

WASTEWATER PRE-APPLICATION  
COVER PAGE

WWAC ID #: 3199

1. Applicant / Owner: City of Flippin		2. ACEDP Grantee: N/A	
Representative & Title: Mary Jane Erwin, Mayor		Representative & Title: <u>4851</u>	
Address: P.O. Box 40, 239 E. Main St.		Address:	
City & Zip Code: Flippin, AR 72634		City & Zip Code:	
County: Marion		County: <u>NOV 21 2007</u>	
Phone: (870)453-8300		Phone:	
FAX: (870)453-5722		FAX: <u>W/H</u>	
E-Mail Address: mayor@southshore.com		E-Mail Address:	
3. Engineering Firm: McGoodwin Williams & Yates		4. Application Type: (Mark all that apply)  <input type="checkbox"/> LMI Service Hookups <input type="checkbox"/> New Collection System or Extension <input type="checkbox"/> Rehab Existing Collection System <input type="checkbox"/> New Treatment Plant <input checked="" type="checkbox"/> Rehab Existing Treatment Plant <input type="checkbox"/> Other _____	
Project Engineer: James C. Ulmer, PE			
Address: 909 Rolling Hills Dr.			
City & Zip Code: Fayetteville, AR 72703			
Phone: (479) 443-3404			
FAX: (479) 443-4340			
E-Mail Address: julmer@arkansasusa.com			
5. Number of Existing Customers: 548	Number of New Customers: 39	Projected Number of Customers: <u>1177</u>	587
6. Arkansas Senate District: 1	Arkansas House District: 86	U.S. House District: <u>LS-00021</u>	3
7. Provide a brief description of the project: Expand and upgrade existing wastewater treatment plant to meet current and future growth demands.			
8. Indicate the Agencies and Dollar Amounts you plan to use for this project:			
\$ _____	Arkansas Community and Economic Development Program Grant		
\$4,370,000	Arkansas Natural Resources Commission		
\$ _____	Community Resource Group		
\$ _____	USDA, Rural Development		
\$ _____	Other Funding Source: _____		
\$4,370,000	Total Funds Requested		
9. I, the undersigned representative of the applicant or grant recipient, certify that the information contained herein and the attached statements, exhibits and reports are true, correct and complete to the best of my knowledge and belief.			
Applicant's Signature: <u>/s/ Mary Jane Erwin</u>		Date: <u>11/15/07</u>	
Application Preparer's Signature: <u>J.C. Ulmer</u>		Date: <u>15 Nov 07</u>	

NPDES PERMIT FILE

AFIN # LS-00021

Permit PIN  
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Date Scanned  
11-26-07

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Correspondence  
Permit PIN  
AFIN #  
NPDES #

NPDES PERMIT FILE

# APPLICATION FOR FEDERAL ASSISTANCE

OMB Approval No. 0348-0043

2. DATE SUBMITTED November 15, 2007	Applicant Identifier
3. DATE RECEIVED BY STATE	State Application Identifier
4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier

1. TYPE OF SUBMISSION:  
Application

Construction       Construction

Non-Construction       Non-Construction

5. APPLICANT INFORMATION

Legal Name: City of Flippin	Organizational Unit: City of Flippin
Address (give city, county, state, and zip code): City of Flippin 239 E. Main St. Flippin, AR 72634 Marion County	Name and telephone number of the person to be contacted on matters involving this application (give area code) James C. Ulmer, PE McGoodwin Williams & Yates (479)443-3404

6. EMPLOYER IDENTIFICATION NUMBER (EIN):

7	1	0	3	3	5	6	0	6
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7. TYPE OF APPLICANT: (enter appropriate letter in box) [C]

A. State	H. Independent School Dist.
B. County	I. State Controlled Institution of Higher Learning
C. Municipal	J. Private University
D. Township	K. Indian Tribe
E. Interstate	L. Individual
F. Intermunicipal	M. Profit Organization
G. Special District	N. Other (Specify):

8. TYPE OF APPLICATION:

New     Continuation     Revision

If Revision, enter appropriate letter(s) in box(es):       

A. Increase Award    B. Decrease Award    C. Increase Duration  
D. Decrease Duration    Other (specify):

9. NAME OF FEDERAL AGENCY:

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER:   

TITLE

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:  
Expand and upgrade existing wastewater treatment plant to meet current and future growth demands.

12. AREAS AFFECTED BY PROJECT (cities, counties, states, etc.):  
City of Flippin

13. PROPOSED PROJECT:

Start Date 11/15/2007	Ending Date
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14. CONGRESSIONAL DISTRICTS OF:

a. Applicant 3	b. Project 3
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15. ESTIMATED FUNDING:	16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS? a. YES. <input checked="" type="checkbox"/> THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON: DATE November 15, 2007 b. NO. <input type="checkbox"/> PROGRAM IS NOT COVERED BY E.O. 12372 <input type="checkbox"/> OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW
a. Federal	
b. Applicant	
c. State	
d. Local	
e. Other	
f. Program Income	
g. TOTAL	17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT? <input type="checkbox"/> Yes If "Yes," attach an explanation. <input checked="" type="checkbox"/> No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED

a. Typed Name of Authorized Representative Mary Jane Erwin	b. Title Mayor	c. Telephone number (870)453-8300
d. Signature of Authorized Representative /S/ Mary Jane Erwin	e. Date Signed 11/15/07	

# PRELIMINARY ENGINEERING REPORT

# Wastewater Treatment Plant Improvements

**Flippin  
Arkansas**

**FL-07**

**November 2007**



**submitted by**

**McGoodwin Williams & Yates**



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**101 Purpose and Scope**

On September 4, 2007 the City of Flippin, Arkansas and McGoodwin, Williams, and Yates, Inc. entered into an agreement that provided for the preparation of a Preliminary Engineering Report.

The purpose of the Study, from which the Preliminary Engineering Report is derived, was to provide the City of Flippin with a 20-year master plan for improvements and additions to the existing wastewater treatment system including improvements to meet existing and short-term future growth needs.

The Scope of Work generally includes:

- Project the flows and loading over the next twenty (20) years.
- Evaluate upgrading or modifying the operation of the existing wastewater treatment facility to meet short-term future growth needs.
- Evaluate the need for possible additional wastewater treatment facility capacity expansion.
- Prepare a conceptual design of the needed treatment facilities.
- Prepare opinions of a range of probable development costs for the viable treatment alternatives.
- Prepare a possible implementation schedule for development of the new or improved treatment facilities, which will include financing options.

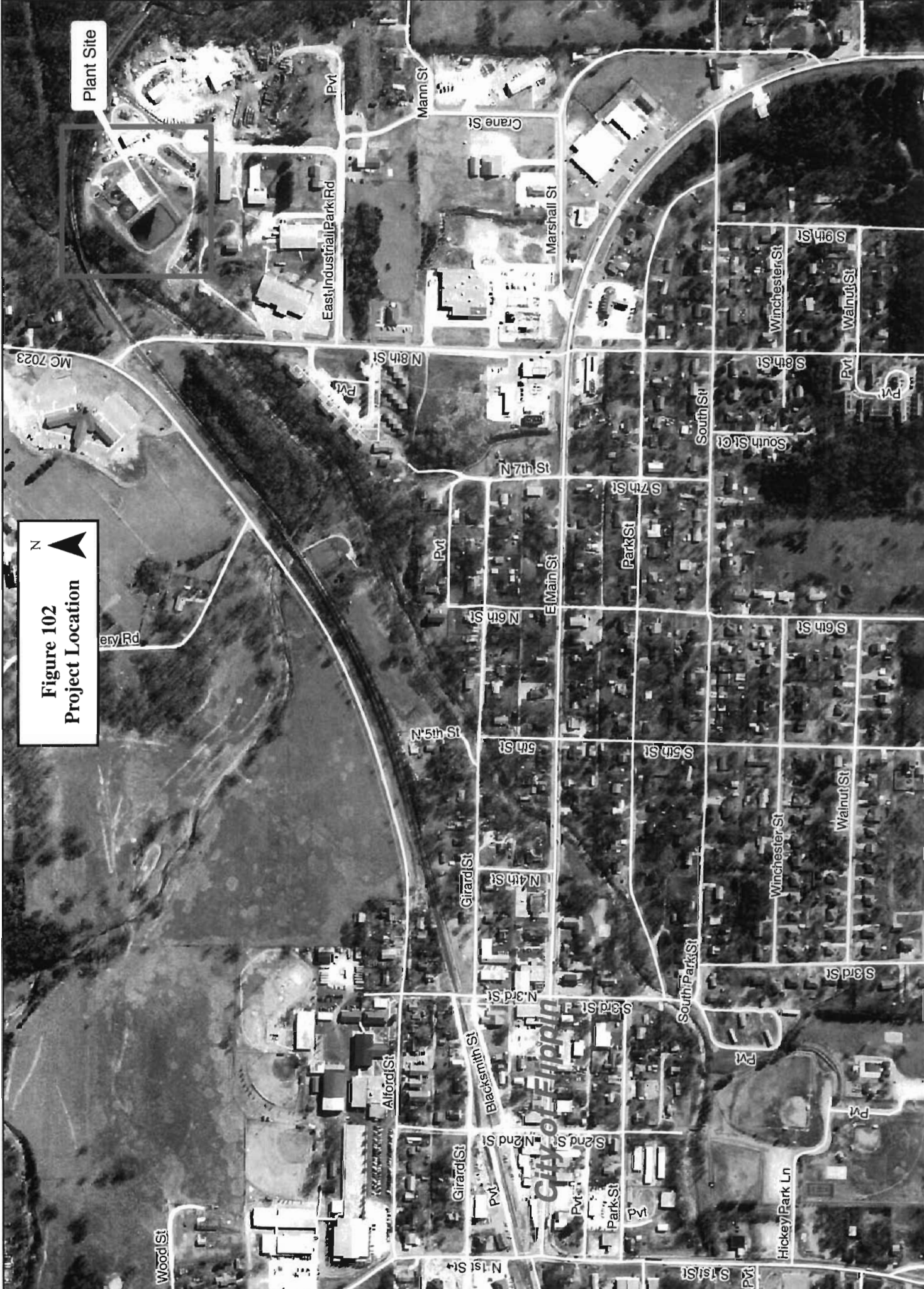
**102 Project Location**

The City of Flippin is located in Marion County, Arkansas. Marion County is located in the north-central part of the state, and is adjacent to the State of Missouri. The City of Flippin is located in the east-central part of the County. As of the 2000 census there were 16,140 people living in Marion County. The existing wastewater treatment facility is located in the northeast section of the City of Flippin, just south of Fallen Ash Creek. Figure 102 is an aerial photograph of the project location.

Figure 102  
Project Location



Plant Site





### 201 Existing Population (2007)

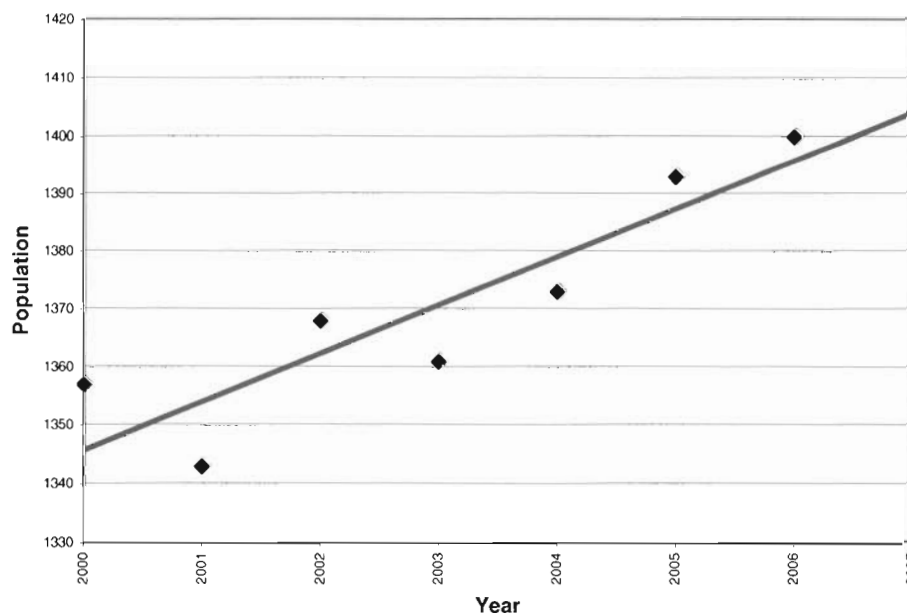
The population for the City of Flippin, Arkansas is listed as 1,357 for the year 2000. For years after 2000, the population is estimated by the Census Data Center, Institute for Economic Advancement at the University of Arkansas Little Rock (UALR). Table 201 shows these population estimates.

