated with a combination gravity and low pressure sewer system to serve the entire Hackleburg area.

**Table 9.4**
**Projected O&M Costs**
**Low Pressure Sewer System Alternate**
**Hackleburg, Alabama**

| Item | Monthly | Annually |
|---|---|---|
| | | |
| Electricity | $2,400 | $28,800 |
| | | |
| Pump Station Repairs | $1000 | $12,000 |
| | | |
| **Total** | **$3,400** | **$40,800** |

## 9.1.3.3. Land Requirements:

It is expected that a total of 150 x 20 x 20 = 60,000 square feet or approximately 1.4 acres of land would be required for the low pressure portion of this alternate. Also, approximately 6 acres of easement would be required for the gravity sewers and pump stations which would not be located in the public street/highway rights-of-way.

### 9.1.3.4. Environmental Impacts:

It is anticipated that the environmental impacts of this alternate will fall between those of the totally gravity sewer alternate and the totally low pressure alternate.

### 9.1.4 Ranking Of Collection Alternatives:

The three collection system alternatives discussed above will be ranked using the following criteria:

- Equivalent Annual Cost 65%
- Land Requirements 15%
- Environmental Impacts 15%
- Other Criteria 5%

The tables below summarize the economic evaluations using a 20 year assumed design life and 6% interest rate.

**Table 9.5**
**Summary of Economic Analysis**
**Collection System Alternatives**
**Hackleburg, Alabama**

| Alternate # | Capital Cost | Annual O&M | Eq. Ann. Cost | Rank |
|---|---|---|---|---|
| 1 | $5,579,283 | $ 40,800 | $526,755 | 2 |
| 2 | $4,798,711 | $111,600 | $529,568 | 3 |
| 3 | $4,018,747 | $ 40,800 | $390,833 | 1 |

**Table 9.6**
**Summary of Rankings**
**Collection System Alternatives**
**Hackleburg, Alabama**

| Alternate | 1 | 2 | 3 |
|---|---|---|---|
| Cost Rank | 2 | 3 | 1 |
| Rank x 65% | 1.38 | 1.95 | 0.65 |
| Land Req. Rank | 3 | 1 | 2 |
| Rank x 15% | 0.45 | 0.15 | 0.30 |
| Envir. Rank | 3 | 1 | 2 |
| Rank x 15% | 0.45 | 0.15 | 0.30 |
| Other Rank | 1 | 3 | 2 |
| Rank x 5% | .05 | .15 | .10 |

Based on the above evaluation the most cost effective, environmentally sound, and implementable alternative for collection of wastewater from Hackleburg is combination gravity and low pressure sewer alternative.

## 9.2 Treatment Alternatives:

### 9.2.1 General:

The alternatives which can be considered for wastewater treatment are dependent on the discharge limits which will be set for the proposed receiving stream. Generally, the lower the flow of the stream the more stringent will be the discharge permit limits and therefore the greater will be the degree of treatment required.

### 9.2.2 Receiving Streams:

Two potential discharge locations have been considered in this study. They are:

- Mixon Springs Branch in Section 19, Township 9 South, Range 12 West, Marion County, Alabama
- Bear Creek in Section 32, Township 8 South, Range 12 West, Franklin County, Alabama

It appears that Mixon Springs Branch has a 7-day, 10-year low flow of approximately zero. Bear Creek appears to have a low flow greater than zero.

### 9.2.3 Anticipated Discharge Parameters:

A positive set of discharge parameters for a given stream and discharge can only be obtained through the formal NPDES permitting process. In the absence of definite limits, the following are assumed as the expected discharge limits:

- Mixon Springs Branch
  BOD - < 5 ppm
  TSS - 15 ppm
  Ammonia - < 2 ppm

- Bear Creek
  BOD - 30 ppm
  TSS - 30-45 ppm

### 9.2.4 Treatment Methods:

For discharge to Mixon Springs Branch two alternatives have been considered. The first of these two alternatives is a packaged extended aeration type treatment plant with tertiary filter and with chlorination and dechlorination facilities. A schematic diagram of this alternative is shown as Figure 9.1.