**Table 201**  
**Flippin, Arkansas Population Estimates 2000-2006**

Year	Population
2000	1357
2001	1343
2002	1368
2003	1361
2004	1373
2005	1393
2006	1400

The population for 2007 was estimated from the growth trend for the years 2000-2006. After projecting this trend forward one (1) year to 2007, the population was determined to be 1405. Figure 201 shows this population estimate by UALR.

**Figure 201**  
**2007 Population Estimate for Flippin, Arkansas**



## **202 Existing Flows**

### ***202.1 Flow Measurement***

Wastewater flows at the Flippin Wastewater Treatment Facility are currently only measured at the post aerator, just prior to discharge into Fallen Ash Creek. The effluent flow meter is an Isco bubbler flow meter. The bubbler flow meter measures depth of flow in an eight-inch parabolic nozzle at the inlet to the post aerator. The bubbler flow meter records average, maximum, and minimum flow rates. In addition, the flow meter totalizes the daily flow. Both flow rates and the totalized daily flow are based on the depth-discharge relationship for the parabolic nozzle.

Influent flows at the Flippin Wastewater Treatment Facility are not measured directly. Rather, they are estimated by determining the run-times on the pumps located at the plant site pump station. All flow that enters the plant passes through these pumps. Once a day, the operator descends into the plant site pump station to read the run-times on each pump. Then, using the run-times and the theoretical flow rate that each pump delivers, the average daily flow is calculated. A major drawback to this type of flow measurement is the lack of any peak flow rate data. Also, should a pump become partially clogged, its runtime would not accurately reflect the flow pumped, as the additional head losses due to the blockage would decrease the flowrate that the pump could produce. Additionally, there is no way to determine the flow rate coming into the plant site pump station.

### ***202.2 Available Flow Data***

For purposes of this report, influent and effluent data from January 2004 through December 2006 was analyzed to determine flow characteristics such as average day, dry weather and wet weather flows, and per capita flows.

Because influent flows are estimated from pump run times, there is no way to determine maximum instantaneous flows into the plant. The only flows that can be extrapolated from the influent data are average daily flows.

The effluent flow meter provides reliable data. However, it can not be used to measure the maximum instantaneous flow through the plant because the maximum flow of the effluent does not necessarily give an accurate representation of the maximum flow entering the plant, as flow equalization, through the various treatment tanks, dampens the peak influent flows that occur. Moreover, some volume of influent flow will be removed from the effluent flow in the form of screenings, grit, sludge, etc.

### ***202.3 Average Daily Flow***

The average daily flow, for the purposes of this study, is defined as the total of all daily flows from the period beginning on January 1, 2004 and ending December 28,

2006 divided by the number of days in that same period. The average daily flow for that time was 200,000 gallons per day.

#### ***202.4 Maximum Day***

The maximum daily flow for the City of Flippin over the period of record is not known. The highest total is based on both pumps in the plant site pump station pumping continuously for twenty-four (24) hours. The theoretical capacity of both pumps running simultaneously is a flow of 748,224 gallons per day. This number represents the maximum theoretical volume of wastewater that the existing lift station can pump and not the maximum volume of flow that may actually reach the Wastewater Treatment Facility. Considering the records of 2004-2006, there were at least six (6) separate events where both pumps were running continuously for a period of 24 hours or more. It is likely that, during one or more of these events, flow entering the plant site pump station was in excess of 748,224 gallons per day.

#### ***202.5 Peak Flow Rate***

The maximum rate of flow arriving at the plant can not be determined from the available data. As previously mentioned, the theoretical peak rate of flow transmitted by the lift station pumps is 748,224 gallons per day.

#### ***202.6 Minimum Day***

The minimum day for the period of record is also difficult to establish. Again, because there is no influent flow meter at the treatment facility, flow volumes are estimated from the pump run times. As there are no personnel at the treatment facility during weekends and holidays, and also because inclement weather prevents the operators from accessing the pump run time meters, there are days where run times are not recorded. Instead, run times for a multiple-day period are recorded. Flows over these days are then calculated as average values.

During the three-day period of August 27-29, 2005 there was a total volume of 207,042 gallons of wastewater pumped by the plant lift station. When averaged over those three days, the resulting daily flows of 69,014 gallons per day are, for the purposes of this study, considered the minimum days.

#### ***202.7 Average Dry Weather Flow***

The average dry weather flow, based on the 6 lowest flow months during the flow data period, was 117,711 gallons per day.

### 202.8 Average Wet Weather Flow

The average wet weather flow, based on the 6 highest flow months during the flow data period was 348,794 gallons per day.

Table 202 summarizes the flow characteristics.

**Table 202**  
**Daily Flow Characteristics**

Flow Characteristic	Value
Average Daily Flow	200,000 gallons
Maximum Day	748,224 gallons
Peak Hourly Flow Rate	Unknown
Minimum Day	69,014 gallons
Average Dry Weather Flow	117,711 gallons/day
Average Wet Weather Flow	348,794 gallons/day

### 203 Existing Loadings

Influent concentrations of wastewater constituents are not normally measured at the Flippin Wastewater Treatment Facility. Special sampling and analysis of the influent parameters was conducted during October 2007. Grab samples were collected and analyzed by a commercial laboratory. Average daily flows were recorded during the sampling period to allow determination of the various influent parameters. The results are set out in Table 203.

**Table 203**  
**Current Influent Concentrations and Loadings**

Date	Flow MGD	BOD <sub>5</sub> mg/L	BOD <sub>5</sub> lb/day	TSS mg/L	TSS lb/day	NH <sub>3</sub> -N mg/L	NH <sub>3</sub> -N lb/day	TP mg/L	TP lb/day
10/2/2007	0.143	310	370	217	259	30.3	36.1	6.92	8.25
10/3/2007	0.196	174	284	82	134	19.7	32.2	N/A	N/A
10/9/2007	0.173	246	355	197	284	27.5	39.7	7.20	10.39
10/10/2007	0.173	233	336	164	237	32.3	46.6	N/A	N/A
10/15/2007	0.137	201	230	169	193	17.0	19.4	5.00	5.71
10/16/2007	0.175	370	540	202	295	33.9	49.5	N/A	N/A
<b>Average</b>	<b>0.166</b>	<b>256</b>	<b>353</b>	<b>172</b>	<b>234</b>	<b>26.8</b>	<b>37.3</b>	<b>6.37</b>	<b>8.12</b>

### 204 Existing Facilities

The existing wastewater treatment plant was constructed in 1987 as an expansion to the previous wastewater treatment plant. Biological treatment is accomplished by way of a single-train oxidation ditch. Additional facilities include an inlet facility which houses a bar screen and a vortex solids classifier, two (2) final clarifiers, a filter dosing tank, four

(4) intermittent sand filters, an ultraviolet disinfection facility, a post aerator, an aerated sludge storage tank, a flow equalization pond, and four (4) sludge drying beds. In addition, there is a plant site pump station and a return activated sludge (RAS) pump station.

The sizes of the major components of the existing wastewater treatment facility and its reported design basis are set out below:

1. Design Flow = 0.175 MGD
2. Design Influent BOD = 232 mg/L
3. Design TSS = 201 mg/L
4. Wedge Wire Screen  
Wire Spacing = 20 Mesh  
Incline = Variable (25°-45°)
5. Teacup Vortex Classifier  
Diameter = 22"  
Removal Efficiency = 95% ≥ 200 micron  
Head Loss = 3" at 0.175 MGD  
= 28" at 0.526 MGD
6. Oxidation Ditch  
Volume = 193,000 gallons  
Hydraulic Retention Time at Design Flow = 26.5 hrs
7. Final Clarifiers (2)  
Diameter = 18' each  
Surface Area = 254.5 ft<sup>2</sup> each  
Volume = 19,035 gallons each  
Weir Length = 51'-10" each
8. Dosing Tank  
Volume = 15,860 gallons
9. Intermittent Sand Filters (4)  
Filter Surface Area = 5852 ft<sup>2</sup> each  
Total Surface Area = 23,408 ft<sup>2</sup>  
Design Depth of Media = 2'-6"  
Filter Media: Coarse Sand  
Uniformity Coefficient ≤ 6.0  
Effective Size = 0.3-0.75 mm

10. U.V. Disinfection Facility
  - U.V. Light Wavelength = 254 nm
  - Channel Width = 15"
  - Number of Bulbs = 18
  - Depth of Flow in Channel = 10"
11. Post Aerator
  - Number of Cascade Weir Steps = 5
  - Height of Each Step = 1'-0"
  - Total Cascade Height = 5'-0"
  - Length of Weir, Each Step = 10'-8"
  - V-Notch Spacing = 6" center to center
12. Aerated Sludge Storage Tank
  - Diameter = 31'-6"
  - Volume = 87,445 gallons
13. Sludge Drying Beds (4)
  - North Beds Surface Area = 1,430 ft<sup>2</sup>
  - South Beds Surface Area = 835 ft<sup>2</sup>
  - Total Surface Area = 2,265 ft<sup>2</sup>
14. Plant Site Pump Station Pumps (2)
  - Motor Horsepower = 15 HP
  - Design Operating Point = 365 gpm at 64' TDH
15. WAS Pump Station Pumps (2)
  - Motor Horsepower = 2 HP
  - Variable Speed Pumps
  - Design Operating Range = 60-125 gpm at 20' TDH

## **205 Condition of Existing Facilities**

### ***205.1 Inlet Facility***

The existing screen is in good condition, but an upgrade to a screen that is mechanically cleaned would be a beneficial improvement to the inlet facility. In addition, the decanter for the screenings does not appear to be working well as the screenings receptacle is holding quite a bit of free liquid. The vortex classifier appears to be working well. However, as the classifier is a part of a stacked screen system, it may need to be replaced in conjunction with the screen improvements.

There is no influent flow meter located in the existing Inlet Facility. The addition of a Parshall flume and an influent flow meter is an improvement which would benefit process control at the Flippin Wastewater Treatment Facility.

### ***205.2 Oxidation Ditch***

The existing oxidation ditch appears to be operating well. However, there is only one oxidation ditch; therefore, the existing oxidation ditch can not be removed from service for maintenance or cleaning purposes. In addition, the inboard bearings on the brush rotors are uncovered. This allows dust and grit to work its way into the bearing housing which can lead to excessive wear on the equipment. There appears to be some lubricating fluids leaking from the bearing area which may be a direct result from the uncovered bearings.

### ***205.3 Final Clarifiers***

The existing final clarifiers do not appear to be working well. The clarifiers are currently being operated in series rather than in parallel. This operating scheme results in one clarifier receiving the overwhelming majority of settleable solids while the second clarifier in series receives much fewer solids. One reason the clarifiers are operated in series is that the splitter box that divides flow between the two final clarifiers does not equally split flow, according to the operator.

Another problem with the clarifiers is the telescoping valve which controls the sludge flow from the final clarifiers. The operator has expressed a general dissatisfaction with the serviceability of these valves.

### ***205.4 Dosing Tank***

The existing filter dosing tank appears to be working well. With its automatic siphons, there is very little maintenance associated with this structure.

### ***205.5 Intermittent Sand Filters***

The earthen lined intermittent sand filters appear to be working well. After discussions with the operator, these filters likely have prevented several permit violations. Nevertheless, the filters need additional media. In addition to the media deficiency, the filter beds are not level. Therefore, when the beds are being dosed, the clarified effluent is not evenly distributed across the filter media. This results in inefficient suspended solids removal, and could potentially lead to solids breakthrough.

### ***205.6 Ultraviolet Disinfection Facility***

The ultraviolet disinfection facility appears to be working well. It has historically provided good disinfection. However, the level control gate is not sealing against the channel properly, and, therefore, replacing the existing level control gate is an improvement that would be beneficial to the ultraviolet disinfection facility.

### ***205.7 Post Aerator***

The cascade post aerator appears to be in good shape and has provided adequate aeration in the past.

### ***205.8 Aerated Sludge Storage Tank***

The aerated sludge storage tank appears to be working adequately. Nevertheless, there are some improvements which should be made. The supernatant decanter is a flexible pipe that has its open end connected to a cable which is controlled by a winch located on the bridge across the tank. This supernatant decanter is very difficult to control and should be replaced. The aspirating aerator does not provide homogeneous aeration for the entire tank and also should be replaced. The tank was converted from a package wastewater treatment plant into an aerated sludge storage tank in 2001.

### ***205.9 Sludge Drying Beds***

The sludge drying beds are in good shape. The operator has been pleased with their performance. However, due to increased loading in the future, additional sludge drying beds will be necessary. Sludge from the drying beds is currently being disposed of via landfill.

### ***205.10 Plant Site Pump Station***

The plant site pump station is operating. However, without an influent flow meter, it is difficult to discern anything other than average daily flow rates into the wastewater treatment facility. It is likely that the pump station needs to be improved, but more data is required to make this determination.

### ***205.11 RAS Pump Station***

The RAS pumping station appears to be working satisfactorily. Regardless, with additional biological treatment units, the RAS pumping station will not be adequate to handle the increased return activated sludge flows. Therefore, this pump station is in need of improvements.

### ***205.12 Flow Equalization Pond***

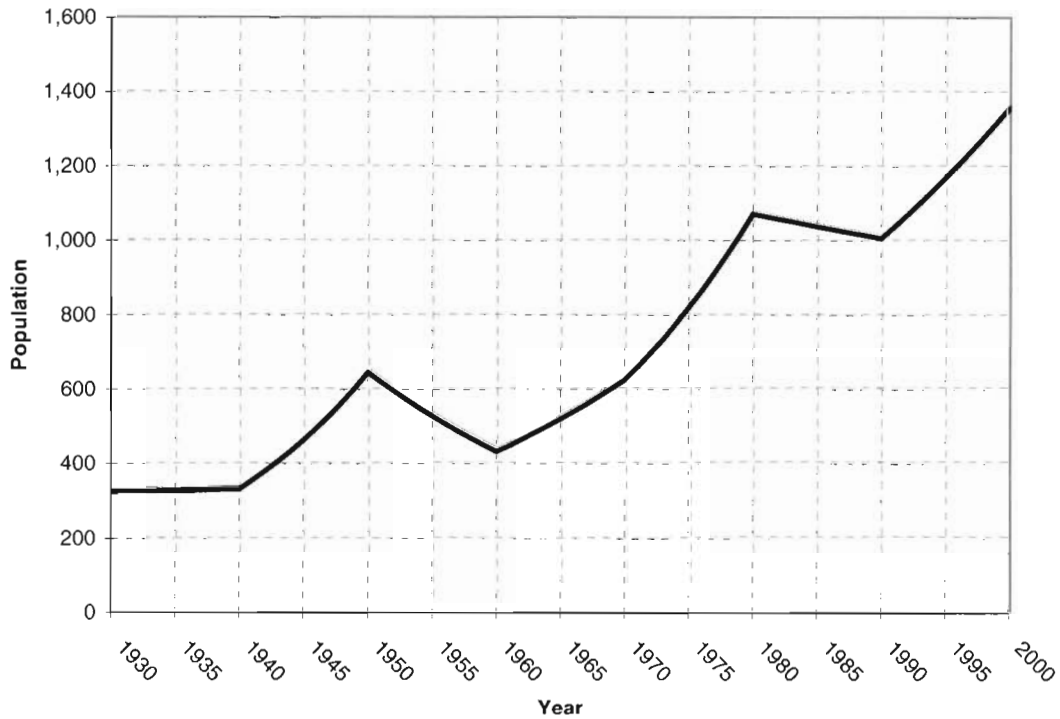
The flow equalization pond provides volume for storage of wastewater during periods of high flow. However, there is currently no aeration capability in the flow equalization pond. The addition of a floating aerator might be beneficial to the performance of the flow equalization pond.



**301 Projected Population**

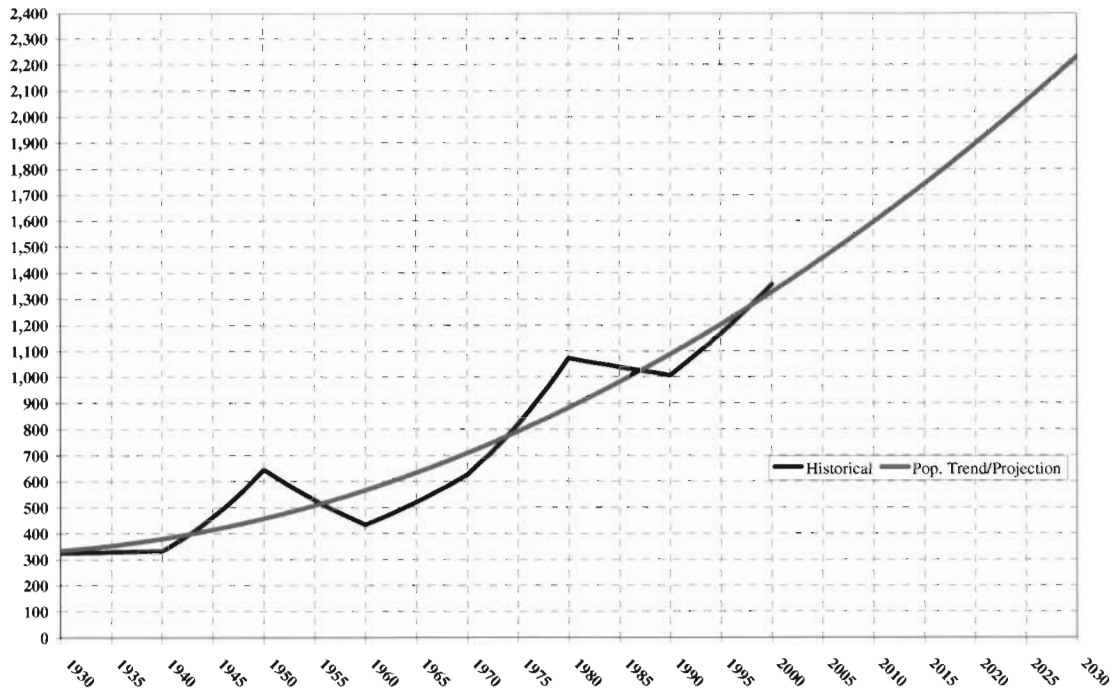
For the purposes of this report, a 20-year population projection was determined. This was accomplished by analyzing trends in population growth for the City of Flippin. Figure 301-1 shows the historical population growth for the City of Flippin from 1930 to 2000.

**Figure 301-1  
Historical Population Growth City of Flippin, 1930-2000**



Population estimates from UALR for the years 2001 through 2006 were used to determine recent growth trends. Projecting these trends into the future to the design year of 2030 results in a design residential population of 2233. Figure 301-2 illustrates the 20-year population projection for the City of Flippin.

**Figure 301-2  
Population Projection**



### 302 Future Flows

In order to determine future flows, existing flows must be projected for the design life of the project. Because industrial growth and residential/commercial growth, and their associated wastewater flows, do not necessarily proceed at the same rate, they must be projected separately. Usage records were first analyzed to determine what percentage of existing flows was associated with residential/commercial usage and what percentage was associated with industrial usage. Then, the residential/commercial flows were projected based on population growth estimates. Industrial growth was estimated after discussions with representatives from the City's largest industrial employer. Finally, the projected flows associated with residential/commercial growth were added to the projected flows associated with industrial growth to determine the total projected flow.

The average day figure is simply the projected population multiplied by the design per capita flow of 100 gallons per day plus some additional flow for increased industrial usage. The estimated dry weather flow is about 75 gallons per capita per day; however, it is recommended that the value of 100 gallons per capita per day be used because it will include some allowance for infiltration and inflow.

It is our recommendation that the flows for the 20-year design be as follows:

Average Day	375,000 gallons/day
Maximum Day	900,000 gallons/day
Peak Flow Rate	1,200,000 gallons/day

The maximum day was determined by taking the existing maximum day of roughly 750,000 gallons and adding 150,000 gallons for future growth.

Because historical data for peak flow rates was not available, future peak flows were developed using a peaking factor based on population of the City of Flippin. This widely accepted method uses the following formula to determine peak hourly flows:

$$\frac{Q_{PeakHour}}{Q_{Average}} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}} ; \text{ Where } P = \text{population in thousands}$$

Table 302 shows a summary of existing flows and projected flows based on the projected population as given in Section 301 of this report.

**Table 302  
Population and Flow Projections**

Item	Projected Value	
	2007	2030
Population	1405	2233
Average Day (MGD)	0.20	0.375
Maximum Day (MGD)	0.75*	0.900
Minimum Day (MGD)	0.07	-
Peak Flow Rate (MGD)	0.75*	1.200

\* Peak Flow Rate that can be pumped to Inlet Facility

### 303 Future Loadings

Due to the limited sampling on the influent, the values shown in Table 203-1 were adjusted upwards in order to have a more conservative estimate of future influent concentrations. For the purposes of this study, design influent concentrations of Table 303 below were developed following analysis of the data shown in Table 203 which were obtained under varying flow conditions. The mass loading values of Table 303 were derived using the 20-year design flow of 375,000 gpd at the specified concentration.

**Table 303  
Projected Influent Concentrations and Loadings**

Flow MGD	BOD5 mg/L	BOD5 lb/day	TSS mg/L	TSS lb/day	NH3-N mg/L	NH3-N lb/day	T.P. mg/L	T.P. lb/day
0.375	260	813	200	626	40	125	8	25

Additional sampling should be performed prior to detailed design to determine whether these projected influent concentrations and loadings need to be adjusted for design of the selected wastewater treatment alternative. However, the values in Table 303 appear to be

sufficiently conservative for the purpose of screening of wastewater treatment alternatives.

### 304 Design Effluent Limits

The discharge from the Flippin Wastewater Treatment Facility is regulated by the National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued to dischargers in all states pursuant to Section 402 of the Federal Clean Water Act, and contain effluent limitations developed pursuant to Section 301 of the Act. NPDES permit number AR0021717 has been issued, effective November 1, 2007, to the City of Flippin by the Arkansas Department of Environmental Quality (ADEQ) and contains the following effluent limitations as set out in table 304.

**Table 304  
NPDES Permit Effluent Limitation**

Effluent Characteristic	Mass Loading (lb/day)	Concentration (mg/l unless otherwise specified)	
	Monthly Average	Monthly Average	7-Day Average
CBOD5	15	10 mg/L	15 mg/L
TSS	22	15 mg/L	23 mg/L
Ammonia-Nitrogen (May-October)	3	2 mg/L	3 mg/L
(November-April)	13	9 mg/L	14 mg/L
Dissolved Oxygen (May-October)	N/A	7.6 mg/L Min.	N/A
(November-April)	N/A	9.2 mg/L Min.	N/A
Fecal Coliform Bacteria	N/A	(Colonies/100 mL) 1000	2000
pH	N/A	6 s.u.	9 s.u.

A copy of the NPDES Permit for the City of Flippin Wastewater Treatment Facility is located in Appendix A of this report.

## **SECTION 400                      DEVELOPMENT AND SCREENING OF ALTERNATIVES**

### **401    General Considerations**

The expanded Flippin Wastewater Treatment Facility should incorporate design features which meet the following objectives:

- Ability to continuously comply with future effluent limitations
- Dual units for ease of maintenance and treatment redundancy
- Gravity flow wherever possible
- Efficiency with regard to power consumption
- Plant should be easy to operate and maintain.

The following alternatives were evaluated for conformance with these objectives.

### **402    Alternative 1 – 0.35 MGD Sequencing Batch Reactor**

#### ***Description***

Two 51' x 25' tanks would be constructed, along with a metal building to house pumps, blowers, piping, and valves. The tanks would operate on a fill and draw basis with each tank going through the following cycles:

- Fill
- Aeration (blowers on)
- Settle (blowers off)
- Decant and sludge removal

No clarifiers are required as each tank acts as both an aeration tank and a settling tank. During high flows, the decant rate must be greater than the influent flow rate, which requires larger effluent piping. The existing oxidation ditch would be converted into additional flow equalization volume. Additional improvements would include construction of a new inlet facility complete with a mechanically cleaned bar screen, a grit chamber, and grit classifier, as well as upgrading the existing plant site pump station. Also, modifications to the existing plant would include replacing the aspirating aerator and decanting mechanism in the aerated sludge storage tank, replacing the flow control gate in the U.V. disinfection channel, and adding additional sludge drying beds.