The flow diagram for an extended aeration process is essentially the same as for a conventional complete mix system except that these smaller plants typically have no primary treatment and aerate the raw wastewater for a 24 hour period rather than the 6-8 hours used in conventional complete mix plants. The long aeration period allows the activated sludge formed to be partially digested within the aeration tank so that it can be dewatered and disposed of without the need for large sludge digestion capacity.

**Costs:** The attached Table 9.7 shows in tabular form the estimated capital cost, salvage value, O&M cost, and equivalent annual cost for the extended aeration alternative.

**Environmental Concerns:** Of all the alternatives studied in this report this alternative would require the disturbance of the least amount of land. The energy consumption of this alternative would be about equal to the aerated lagoon and overland flow alternative and greater than the three cell lagoon with hydrograph control release alternative.

## Table 9.7
## Cost of Extended Aeration Alternative
## Hakleburg, Alabama

| Item | Est. Qty. | Unit | Unit Cost | Amount | Life | Salvage Value | O&M Cost | Equivalent Annual Cost |
|---|---|---|---|---|---|---|---|---|
| Packaged Aeration Plant | 1 | L.S. | $175,000 | $175,000 | 20 | $ 10,000 | $7,800 | $22,788 |
| Pumps and Auxiliary Equip. | 1 | L.S. | $100,000 | $100,000 | 20 | $ 5,000 | $5,000 | $13,584 |
| Tertiary Filter | 1 | L.S. | $50,000 | $50,000 | 20 | $ 7,500 | $7,500 | $11,656 |
| Chlorination | 1 | L.S. | $25,000 | $25,000 | 15 | $ 3,000 | $5,000 | $7,098 |
| Dechlorination | 1 | L.S. | $25,000 | $25,000 | 15 | $ 3,000 | $5,000 | $7,098 |
| Site Work | 1 | L.S. | $30,000 | $30,000 | 30 | $ - | $3,000 | $5,616 |
| Lab & Office | 1 | L.S. | $90,000 | $90,000 | 40 | $ 60,000 | $1,000 | $7,216 |
| Subtotal | | | | $495,000 | | $ 88,500 | $34,300 | $75,057 |
| Contingencies | | | | $24,750 | | | | $2,158 |
| Engineering and Inspection | | | | $64,350 | | | | $5,611 |
| Total | | | | $584,100 | | | | $82,826 |

## Table 9.8
## Cost of Aerated Lagoon and Overland Flow Alternative
## Hakleburg, Alabama

| Item | Est. Qty. | Unit | Unit Cost | Amount | Life | Salvage Value | O&M Cost | Equivalent Annual Cost |
|---|---|---|---|---|---|---|---|---|
| Unclassified Excavation | 10000 | C.Y. | $7 | $70,000 | 50 | $5,000 | $7,500 | $13,468 |
| Sitework | 45 | AC. | $3,000 | $135,000 | 30 | $60,000 | $15,000 | $25,140 |
| Sprinklers & Piping | 1 | L.S. | $125,000 | $125,000 | 30 | $30,000 | $20,000 | $30,084 |
| Aerators & Controls | 1 | L.S. | $50,000 | $50,000 | 20 | $5,000 | $12,000 | $16,224 |
| Pond Liner | 1 | L.S. | $50,000 | $50,000 | 30 | $10,000 | $1,500 | $5,588 |
| Pumps | 1 | L.S. | $40,000 | $40,000 | 20 | $10,000 | $6,000 | $9,216 |
| Lab & Office | 1 | L.S. | $90,000 | $90,000 | 40 | $60,000 | $1,000 | $7,216 |
| Land | 45 | AC | $3,000 | $135,000 | 50 | $45,000 | $5,000 | $15,548 |
| Chlorination | 1 | L.S. | $25,000 | $25,000 | 15 | $3,000 | $5,000 | $7,098 |
| Subtotal | | | | $720,000 | | $228,000 | $73,000 | $129,582 |
| Contingencies | | | | $36,000 | | | | $3,139 |
| Engineering & Inspection | | | | $93,600 | | | | $8,162 |
| Total | | | | $849,600 | | | | $140,884 |