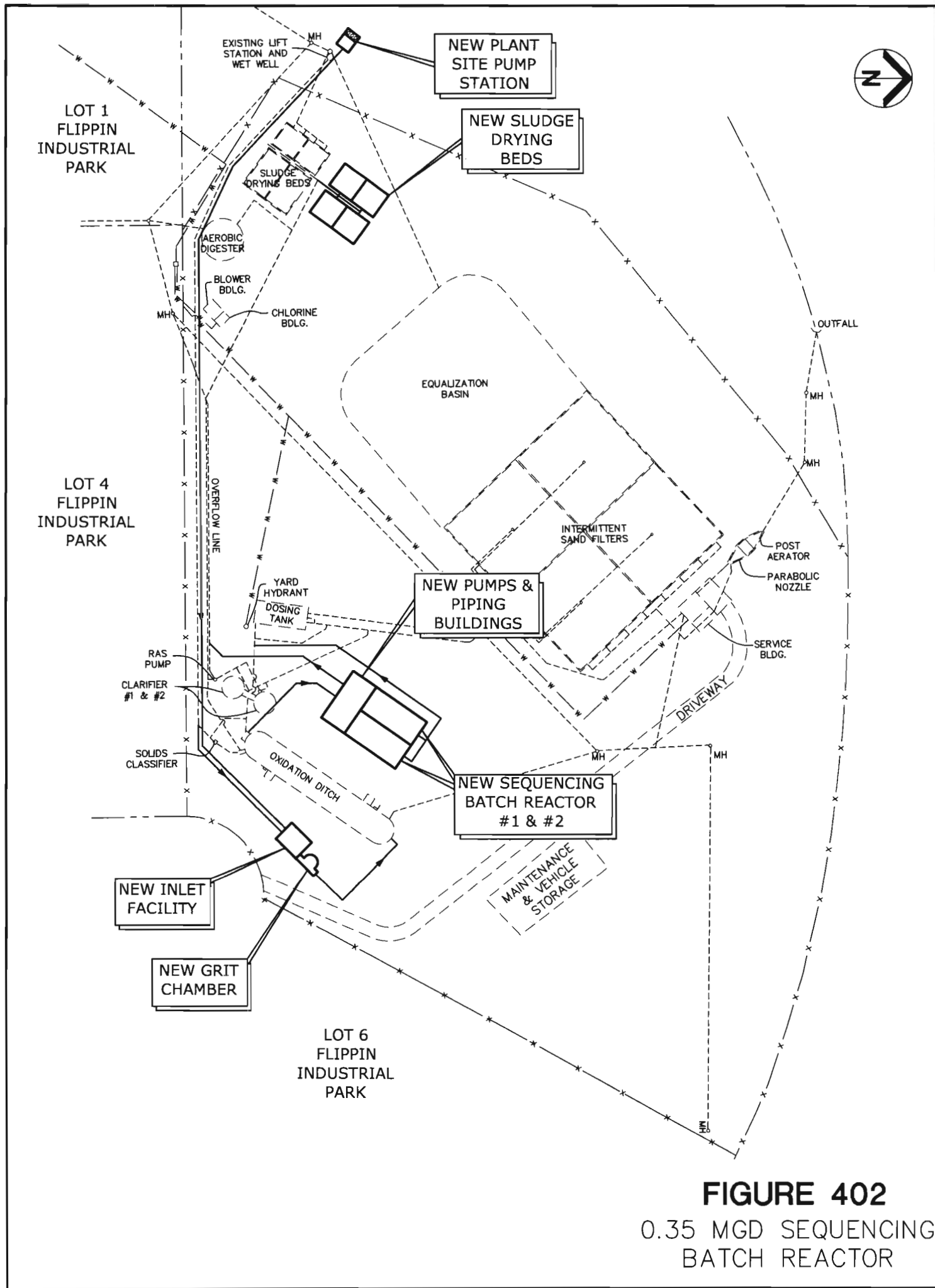
### ***Advantages***

- No separate clarifier or RAS pumps necessary
- High Tolerance for shock loadings
- Relatively small footprint
- After proper programming, system requires very little operator attention.

### ***Disadvantages***

- Inconsistent effluent quality
- No independent operation of sedimentation process/aeration
- Many moving parts could require higher maintenance
- Accessibility to underwater equipment complicates maintenance requirements
- Tendency of filamentous microorganisms to grow in SBRs inhibits proper sludge settling, causing possible washout of sludge particles during peak flow periods.

Figure 402 shows a conceptual layout of this alternative.



## 403 Alternative 2 – 0.35 MGD Membrane Bioreactor

### *Description*

Two units would be constructed side-by-side in a concrete structure. The aeration zone would contain modules of membrane plates which filter the clear water, leaving solids, including most bacteria, in the tank. Pumps are required to pull the water through the plates. The resulting filtrate is high in purity, and would be suitable for reuse.

Because the system is limited to treating only twice the average flow, or 0.70 MGD, the existing oxidation ditch could be converted into flow equalization volume. Further improvements would include construction of a new inlet facility complete with a mechanically cleaned coarse and fine screens, a grit chamber, and grit classifier, as well as upgrading the existing plant site pump station. Additionally, modifications to the existing plant would include replacing the aspirating aerator and decanting mechanism in the aerated sludge storage tank, replacing the flow control gate in the U.V. disinfection channel, and adding additional sludge drying beds.

### *Advantages*

- High quality effluent
- Separate clarifiers not required
- Smallest footprint of all alternatives.

### *Disadvantages*

- Inability to treat high peak flows requires large flow equalization system
- Technology is new, with few large operating wastewater treatment plants
- Routine chemical cleaning of membranes requires taking one unit out of service
- Chemicals for cleaning purposes can be expensive
- Process is controlled by computer.

Figure 403 shows a conceptual layout of this alternative.

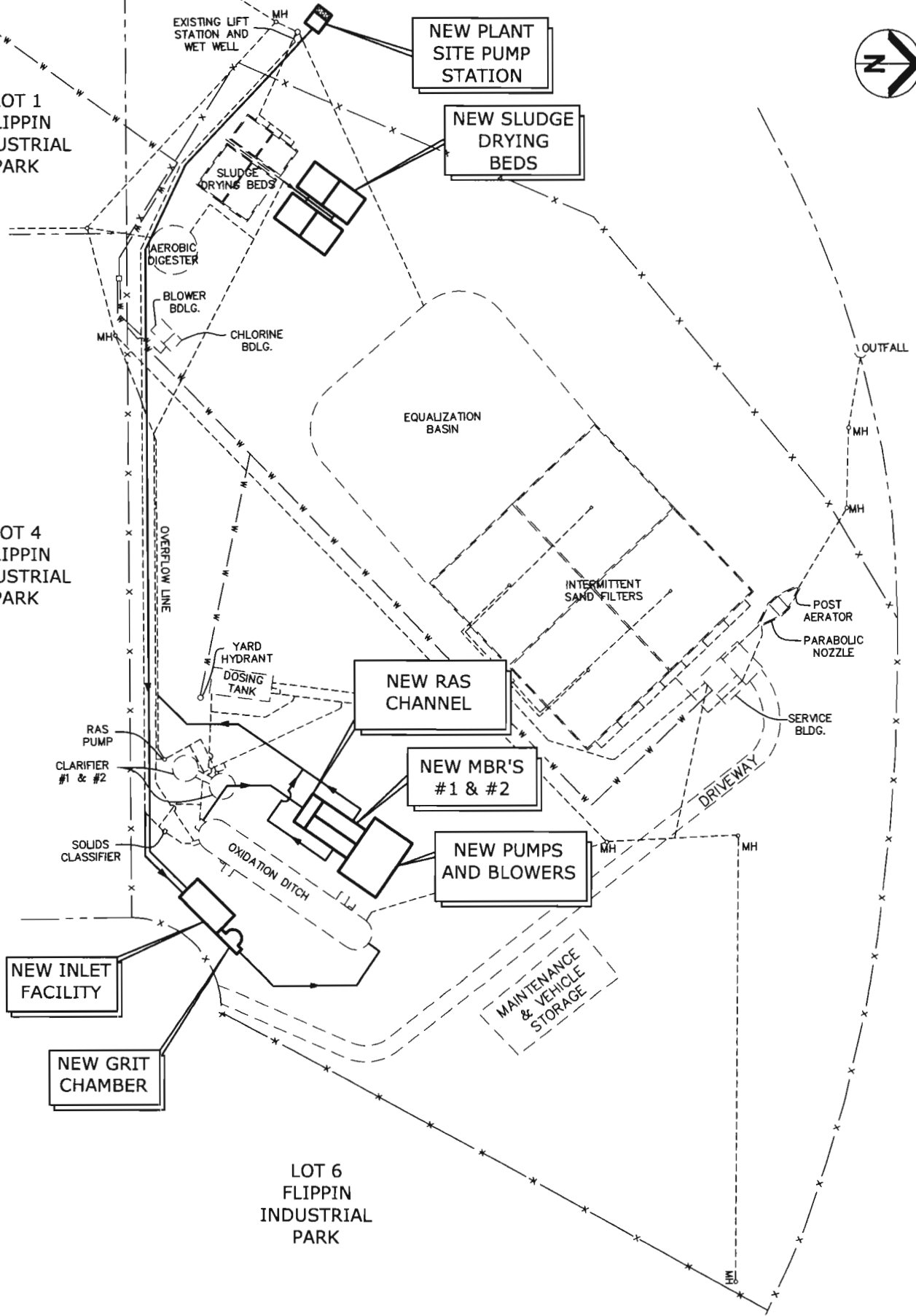




LOT 1  
FLIPPIN  
INDUSTRIAL  
PARK

LOT 4  
FLIPPIN  
INDUSTRIAL  
PARK

LOT 6  
FLIPPIN  
INDUSTRIAL  
PARK



**FIGURE 403**

0.35 MGD MEMBRANE  
BIOREACTOR

## 404 Alternative 3 – Addition of a 0.175 MGD Oxidation Ditch

### *Description*

A concrete oxidation ditch would be constructed, on-site, next to the existing oxidation ditch. The ditch would be aerated with horizontal axis brush rotors to match the existing process. In addition to the additional oxidation ditch, two new 30' diameter final clarifiers would be constructed. After completion of the new clarifiers, the existing final clarifiers would be abandoned and demolished. Further improvements would include construction of a new inlet facility complete with a mechanically cleaned bar screen, a grit chamber, and grit classifier, as well as upgrading the existing plant site pump station. Additionally, modifications to the existing plant would include replacing the aspirating aerator and decanting mechanism in the aerated sludge storage tank, replacing the flow control gate in the U.V. disinfection channel, upgrading the existing RAS/WAS pump station, and adding additional sludge drying beds.

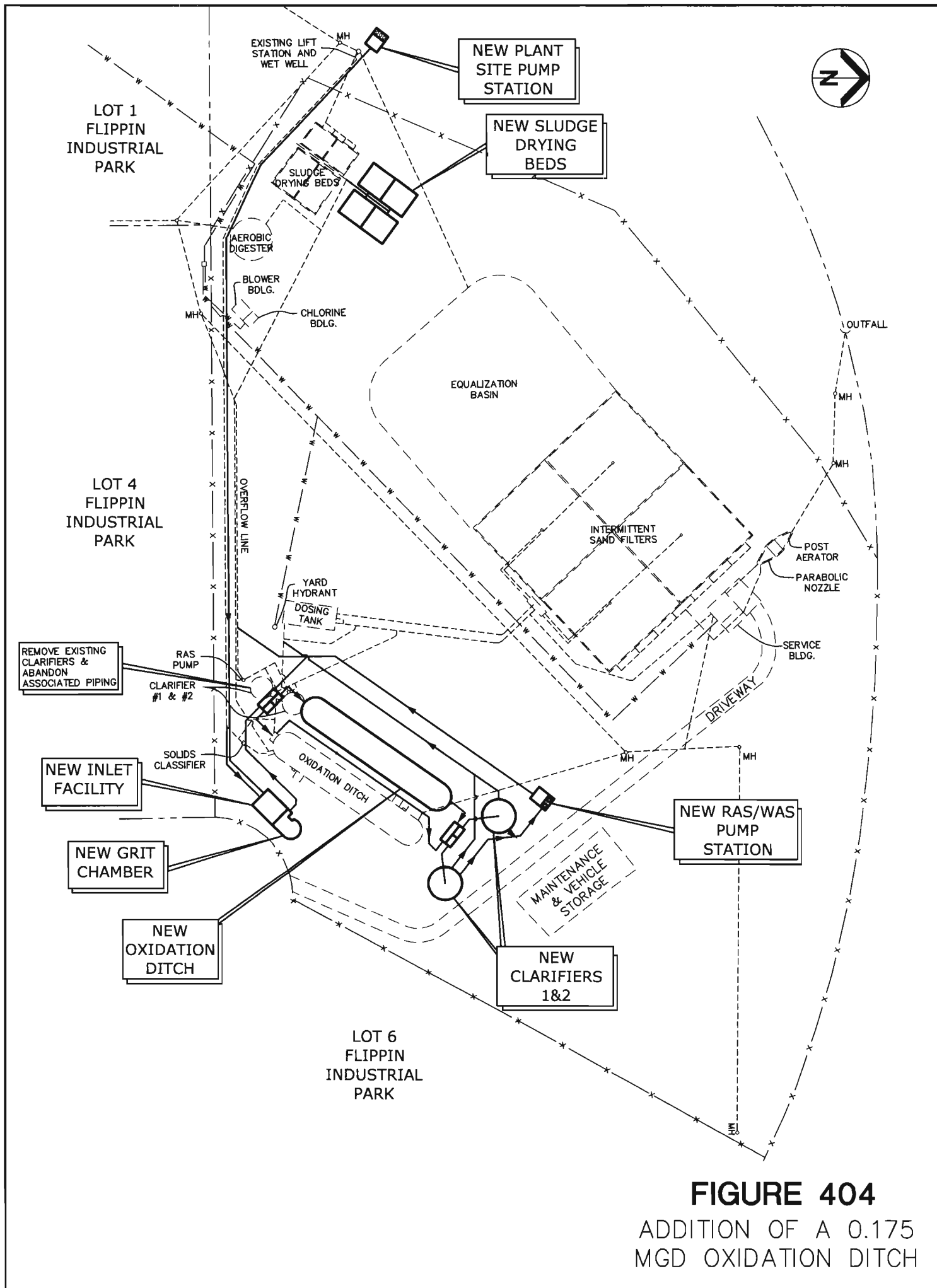
### *Advantages*

- Same technology as existing plant; therefore, additional operator training is minimized
- Greatest flexibility in operations with independent control of recycle rates, aeration input, and sedimentation in final clarifiers
- Easy to maintain: all mechanical components are above water or easily removed

### *Disadvantages*

- Large footprint can be constraining on small sites

Figure 404 shows a conceptual layout of this alternative.



**FIGURE 404**

ADDITION OF A 0.175 MGD OXIDATION DITCH

#### **405 Alternative 4 - No Action**

##### ***Description***

No improvements would be made to the Flippin Wastewater Treatment Facility. The existing facility would continue to operate exactly as it does now.

##### ***Advantages***

- Zero capital cost option
- Requires no additional personnel or training.

##### ***Disadvantages***

- Ability to meet permit limitations would diminish
- Permit violations could lead to significant fines
- Impact on the environment would increase
- Will stop growth in the City.

The no-action alternative is not a viable alternative due to the fines and regulatory actions associated with the effluent violations that would occur.

#### **406 Collection System Expansion**

Most of the residents of Flippin have existing sewer service. However, there is an unsewered area within the City limits that is proposed to receive sewer service. This area, located in the southeast portion of the City along Main Street, in the vicinity of Johnson Lane, Central Street, and Orchard Street, is comprised of roughly fifty (50) existing homes. This proposal would include roughly 8,100 lineal feet of 8" diameter PVC gravity sewer. In addition, because part of the project area cannot be served by gravity sewers due to significant rock excavation that would be necessary, two (2) grinder pump stations along with roughly 1,500 lineal feet of 2" diameter PVC force main would also be necessary.

The proposed expansion would not only serve the existing homes in the project area, but would also provide service to those areas within the project area that are yet to be developed. When fully developed, roughly sixty-five (65) homes would be served by the proposed collection system expansion. Details of this expansion, including a map of the area for the proposed collection system expansion are included in a report dated September 2007 and included in Appendix C of this report.

## 407 Probable Project Costs

The opinion of the probable costs for the treatment alternatives discussed above is set out in Table 407 below.

**Table 407**  
**Cost Summary – Wastewater Treatment Facility Options**

Item	Sequencing Batch Reactor	Membrane Bioreactor	Oxidation Ditch
New Plant Cost	\$ 2,091,000	\$ 3,684,000	\$ 1,768,000
Modify Existing Plant	\$ 807,000	\$ 807,000	\$ 919,000
New Inlet Facility	\$ 935,000	\$ 1,266,000	\$ 935,000
<b>WWTF Project Cost</b>	<b>\$ 3,833,000</b>	<b>\$ 5,757,000</b>	<b>\$ 3,622,000</b>
Collection System Expansion	\$ 650,000	\$ 650,000	\$ 650,000
<b>Total Project Cost</b>	<b>\$ 4,483,000</b>	<b>\$ 6,407,000</b>	<b>\$ 4,272,000</b>

A detailed opinion of probable cost for the wastewater facility project is located in Appendix B of this report. A detailed opinion of probable cost for the collection system expansion is located in Appendix C of this report.

## 501 WWTP Improvements

The recommended wastewater treatment alternative is the oxidation ditch design. This design has several advantages over the other options including:

- Process is capable of handling peak flows better than other alternatives
- Operation and maintenance is simpler than other alternatives
- Process matches the existing treatment and, therefore, additional operator training will be minimized
- Most cost effective alternative.

### 501.1 Description

Figure 404 shows the layout of the recommended treatment facilities. A description of the treatment process is as follows:

- A new plant site pump station will be installed. This pump station will provide additional capacity to the existing pump station. All influent into the plant will be pumped via a combination of the new pump station and the existing pump station. The new pump station will have the ability for future upgrade through the installation of additional pumps.
- The existing inlet facility will be abandoned and demolished. A new, vortex grit chamber will be constructed adjacent to a new inlet facility which will house a Parshall flume, a new mechanically cleaned bar screen with a screenings washer/compactor, and a grit classifier. Both the bar screen as well as the grit classifier will discharge into a dumpster or other similar receptacle.
- A new oxidation ditch will be constructed adjacent to the existing oxidation ditch which will remain in service. A new flow splitting box will also be constructed upstream from the oxidation ditches.
- The existing clarifiers will be abandoned. New final clarifiers will be constructed. In addition, a new final clarifier flow splitter box will be constructed ahead of the new clarifiers which will allow for either of the clarifiers to be taken out of service for maintenance purposes.
- Two additional sludge drying beds will be constructed adjacent to the existing sludge drying beds. These new drying beds will provide additional dewatering capacity necessary due to increased sludge production associated

with increased flows. In addition, the existing aerobic digester will have its aspirating aerator replaced with a coarse bubble diffused aeration system. Also, the decanter will be replaced with a new decanter which will operate automatically.

## 502 Plant Construction Cost

A preliminary opinion of the probable construction costs are set out below:

Excavation	\$	87,000
Crushed Rock		5,500
Concrete		292,000
Reinforcing Steel		120,000
Piping, Valves, Gates		104,000
Handrail		22,000
Buildings		75,000
Process Equipment		1,022,000
Electrical & Mechanical/HVAC		380,000
General Conditions		207,000
Engineering and Contingencies		<u>1,307,500</u>
Total	\$	3,622,000

## 503 Staffing Requirements

Licensure requirements for wastewater treatment plant operators are determined by a ranking system set out in Regulation No. 3 adopted by the Arkansas Pollution Control and Ecology Commission in December 2002. For all the alternatives evaluated in this report, including the recommended alternative, a Class IV operator will be required to be in responsible charge of the operation of the facility.

The number of man-hours required to operate and maintain the facility will be largely affected by the amount of in-house lab testing the City chooses to perform, as opposed to contracting with a commercial laboratory. Certain process control tests such as monitoring of dissolved oxygen concentrations and sludge settleability rates will continue to be done in-house on a daily basis. Other tests, such as influent and effluent parameters, would require a significant investment of laboratory equipment and supplies, and are not recommended at this time.

It is anticipated the operation and maintenance of the plant will require about four man-hours per day. This does not include time required for sludge removal from the drying beds or sludge disposal.

## 504 Financing Plan

The City of Flippin has the following objectives in funding the proposed wastewater treatment facility improvements:

- Provide adequate funds to construct the necessary improvements
- Minimize financial impact on residents
- Establish water and sewer rates consistent with the cost of providing the service
- Provide operations and maintenance funding.

### *504.1 Clean Water Revolving Loan Fund*

The Clean Water Revolving Loan Fund (CWRLF) is administered by the Arkansas Natural Resources Commission (ANRC). This low-interest loan program will cover costs associated with planning, design, and construction of wastewater treatment facilities.

Current loan rates are:

- A special rate of 2.75 percent for loans of 10 to 20 years for municipalities entering the CWRLF Program by December 2007
- 3.25 percent for loans of 10-20 years for municipalities entering the CWRLF program after December 2007.

Somewhat lower rates are generally available if the revolving loan can be paid off in less than ten years. These lower rates are generally 0.25% less than the applicable rate for a 10-20 year revolving loan.

The CWRLF program also requires submission of the necessary documentation to the WWAC, which recommends the type of project financing.

The advantage of the CWRLF program is the very low interest rates currently being charged. The program requires a detailed engineering report and an environmental information document be submitted and commented on through public meetings and a public hearing. These activities require a significant amount of preparation time. However, the time and effort required during the planning phase of expensive and complex projects is well advised to assure that decisions are well thought out and propose cost effective solutions. In today's complex regulatory environment, careful consideration of the environmental and permitting issues during preliminary planning prior to beginning construction can avoid costly delays.



### **504.2 Commercial Bonds**

Another option for the financing of the needed wastewater treatment improvements is the sale of commercial revenue bonds. Revenue bonds, at significantly higher interest rates than with the Clean Water Revolving Loan Fund, would be financed by income from water and sewer rate increases, or other municipal sources of income such as a sales tax.

### **505 Implementation Schedule**

Applicants for government grants and loans in Arkansas must comply with the requirements of the Arkansas Water and Wastewater Advisory Committee (WWAC). Early in the project, the City enters into a Memorandum of Agreement (MOA) which sets out the project schedule from preliminary planning through detailed design, through construction, and, beginning at the completion of construction, a one-year project performance period. The deadlines which are incorporated in the MOA are usually determined by the Engineer, working with the ANRC.

Due to the documentation required by the ANRC, including review and approval of draft and final documents, required public meetings and public hearings, and approval of both preliminary and final plans, the process can be anticipated to require approximately 1½ years from the time a decision is made to go through the WWAC until the project can be advertised for construction.

Construction time for a project of this scope would typically be 1½ to 2 years. Therefore, a total of approximately three to 3½ years would be required before the new facilities would be in operation.

**APPENDIX A**

**Flippin WWTP**  
**NPDES Discharge Permit**

Permit Number: AR0021717

**AUTHORIZATION TO DISCHARGE WASTEWATER UNDER  
THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM AND  
THE ARKANSAS WATER AND AIR POLLUTION CONTROL ACT**

In accordance with the provisions of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended, Ark. Code Ann. 8-4-101 et seq.), and the Clean Water Act (33 U.S.C. § 1251 et seq.),

The applicant's mailing address is:

City of Flippin  
P. O. Box 40  
Flippin, AR 72634

The facility address is:

City of Flippin  
222 East Industrial Drive  
Flippin, AR 72634

is authorized to discharge from a facility located as follows: one block north of Highway 62/412 on Light Street, then into East Industrial Drive. Follow to dead-end at facility, in Section 20, Township 19 North, Range 15 West in Marion County, Arkansas.

Latitude: 36° 16' 56"; Longitude: 92° 35' 03"

to receiving waters named:

Fallen Ash Creek, thence into the White River in Segment 4] of the White River Basin.

The outfall is located at the following coordinates:

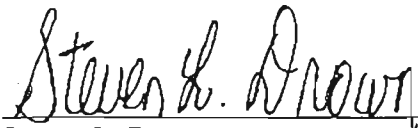
Outfall 001: Latitude: 36° 17' 00"; Longitude: 92° 35' 10"

Discharge shall be in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, and IV hereof.