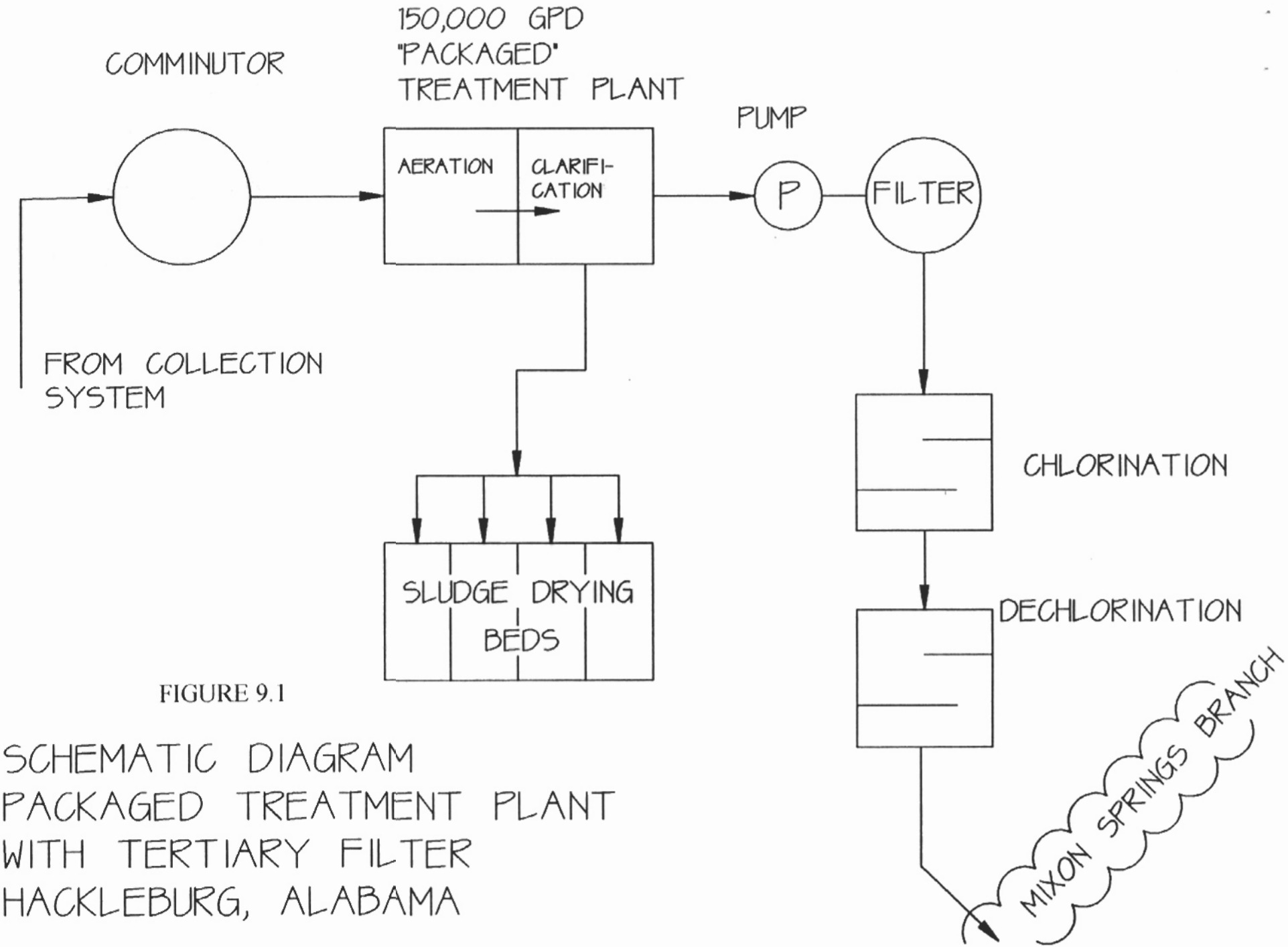


FIGURE 9.1

SCHEMATIC DIAGRAM
PACKAGED TREATMENT PLANT
WITH TERTIARY FILTER
HACKLEBURG, ALABAMA

The second alternative considered for discharge to Mixon Springs Branch is an aerated oxidation pond followed by overland flow land treatment followed by chlorination and dechlorination and discharge to the receiving stream.

A schematic diagram of this alternative is shown as Figure 9.2.

The oxidation pond for this alternative would be sized for about six days detention. The depth of the pond would be about ten feet. Air can be supplied by a compressor that injects air into the pond by tubing installed on the bottom or by mechanical aerators installed at the surface of the pond.

In the overland flow portion of the process, the wastewater is sprayed over the upper edges of sloping terraces and flows slowly down the hill and through the grass and vegetative litter. Although the soil is not the primary filter in this mode, treatment efficiencies are high in a well run system. Typical removals are $BOD_5$, 92 percent; suspended solids, 92 percent; nitrogen, 70-90 percent; phosphorus, 40-80 percent; and metals, 50 percent. Soils best suited for this approach are clays and clay loams with even, moderate slopes (2-6 percent). Grass is usually planted to provide a habitat for biota and to prevent erosion. As the effluent flows down the slope, a portion infiltrates into the soil, a small amount evaporates, and the remainder flows to collection channels. As the effluent flows through the grass, the suspended solids are filtered out and the organic matter is oxidized by the bacteria living in the vegetative litter.

**Costs:** The attached Table 9.8 shows in tabular form the estimated capital cost, salvage value, O&M cost, and equivalent annual cost for the aerated lagoon and overland flow alternative

**Environmental Concerns:** This alternative requires the most land for an irreversible use. This alternative has about the same energy consumption as the packaged plant alternative.