Issue Date: October 31, 2007

Effective Date: November 1, 2007

Expiration Date: October 31, 2012



Steven L. Drown  
Chief, Water Division  
Arkansas Department of Environmental Quality

**PART I  
PERMIT REQUIREMENTS**

**SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS: OUTFALL 001 - treated municipal wastewater.**

During the period beginning on the effective date and lasting until the date of expiration, the permittee is authorized to discharge from Outfall 001. Such discharges shall be limited and monitored by the permittee as specified below:

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Flow <sup>1</sup>	N/A	Report	Report	Five/week	Instantaneous
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	15	10	15	One/month	Grab
Total Suspended Solids (TSS)	22	15	22.5	One/month	Grab
Ammonia Nitrogen (NH <sub>3</sub> -N)					
(April)	Report	Report	3.9	One/month	Grab
(May-Oct)	3	2	3	One/month	Grab
(Nov-March)	13	9	10.3	One/month	Grab
Dissolved Oxygen <sup>2</sup>					
(May-Oct)	N/A	7.6 (Monthly Avg. Min.)		One/month	Grab
(Nov-Apr)	N/A	9.2 (Monthly Av. Min.)		One/month	Grab
Fecal Coliform Bacteria (FCB)		(colonies/100ml)			
(Apr-Sept)	N/A	200	400	One/month	Grab
(Oct-Mar)	N/A	1000	2000	One/month	Grab
pH	N/A	<u>Minimum</u> 6.0 s.u.	<u>Maximum</u> 9.0 s.u.	One/month	Grab

1 Report monthly average and daily maximum as MGD.

2 See item #27(a) of Part IV (Dissolved Oxygen).

There shall be no discharge of distinctly visible solids, scum, or foam of a persistent nature, nor shall there be any formation of slime, bottom deposits, or sludge banks. There shall be no visible sheen due to the presence of oil (Sheen means an iridescent appearance on the surface of the water).

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location:

Flow: after UV disinfection unit and prior to post-aeration: Latitude: 36 deg 16' 59", Longitude: 92 deg 35' 06"

All other parameters: after post-aeration: Latitude: 36 deg 17' 00", Longitude: 92 deg 35' 07"

**SECTION B. PERMIT COMPLIANCE**

The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

Compliance is required on the effective date of the permit.

## PART II STANDARD CONDITIONS

### SECTION A – GENERAL CONDITIONS

#### 1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the federal Clean Water Act and the Arkansas Water and Air Pollution Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; and/or for denial of a permit renewal application. **Any values reported in the required Discharge Monitoring Report (DMR) which are in excess of an effluent limitation specified in Part I shall constitute evidence of violation of such effluent limitation and of this permit.**

#### 2. Penalties for Violations of Permit Conditions

The Arkansas Water and Air Pollution Control Act provides that any person who violates any provisions of a permit issued under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year, or a fine of not more than ten thousand dollars (\$10,000) or by both such fine and imprisonment for each day of such violation. Any person who violates any provision of a permit issued under the Act may also be subject to civil penalty in such amount as the court shall find appropriate, not to exceed ten thousand dollars (\$10,000) for each day of such violation. The fact that any such violation may constitute a misdemeanor shall not be a bar to the maintenance of such civil action.

#### 3. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to the following:

- a. Violation of any terms or conditions of this permit; or
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
- c. A change in any conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge; or
- d. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination.
- e. Failure of the permittee to comply with the provisions of APCEC Regulation No. 9 (Permit fees) as required by Part II.A.10. herein.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

#### **4. Toxic Pollutants**

Notwithstanding Part II.A.3., if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under APCEC Regulation No. 2, as amended, or Section 307(a) of the Clean Water Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitations on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standards or prohibition and the permittee so notified.

The permittee shall comply with effluent standards, narrative criteria, or prohibitions established under APCEC Regulation No. 2, as amended, or Section 307 (a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

#### **5. Civil and Criminal Liability**

Except as provided in permit conditions on "Bypassing" (Part II.B.4.a.), and "Upsets" (Part II.B.5.b), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of this permit or applicable state and federal statutes or regulations which defeats the regulatory purposes of the permit may subject the permittee to criminal enforcement pursuant to the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended).

#### **6. Oil and Hazardous Substance Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under Section 311 of the Clean Water Act.

#### **7. State Laws**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

#### **8. Property Rights**

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any exclusive privileges, nor does it authorize any injury to

private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

#### **9. Severability**

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

#### **10. Permit Fees**

The permittee shall comply with all applicable permit fee requirements for wastewater discharge permits as described in APCEC Regulation No. 9 (Regulation for the Fee System for Environmental Permits). Failure to promptly remit all required fees shall be grounds for the Director to initiate action to terminate this permit under the provisions of 40 CFR Parts 122.64 and 124.5 (d), as adopted in APCEC Regulation No. 6 and the provisions of APCEC Regulation No. 8.

### **SECTION B – OPERATION AND MAINTENANCE OF POLLUTION CONTROLS**

#### **1. Proper Operation and Maintenance**

- a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.
- b. The permittee shall provide an adequate operating staff which is duly qualified to carryout operation, maintenance, and testing functions required to insure compliance with the conditions of this permit.

#### **2. Need to Halt or Reduce not a Defense**

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power for the treatment facility is reduced, is lost, or alternate power supply fails.



### **3. Duty to Mitigate**

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment or the water receiving the discharge.

### **4. Bypass of Treatment Facilities**

#### **a. Bypass not exceeding limitation**

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts II.B.4.b. and 4.c.

#### **b. Notice**

- (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
- (2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Part II.D.6. (24-hour notice).

#### **c. Prohibition of bypass**

- (1) Bypass is prohibited and the Director may take enforcement action against a permittee for bypass, unless:
  - (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
  - (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal or preventive maintenance; and
  - (c) The permittee submitted notices as required by Part II.B.4.b.
- (2) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in Part II.B.4.c.(1).

### **5. Upset Conditions**

- a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Part II.B.5.b. of this section are met. No determination made during administrative

- review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
- b. Conditions necessary for demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
- (1) An upset occurred and that the permittee can identify the specific cause(s) of the upset;
  - (2) The permitted facility was at the time being properly operated.
  - (3) The permittee submitted notice of the upset as required by Part II.D.6.; and
  - (4) The permittee complied with any remedial measures required by Part II.B.3.
- c. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

## **6. Removed Substances**

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering the waters of the State. Written approval must be obtained from the ADEQ for land application only.

## **7. Power Failure**

The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators, or retention of inadequately treated effluent.

## **SECTION C – MONITORING AND RECORDS**

### **1. Representative Sampling**

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge during the entire monitoring period. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director. Intermittent discharges shall be monitored.

### **2. Flow Measurement**

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a

maximum deviation of less than +/- 10% from true discharge rates throughout the range of expected discharge volumes and shall be installed at the monitoring point of the discharge.

### **3. Monitoring Procedures**

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals frequent enough to insure accuracy of measurements and shall insure that both calibration and maintenance activities will be conducted. An adequate analytical quality control program, including the analysis of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory. At a minimum, spikes and duplicate samples are to be analyzed on 10% of the samples.

### **4. Penalties for Tampering**

The Arkansas Water and Air Pollution Control Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year or a fine of not more than ten thousand dollars (\$10,000) or by both such fine and imprisonment.

### **5. Reporting of Monitoring Results**

Monitoring results must be reported on a Discharge Monitoring Report (DMR) form (EPA No. 3320-1). Permittees are required to use preprinted DMR forms provided by ADEQ, unless specific written authorization to use other reporting forms is obtained from ADEQ. Monitoring results obtained during the previous calendar month shall be summarized and reported on a DMR form postmarked no later than the 25<sup>th</sup> day of the month following the completed reporting period to begin on the effective date of the permit. Duplicate copies of DMR forms signed and certified as required by Part II.D.11. and all other reports required by Part II.D., shall be submitted to the Director at the following address:

NPDES Enforcement Section  
Water Division  
Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, Arkansas 72118-5317  
(501) 682-0622

If permittee uses outside laboratory facilities for sampling and/or analysis, the name and address of the contract laboratory shall be included on the DMR.

**6. Additional Monitoring by the Permittee**

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated on the DMR.

**7. Retention of Records**

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

**8. Record Contents**

Records and monitoring information shall include:

- a. The date, exact place, time and methods of sampling or measurements, and preservatives used, if any;
- b. The individuals(s) who performed the sampling or measurements;
- c. The date(s) and time analyses were performed;
- d. The individual(s) who performed the analyses;
- e. The analytical techniques or methods used; and
- f. The measurements and results of such analyses.

**9. Inspection and Entry**

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

- a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and
- d. Sample, inspect, or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

**SECTION D – REPORTING REQUIREMENTS****1. Planned Changes**

The permittee shall give notice and provide plans and specification to the Director for review and approval prior to any planned physical alterations or additions to the permitted facility. Notice is required only when:

***For Industrial Dischargers***

- a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR Part 122.29(b).
- b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR Part 122.42 (a)(1).

***For POTW Dischargers:***

Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges of pollutants) must be reported to the permitting authority. In no case are any new connections, increased flows, or significant changes in influent quality permitted that cause violation of the effluent limitations specified herein.

**2. Anticipated Noncompliance**

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

**3. Transfers**

The permit is nontransferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

**4. Monitoring Reports**

Monitoring results shall be reported at the intervals and in the form specified in Part II.C.5. **Discharge Monitoring Reports must be submitted even when no discharge occurs during the reporting period.**

**5. Compliance Schedule**

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

## **6. Twenty-four Hour Report**

- a. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain the following information:
  - (1) a description of the noncompliance and its cause;
  - (2) the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and
  - (3) steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
- b. The following shall be included as information which must be reported within 24 hours:
  - (1) Any unanticipated bypass which exceeds any effluent limitation in the permit;
  - (2) Any upset which exceeds any effluent limitation in the permit and
  - (3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part I of the permit to be reported within 24 hours to the Enforcement Section of the Water Division of the ADEQ.
- c. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours to the Enforcement Section of the Water Division of the ADEQ.

## **7. Other Noncompliance**

The permittee shall report all instances of noncompliance not reported under Parts II.D.4., 5., and 6., at the time monitoring reports are submitted. The reports shall contain the information listed at Part II.D.6.

## **8. Changes in Discharge of Toxic Substances for Industrial Dischargers**

The permittee shall notify the Director as soon as he/she knows or has reason to believe:

- a. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the "notification levels" described in 40 CFR Part 122.42(a)(1); or
- b. That any activity has occurred or will occur which would result in any discharge on a non-routine or infrequent basis of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the "notification levels" described in 40 CFR Part 122.42(a)(2).

## **9. Duty to Provide Information**

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and

reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit. Information shall be submitted in the form, manner and time frame requested by the Director.

#### 10. Duty to reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The complete application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated in APCEC Regulation No. 6.

#### 11. Signatory Requirements

All applications, reports, or information submitted to the Director shall be signed and certified as follows:

- a. All **permit applications** shall be signed as follows:
  - (1) For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
    - (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
    - (ii) The manager of one or more manufacturing, production, or operation facilities, provided: the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
  - (2) For a partnership or sole proprietorship: by a general partner or proprietor, respectively; or
  - (3) For a municipality, State, Federal, or other public agency, by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
    - (i) The chief executive officer of the agency, or
    - (ii) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

- b. All **reports** required by the permit and **other information** requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
- (1) The authorization is made in writing by a person described above.
  - (2) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
  - (3) The written authorization is submitted to the Director.
- c. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

## **12. Availability of Reports**

Except for data determined to be confidential under 40 CFR Part 2 and APCEC Regulation No. 6, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department of Environmental Quality. As required by the Regulations, the name and address of any permit applicant or permittee, permit applications, permits, and effluent data shall not be considered confidential.

## **13. Penalties for Falsification of Reports**

The Arkansas Air and Water Pollution Control Act provides that any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this permit shall be subject to civil penalties specified in Part II.A.2. and/or criminal penalties under the authority of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended).



**PART III  
OTHER CONDITIONS**

1. The operator of this wastewater treatment facility shall be licensed as Class III by the State of Arkansas in accordance with Act 211 of 1971, Act 1103 of 1991, Act 556 of 1993, and APCEC Regulation No. 3, as amended.
2. For publicly owned treatment works, the 30-day average percent removal for Biochemical Oxygen Demand (BOD5) or Carbonaceous Biochemical Oxygen Demand (CBOD5) and Total Suspended Solids shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR Part 133.102, as adopted by reference in APCEC Regulation No. 6.
3. Produced sludge shall be disposed of by land application only when meeting the following criteria:
  - a. Sewage sludge from treatment works treating domestic sewage (TWTDS) must meet the applicable provisions of 40 CFR Part 503; and
  - b. The sewage sludge has not been classified as a hazardous waste under state or federal regulations.
4. The permittee shall give at least 120 days prior notice to the Director of any change planned in the permittee's sludge disposal practice or land use applications, including types of crops grown (if applicable).
5. The permittee shall report all overflows with the Discharge Monitoring Report (DMR) submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: the date, time, duration, location, estimated volume, and cause of overflow; observed environmental impacts from the overflow; action taken to address the overflow; and ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary). All overflows which endanger health or the environment shall be orally reported to this department (Enforcement Section of the Water Division), within 24 hours from the time the permittee becomes aware of the circumstance. A written report of overflows which endanger health or the environment, shall be provided within 5 days of the time the permittee becomes aware of the circumstance.
6. In accordance with 40 CFR Parts 122.62 (a)(2) and 124.5, this permit may be reopened for modification or revocation and/or reissuance to require additional monitoring and/or effluent limitations when new information is received that actual or potential exceedance of State water quality criteria and/or narrative criteria are determined to be the result of the permittee's discharge(s) to a relevant water body or a Total Maximum Daily Load (TMDL) is established or revised for the water body that was not available at the time of the permit

issuance that would have justified the application of different permit conditions at the time of permit issuance.

#### 7. Other Specified Monitoring Requirements

The permittee may use alternative appropriate monitoring methods and analytical instruments other than as specified in Part I Section A of the permit without a major permit modification under the following conditions:

- The monitoring and analytical instruments are consistent with accepted scientific practices;
- The requests shall be submitted in writing to the NPDES Section of the Water Division of the ADEQ for use of the alternate method or instrument.
- The method and/or instrument is in compliance with 40 CFR Part 136 or acceptable to the Director; and
- All associated devices are installed, calibrated, and maintained to insure the accuracy of the measurements and are consistent with the accepted capability of that type of device. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

Upon written approval of the alternative monitoring method and/or analytical instruments, these methods or instruments must be consistently utilized throughout the monitoring period. ADEQ must be notified in writing and the permittee must receive written approval from ADEQ if the permittee decides to return to the original permit monitoring requirements.

#### 8. Contributing Industries and Pretreatment Requirements

A. The following pollutants may not be introduced into the treatment facility:

pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW), including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21;

pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works are specifically designed to accommodate such discharges;

solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW, resulting in Interference;

any pollutant, including oxygen demanding pollutants (e.g., BOD), released in a discharge at a flow rate and/or pollutant concentration which will cause Pass Through(\*) or Interference(\*\*) with the POTW;

heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 deg. C (104 deg. F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits;

Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;

Any trucked or hauled pollutants, except at discharge points designated by the POTW.

- B. The permittee shall require any indirect discharger to the treatment works to comply with the reporting requirements of Sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR Part 403.
- C. The permittee shall provide adequate notice to the Department of the following:
1. any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 or 306 of the Act if it were directly discharging those pollutants; and
  2. any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.
  3. Any notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

\* According to 40 CFR 403.3(p) the term *Pass Through* means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

\*\* According to 40 CFR Part 403.3(k) the term *Interference* means a Discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

(1) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(2) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

## PART IV DEFINITIONS

All definitions contained in Section 502 of the Clean Water Act shall apply to this permit and are incorporated herein by reference. Additional definitions of words or phrases used in this permit are as follows:

1. **"Act"** means the Clean Water Act, Public Law 95-217 (33.U.S.C. 1251 et seq.) as amended.
2. **"Administrator"** means the Administrator of the U.S. Environmental Protection Agency.
3. **"Applicable effluent standards and limitations"** means all State and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards of performance, toxic effluent standards and prohibitions, and pretreatment standards.
4. **"Applicable water quality standards"** means all water quality standards to which a discharge is subject under the federal Clean Water Act and which has been (a) approved or permitted to remain in effect by the Administrator following submission to the Administrator pursuant to Section 303(a) of the Act, or (b) promulgated by the Director pursuant to Section 303(b) or 303(c) of the Act, and standards promulgated under (APCEC) Regulation No. 2, as amended.
5. **"Bypass"** means the intentional diversion of waste streams from any portion of a treatment facility.
6. **"Daily Discharge"** means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.  
*Mass Calculations:* For pollutants with limitations expressed in terms of mass, the "daily discharge" is calculated as the total mass of pollutant discharged over the sampling day.  
*Concentration Calculations:* For pollutants with limitations expressed in other units of measurement, determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the "daily discharge" determination of concentration shall be the arithmetic average (weighted by flow value) of all the samples collected during that sampling day by using the following formula: where C= daily concentration, F=daily flow and n=number of daily samples

$$\frac{C_1F_1 + C_2F_2 + \dots + C_nF_n}{F_1 + F_2 + \dots + F_n}$$

7. **"Monthly average"** means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month. For Fecal Coliform Bacteria (FCB) report the monthly average (see 30-day average below).
8. **"Daily Maximum"** discharge limitation means the highest allowable "daily discharge" during the calendar month. The 7-day average for Fecal Coliform Bacteria (FCB) is the

- geometric mean of the values of all effluent samples collected during the calendar week in colonies per 100 ml.
9. **"Department"** means the Arkansas Department of Environmental Quality (ADEQ).
  10. **"Director"** means the Administrator of the U.S. Environmental Protection Agency and/or the Director of the Arkansas Department of Environmental Quality.
  11. **"Grab sample"** means an individual sample collected in less than 15 minutes in conjunction with an instantaneous flow measurement.
  12. **"Industrial User"** means a nondomestic discharger, as identified in 40 CFR Part 403, introducing pollutants to a POTW.
  13. **"National Pollutant Discharge Elimination System"** means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under Sections 307, 402, 318, and 405 of the Clean Water Act.
  14. **"POTW"** means a Publicly Owned Treatment Works.
  15. **"Severe property damage"** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in products.
  16. **"APCEC"** means the Arkansas Pollution Control and Ecology Commission.
  17. **"Sewage sludge"** means the solids, residues, and precipitate separated from or created in sewage by the unit processes at a POTW. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff that are discharged to or otherwise enter a POTW.
  18. **"7-day average"** discharge limitation, other than for Fecal Coliform Bacteria (FCB), is the highest allowable arithmetic mean of the values for all effluent samples collected during the calendar week. The 7-day average for Fecal Coliform Bacteria (FCB) is the geometric mean of the values of all effluent samples collected during the calendar week in colonies/100 ml. The Discharge Monitoring Report should report the highest 7-day average obtained during the calendar month. For reporting purposes, the 7-day average values should be reported as occurring in the month in which the Saturday of the calendar week falls in.
  19. **"30-day average"**, other than for Fecal Coliform Bacteria (FCB), is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The 30-day average for Fecal Coliform Bacteria (FCB) is the geometric mean of the values for all effluent samples collected during a calendar month. For Fecal Coliform Bacteria (FCB), report the monthly average as a 30-day geometric mean in colonies per 100 ml.
  20. **"24-hour composite sample"** consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.
  21. **"12-hour composite sample"** consists of 12 effluent portions, collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

22. **"6-hour composite sample"** consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.
23. **"3-hour composite sample"** consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.
24. **"Treatment works"** means any devices and systems used in storage, treatment, recycling, and reclamation of municipal sewage and industrial wastes, of a liquid nature to implement section 201 of the Act, or necessary to recycle reuse water at the most economic cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities, and any works, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment.
25. **"Upset"** means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. Any upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventive maintenance, or careless or improper operations.
26. **"For Fecal Coliform Bacteria (FCB)"**, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads. For Fecal Coliform Bacteria (FCB) report the monthly average as a 30-day geometric mean in colonies per 100 ml.
27. **"Dissolved oxygen limit"**, shall be defined as follows:
  - a. When limited in the permit as a minimum monthly average, shall mean the lowest acceptable monthly average value, determined by averaging all samples taken during the calendar month;
  - b. When limited in the permit as an instantaneous minimum value, shall mean that no value measured during the reporting period may fall below the stated value.
28. **The term "MGD"** shall mean million gallons per day.
29. **The term "mg/l"** shall mean milligrams per liter or parts per million (ppm).
30. **The term "µg/l"** shall mean micrograms per liter or parts per billion (ppb).
31. **The term "cfs"** shall mean cubic feet per second.
32. **The term "ppm"** shall mean parts per million.
33. **The term "s.u."** shall mean standard units.
34. **The term "Instantaneous Maximum"** when limited in the permit as an instantaneous maximum value, shall mean that no value measured during the reporting period may fall above the stated value.
35. **Monitoring and Reporting:**

When a permit becomes effective, monitoring requirements are of the immediate period of the permit effective date. Where the monitoring requirement for an effluent characteristic is monthly or more frequently, the Discharge Monitoring Report (DMR) shall be submitted by the 25<sup>th</sup> of the month following the sampling. Where the monitoring requirement for an effluent characteristic is Quarterly, Semi-Annual, Annual,

or Yearly, the DMR shall be submitted by the 25<sup>th</sup> of the month following the monitoring period end date.

**MONTHLY:**

is defined as a calendar month or any portion of a calendar month for monitoring requirement frequency of once/month or more frequently.

**QUARTERLY:**

(1) is defined as a fixed calendar quarter or any part of the fixed calendar quarter for a non-seasonal effluent characteristic with a measurement frequency of once/quarter. Fixed calendar quarters are: January through March, April through June, July through September, and October through December; or

(2) is defined as a fixed three month period (or any part of the fixed three month period) of or dependent upon the seasons specified in the permit for a seasonal effluent characteristic with a monitoring requirement frequency of once/quarter that does not coincide with the fixed calendar quarter. Seasonal calendar quarters are: May through July, August through October, November through January, and February through April.

**SEMI-ANNUAL:**

is defined as the fixed time periods January through June, and July through December (or any portion thereof) for an effluent characteristic with a measurement frequency of once/6 months or twice/year.

**ANNUAL or YEARLY:**

is defined as a fixed calendar year or any portion of the fixed calendar year for an effluent characteristic or parameter with a measurement frequency of once/year. A calendar year is January through December, or any portion thereof.

36. The term **"Weekday"** means Monday – Friday.



## **Final Statement of Basis**

for renewal of final NPDES Permit Number AR0021717 to discharge to Waters of the State

### **1. PERMITTING AUTHORITY.**

The issuing office is:

Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, Arkansas 72118-5317

### **2. APPLICANT.**

The applicant's mailing address is:

City of Flippin  
P. O. Box 40  
Flippin, AR 72634

The facility address is:

City of Flippin  
222 East Industrial Drive  
Flippin, AR 72634

### **3. PREPARED BY.**

The permit was prepared by:

Marysia Jastrzebski, P.E.  
Staff Engineer  
NPDES Branch, Water Division  
(870)446-6170  
E-mail: marysia@adeq.state.ar.us

### **4. DATE PREPARED.**

The permit was prepared on October 17, 2007.

### **5. PREVIOUS PERMIT ACTIVITY.**

Effective Date: 09/01/2002  
Modification Date: N/A  
Expiration Date: 08/31/2007

The permit application was received on 03/02/2007 and was deemed administratively complete on 04/05/2007. It is proposed that the current NPDES permit be reissued for a 5-year term in accordance with regulations promulgated at 40 CFR Part 122.46(a).

## 6. RECEIVING STREAM SEGMENT AND DISCHARGE LOCATION.

The outfall is located at the following coordinates:

Latitude: 36° 17' 00" Longitude: 92° 35' 10"

The receiving waters named:

Fallen Ash Creek, thence into the White River in Segment 4I of the White River Basin. The White River in USGS Hydrologic Unit Code (H.U.C) of 11010003 and reach # 002 is a Water of the State classified for primary contact recreation, raw water source for public, industrial, and agricultural water supplies, propagation of desirable species of fish and other aquatic life, and other compatible uses.

### a. 303(d) LIST AND ENDANGERED SPECIES CONSIDERATIONS.

- i. **303(d) List:** The receiving stream, Fallen Ash Creek is not listed on the 2004 303(d) list. Fallen Ash Creek empties into the White River in Reach 002 of HUC 11010003. This Reach of the White River is not listed on the 2004 303(d). Therefore, no permit action is needed.

Discussion: The facility discharges to Fallen Ash thence to the White River in Reach 002 of HUC 11010003. The 3 mile stretch of the White River immediately below the Bull Shoals Dam (in the same Reach and HUC) is listed on the 2004 303d list for Dissolved Oxygen. The point where Fallen Ash Creek reaches the White River is approximately 16 miles downstream from the Bull Shoals Dam in a section of the receiving stream which meets all designated uses and water quality standards. No permit action is needed.

- ii. **Endangered Species:**

No comments on the application were received from the U.S. Fish and Wildlife Service (USF&WS).

## 7. OUTFALL AND TREATMENT PROCESS DESCRIPTION.

The following is a description of the facility described in the application:

- a. Design Flow: 0.175 MGD
- b. Type of Treatment: vortex screen, oxidation ditch, final clarifiers, dosing tank, intermittent sand filter, ultra violet disinfection, post-aeration.

c. Discharge Description: treated municipal wastewater

**8. ACTIVITY.**

Under the standard industrial classification (SIC) code 4952 or North American Industry Classification System (NAICS) code of 22132, the applicant's activities are the operation of a sewage treatment plant.