In addition to the two alternatives described above which result in discharge to Mixon Springs Branch, an alternative with discharge to Bear Creek (approximately 3 1/2 miles north of Hackleburg) has been considered. This alternative involves the use of a three-cell oxidation pond sized at a $BOD_5$ of 35 pounds per acre. An additional holding pond would be required to allow for hydrograph control release. The effluent would then be pumped by three pump stations through 19,000 feet of 6" diameter PVC forcemain to Bear Creek. It is anticipated that chlorine contact time as well as dechlorination would be achieved in the time of travel through the forcemain.

A schematic diagram of this alternative is shown as Figure 9.3.

**Costs:** The attached Table 9.9 shows in tabular form the estimated capital cost, salvage value, O&M cost, and equivalent annual cost for the oxidation pond and hydrograph release alternative with discharge to Bear Creek.

## Table 9.9
## Cost of Three Cell Lagoon and Hydrograph Control Release Alternative
## Hakleburg, Alabama

| Item | Est. Qty. | Unit | Unit Cost | Amount | Life | Salvage Value | O&M Cost | Equivalent Annual Cost |
|---|---|---|---|---|---|---|---|---|
| Unclassified Excavation | 40000 | C.Y. | $7 | $280,000 | 50 | $20,000 | $10,000 | $33,872 |
| Sitework | 1 | L.S. | $40,000 | $40,000 | 30 | $20,000 | $3,000 | $5,944 |
| Pump Stations | 3 | EA. | $40,000 | $120,000 | 20 | $17,500 | $9,000 | $18,988 |
| HCR Equipment | 1 | L.S. | $30,000 | $30,000 | 15 | $2,500 | $3,000 | $5,548 |
| Effluent Forcemain | 19000 | L.F. | $9 | $171,000 | 20 | $7,500 | $1,500 | $16,207 |
| Land | 10 | AC. | $3,000 | $30,000 | 50 | $10,000 | $1,000 | $3,344 |
| Chlorination | 1 | L.S. | $35,000 | $35,000 | 15 | $3,000 | $5,000 | $7,970 |
| Lab & Office | 1 | L.S. | $90,000 | $90,000 | 40 | $60,000 | $1,000 | $7,216 |
| Subtotal | | | | $796,000 | | $140,500 | $33,500 | $99,090 |
| Contingencies | | | | $39,800 | | | | $3,471 |
| Engineering & Inspection | | | | $103,480 | | | | $9,023 |
| Total | | | | $939,280 | | | | $111,584 |

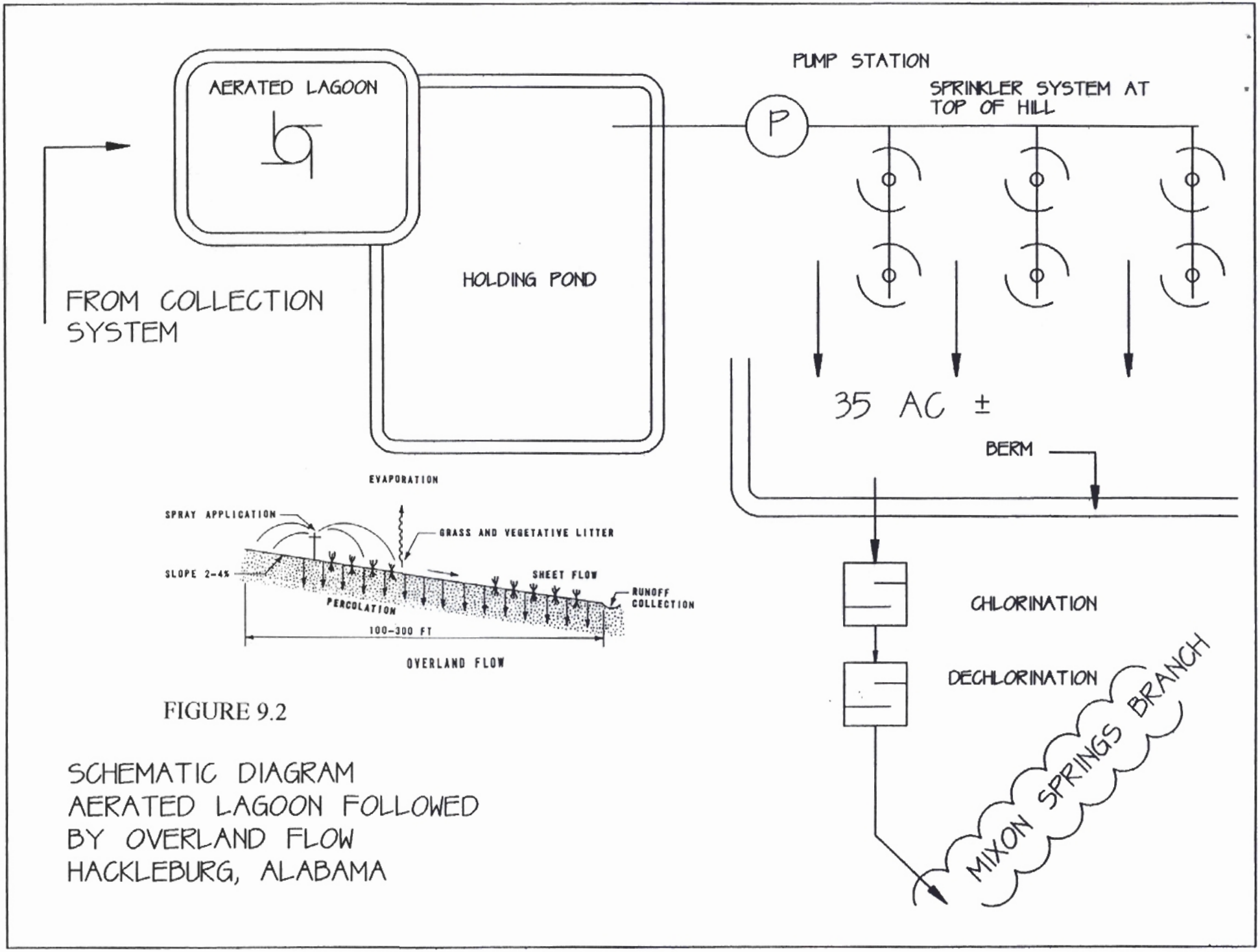


FIGURE 9.2

SCHEMATIC DIAGRAM
AERATED LAGOON FOLLOWED
BY OVERLAND FLOW
HACKLEBURG, ALABAMA

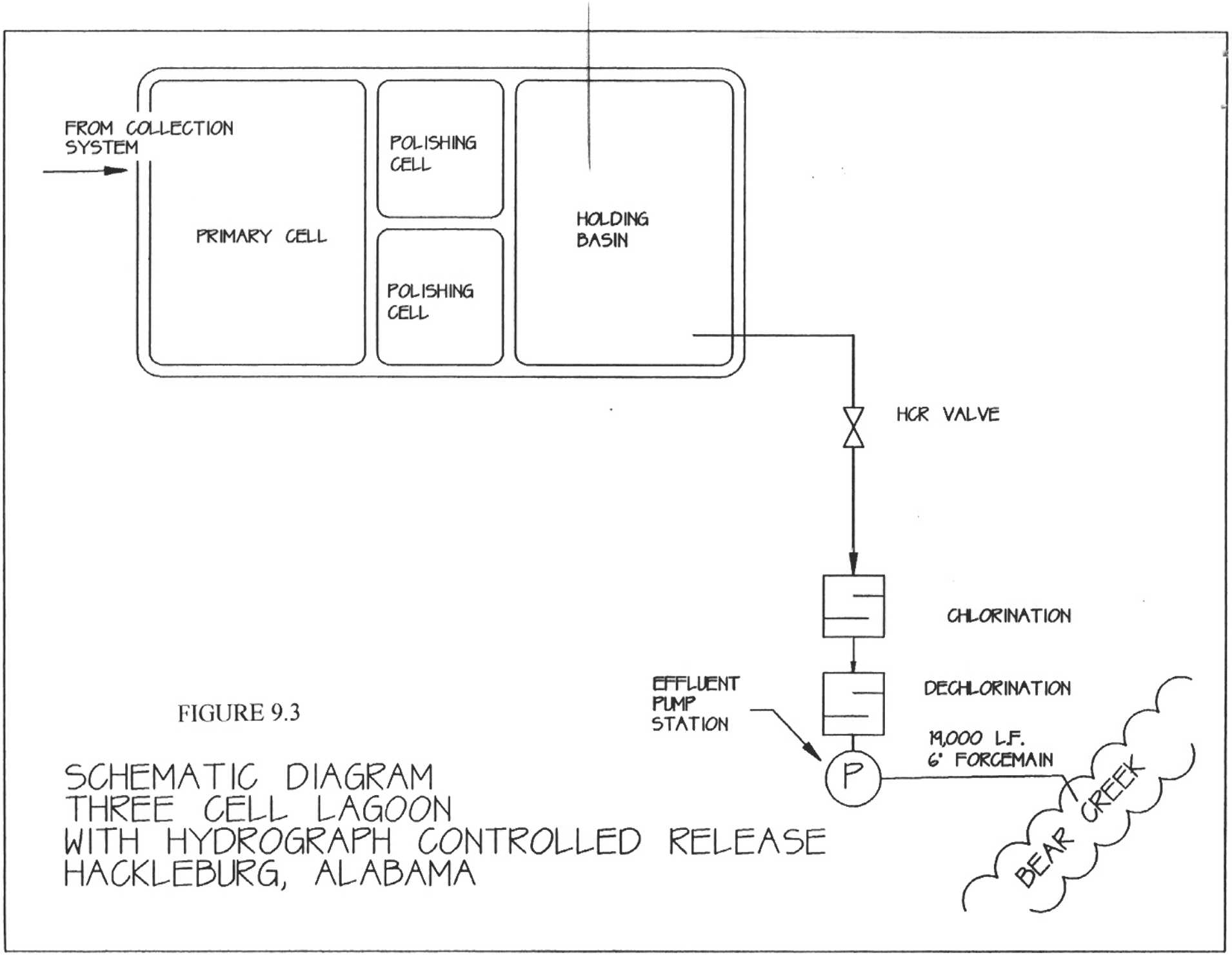


FIGURE 9.3

SCHEMATIC DIAGRAM
THREE CELL LAGOON
WITH HYDROGRAPH CONTROLLED RELEASE
HACKLEBURG, ALABAMA

**Environmental Concerns:** Of the three alternatives considered, this ranks second for land requirements. This alternative would result in considerable disruption as a result of the construction of 3 1/2 miles of forcemain to Bear Creek.

9.3 Ranking of Alternatives:

For purposes of this study, the ranking of alternatives will be conducted with the following weights:

- Cost effectiveness 75%
- Environmental concerns 25%

**Table 9.10**
**Ranking of Treatment Alternatives**

| | | | | |
|---|---|---|---|---|
| Extended Aeration | $82,826 | 1 | 1 | 1 |
| Overland Flow | $140,884 | 3 | 3 | 3 |
| Hydr. Control Rel. | $111,584 | 2 | 2 | 2 |

Based on the above ranking the selected alternative utilizes an extended aeration packaged plant with tertiary filters and discharge to Mixon Springs Branch.

## 10. Funding of Selected Alternative:

The attached Table 10.1 is a tabulation of the costs anticipated with the initiation of each of the prioritized collection areas and the necessary treatment facility.

Table 10.1 indicates that the construction of the selected wastewater treatment facility and sewers in Priority areas 1, 2, and 3 would serve the majority of the populated area of Hackleburg. It is believed that much of the Hackleburg area would qualify for Community Development Block Grant Funding. Table 10.2 shows the anticipated monthly sewer bill with various assumed ratios of grant participation.

**Table 10.1**
**Priority of Construction**
**Hackleburg, Alabama Sewerage System**

| Item/Area | Capital Cost | Accum. Capital | Engr. Cost | Contingency Cost | Total | No. Customers | Accum. No. Customers | Accum. Flow | Annual O&M | Total Per User |
|---|---|---|---|---|---|---|---|---|---|---|
| Treatment Facility | $495,000 | $495,000 | $64,350 | $24,750 | $584,100 | 0 | 0 | 0 | $0 | $0 |
| Priority #1 Area | $905,120 | $1,400,120 | $117,750 | $35,003 | $1,552,873 | 225 | 225 | 67500 | $33,795 | $7,052 |
| Priority #2 Area | $588,328 | $1,988,448 | $167,228 | $49,711 | $2,205,388 | 60 | 285 | 85500 | $42,807 | $7,888 |
| Priority #3 Area | $769,352 | $2,757,800 | $231,931 | $68,945 | $3,058,676 | 125 | 410 | 123000 | $61,582 | $7,610 |
| Priority #4 Area | $122,445 | $2,880,245 | $242,229 | $72,006 | $3,194,480 | 15 | 425 | 127500 | $63,835 | $7,667 |
| Priority #5 Area | $639,435 | $3,519,680 | $296,005 | $87,992 | $3,903,677 | 50 | 475 | 142500 | $71,345 | $8,368 |
| Priority #6 Area | $598,620 | $4,118,300 | $346,349 | $102,958 | $4,567,607 | 25 | 500 | 150000 | $75,100 | $9,285 |

For the citizens of Hackleburg to pay a sewer rate in line with other communities of similar size, a grant participation of at least 50% will be required.

Possible matching funding for the Hackleburg wastewater treatment facility and sewerage system is available from the United States Department of Agriculture Rural Economic and Community Development and/or the State of Alabama Revolving Loan Fund.