**9. INDUSTRIAL WASTEWATER CONTRIBUTIONS.**

**NO INDUSTRIAL USERS**

Currently, it does not appear the permittee receives process wastewater from any significant industrial users as defined by 40 CFR Part 403.3(t). Standard boilerplate Pretreatment Prohibitions (40 CFR Part 403.5[b]) and reporting requirements are deemed appropriate at this time.

**10. SEWAGE SLUDGE PRACTICES.**

Sludge is transported to the landfill.

**11. PERMIT CONDITIONS.**

The Arkansas Department of Environmental Quality has made a determination to issue a permit for the discharge described in the application. Permit requirements are based on NPDES regulations (40 CFR Parts 122, 124, and Subchapter N), the National Pretreatment Regulation in 40 CFR Part 403 and regulations promulgated pursuant to the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended, Ark. Code Ann. 8-4-101 et. seq.).

a. **Final Effluent Limitations**

Outfall 001- treated municipal wastewater

i. **Conventional and/or Toxic Pollutants**

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Flow (MGD)	N/A	Report	Report	Five/week	Instantaneous
Carbonaceous Biochemical Oxygen Demand (CBOD5)	15	10	15	One/month	Grab
Total Suspended Solids (TSS)	22	15	22.5	One/month	Grab
Ammonia Nitrogen (NH3-N)					
(April)	Report	Report	3.9	One/month	Grab
(May-Oct)	3	2	3	One/month	Grab
(Nov-March)	13	9	10.3	One/month	Grab
Dissolved Oxygen					
(May-Oct)	N/A	7.6 (Monthly Avg. Min.)		One/month	Grab
(Nov-Apr)	N/A	9.2 (Monthly Avg. Min.)		One/month	Grab
Fecal Coliform Bacteria (FCB)		(colonies/100 ml)			
(Apr-Sept)	N/A	200	400	One/month	Grab
(Oct-Mar)	N/A	1000	2000	One/month	Grab
pH	N/A	<u>Minimum</u> 6.0 s.u.	<u>Maximum</u> 9.0 s.u.	One/month	Grab

- ii. **Solids, Foam, and Free Oil:** There shall be no discharge of distinctly visible solids, scum, or foam of a persistent nature, nor shall there be any formation of slime, bottom deposits, or sludge banks. There shall be no visible sheen due to the presence of oil (Sheen means an iridescent appearance on the surface of the water).

**12. BASIS FOR PERMIT CONDITIONS.**

The following is an explanation of the derivation of the conditions of the final permit and the reasons for them or, in the case of notices of intent to deny or terminate, reasons suggesting the tentative decisions as required under 40 CFR Part 124.7 (48 FR 1413, April 1, 1983).

### **Technology-Based Versus Water Quality-Based Effluent Limitations And Conditions**

Following regulations promulgated at 40 CFR Part 122.44 (1)(2)(ii), the final permit limits are based on either technology-based effluent limits pursuant to 40 CFR Part 122.44 (a) or on State water quality standards and requirements pursuant to 40 CFR Part 122.44 (d), whichever are more stringent.

#### **a. Anti-backsliding**

The proposed permit is consistent with the requirements to meet Anti-backsliding provisions of the Clean Water Act (CWA), Section 402(o) [40 CFR 122.44(l)(i)(A)], which state in part that final effluent limitations for reissuance permits must be as stringent as those in the previous permit, unless material and substantial alternations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitations.

The proposed permit maintains the requirements of the previous permit with the following exceptions:

The monitoring frequencies for all parameters except flow have been reduced. This revision is allowed in accordance with the regulations contained in 40 CFR 122.44 (l)(2)(i)(B)(1) – since there is new information available which was not available at the time of permit issuance.

#### **b. Technology-Based Effluent Limitations And/Or Conditions**

The permit must at least comply with 40 CFR Part 133 (Secondary Treatment Regulation) when applicable.

#### **c. State Water Quality Numerical Standards Based Limitations**

The monthly average water quality-based limits for CBOD<sub>5</sub>, TSS, and DO have been based on the current NPDES permit and 40 CFR Part 122.44(l). The calculation of the loadings (lbs per day) uses a design flow of 0.175 MGD and the following equation (See below). These limitations are included in the updated Arkansas Water Quality Management Plan (AWQMP). Fecal Coliform Bacteria and pH limitations are based on Chapter 5, Sections 2.507 and 2.504 of APCEC Regulation No. 2 as amended, respectively.

$$\text{Daily Maximum limits} = \text{Monthly average limits} \times 1.5$$

$$\text{lbs/day} = \text{Concentration (mg/l)} \times \text{Flow (MGD)} \times 8.34$$

Ammonia-Nitrogen (NH3-N):

The water quality effluent limitations for Ammonia Nitrogen are based on either DO-based effluent limits or on toxicity-based standards, whichever are more stringent.

The toxicity-based effluent limitations are based on Chapter 5, Section 2.512 of APCEC Regulation No. 2 and an ADEQ internal memo dated March 28, 2005. The following formula has been used to calculate toxicity based Ammonia limits:

$$Cd = (IWC(Qd + Qb) - CbQb)/Qd,$$

Where:

Cd = effluent limit concentration (mg/l)

IWC = Ammonia toxicity standard for Ecoregion

Qd = design flow = 0.175 MGD = 0.23 cfs

The 7Q10 of 0 cfs is based on "Identification and Classification of Perennial Streams of Arkansas", Arkansas Geological Commission Map

Qb = Critical flow of the receiving stream = 0 cfs. This flow is 67 percent of the 7-day, 10-year low-flow (7Q10) for the receiving stream.

Cb = background concentration = 0 mg/l

The following pH and temperature were used for Ozark Highlands Ecoregion:

Month	pH s.u.	Temperature °C	IWC (Monthly Avg)	IWC (Daily Max)
April-October	7.6	29	Report	3.9 mg/l
November-March	7.6	14	Report	10.3 mg/l

Notes:

- Daily Max = 4-day Average in APCEC Regulation No. 2
- Monthly Average = 30-day Average in APCEC Regulation No. 2

Calculations of Toxicity-Based Limits:

Since background flow of the receiving stream is 0 cfs then Cd = IWC

Comparison between Arkansas Water Quality Standard DO based limits and calculated toxicity limits for Ammonia Nitrogen (NH3-N):

Month	DO Based Limits		Calculated Toxicity Limits		Final Water Quality Limits	
	Monthly Avg. (mg/l)	Daily Max (mg/l)	Monthly Avg. (mg/l)	Daily Max (mg/l)	Monthly Avg. (mg/l)	Daily Max (mg/l)
(April)	9	13.5	Report	3.9	Report*	3.9
(May-Oct)	2	3	Report	3.9	2	3
(Nov-Mar)	9	13.5	Report	10.3	9	10.3

\* Monitoring and reporting requirements are being included in the permit because the monthly average limit cannot exceed the daily maximum limit.

A review of the submitted DMRs indicates the facility is capable of meeting the revised effluent limitations for Total Suspended Solids (7-day Avg.), Ammonia Nitrogen (7-Day Avg. for November-April), and Fecal Coliform Bacteria (April-September). No schedule of compliance is included. The effluent limitations will be effective on the effective date of the permit.

d. **208 Plan (Water Quality Management Plan)**

The 208 Plan, developed by the ADEQ under provisions of Section 208 of the federal Clean Water Act, is a comprehensive program to work toward achieving federal water goals in Arkansas. The initial 208 Plan, adopted in 1979, provides for annual updates, but can be revised more often if necessary. Updates to the 208 Plan have been proposed to include correct design flow of the treatment facility:

May-October:           CBOD5/TSS/NH3-N/DO = 10/15/2/7.6 mg/l  
 November-April:       CBOD5/TSS/NH3-N/DO = 10/15/9/9.2 mg/l  
 Design flow (Q):       0.175 MGD  
 Background Flow of the receiving stream (7Q10): 0 cfs

**13. FINAL LIMITATIONS.**

The following effluent limitations requirements were placed in the permit based on the more stringent of the technology-based, water quality-based, or previous NPDES permit limitations:

Parameter	Water Quality-Based		Technology-Based/BPJ		Previous NPDES Permit		Final Permit Limit	
	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l
CBOD5	10	15	25	40	10	15	10	15
TSS	15	22.5	30	45	15	23	15	22.5
NH3-N								
(April)	Report	3.9	N/A	N/A	9	13.5	Report	3.9
(May-Oct)	2	3	N/A	N/A	2	3	2	3
(Nov-March)	9	10.3	N/A	N/A	9	13.5	9	10.3
Dissolved Oxygen								
(May-Oct)	7.6 (Monthly Avg. Min.)		N/A		7.6 (Inst. Min.)		7.6 (Monthly Avg. Min.)	
(Nov-Apr)	9.2 (Monthly Avg. Min.)		N/A		9.2 (Inst. Min.)		9.2 (Monthly Avg. Min.)	
FCB (col/100 ml)								
(Apr-Sept)	200	400	N/A	N/A	1000	2000	200	400
(Oct-Mar)	1000	2000	N/A	N/A	1000	2000	1000	2000
pH	6.0-9.0 s.u.		6.0-9.0 s.u.		6-9 s.u.		6.0-9.0 s.u.	

**14. SAMPLE TYPE AND FREQUENCY.**

Regulations require permits to establish monitoring requirements to yield data representative of the monitored activity [40 CFR Part 122.48(b)] and to ensure compliance with permit limitations [40 CFR Part 122.44(i)(I)]

Requirements for sample type for all parameters and sampling frequency for flow have been based on the current NPDES permit.

The requirements for sampling frequencies for all parameters except flow have been changed from two per month to one per month. This change is based on best engineering judgment of the permit writer based on a review of the Discharge Monitoring Reports. This decrease in monitoring frequencies does not constitute backsliding based on 40 CFR 122.44



(1)(2)(i)(B)(1) since there is new information available which was not available at the time of permit issuance.

Parameter	Previous Permit		Final Permit	
	Sample Type	Frequency of Sample	Sample Type	Frequency of Sample
Flow	Instantaneous	Five/week	Instantaneous	Five/week
CBOD5	Grab	Two/month	Grab	One/month
TSS	Grab	Two/month	Grab	One/month
NH3-N				
(April)	Grab	Two/month	Grab	One/month
(May-Oct)	Grab	Two/month	Grab	One/month
(Nov-March)	Grab	Two/month	Grab	One/month
Dissolved Oxygen				
(May-Oct)	Grab	Two/month	Grab	One/month
(Nov-Apr)	Grab	Two/month	Grab	One/month
FCB				
(Apr-Sept)	Grab	Two/month	Grab	One/month
(Oct-Mar)	Grab	Two/month	Grab	One/month
pH	Grab	Two/month	Grab	One/month

**15. SIGNIFICANT CHANGES FROM THE PREVIOUSLY ISSUED PERMIT.**

The permittee is responsible for carefully reading the permit in detail and becoming familiar with all of the changes therein:

1. The mailing address has been included.
2. The coordinates of the facility have been corrected.
3. The coordinates and a description of the sampling locations have been added.
4. The effluent limitations for Ammonia Nitrogen for the month of April and the 7-day Average for the months of November through March have been revised.
5. The effluent limitations for Fecal Coliform Bacteria for the months of April through September have been revised.
6. The 7-day Average effluent limitation for Total Suspended Solids has been revised.
7. The effluent limitation for Dissolved Oxygen has been expressed as Monthly Average Minimum.
8. The effluent limitations for pH have been changed from 6-9 s.u. to 6.0-9.0 s.u.

9. A requirement specifying the wastewater operator must have a class III License has been included.
10. The monitoring frequencies for all parameters except flow have been reduced.
11. Part II, Part III, and Part IV have been revised.

## **16. PERMIT COMPLIANCE.**

Compliance with final effluent limitations is required by the following schedule:

Compliance is required on the effective date of the permit.

## **17. MONITORING AND REPORTING.**

The applicant is at all times required to monitor the discharge on a regular basis and report the results monthly. The monitoring results will be available to the public.

## **18. SOURCES.**

The following sources were used to prepare the final permit:

- a. NPDES application No. AR0021717 received 03/02/2007.
- b. Arkansas Water Quality Management Plan (WQMP).
- c. APCEC Regulation No. 2.
- d. APCEC Regulation No. 6.
- e. 40 CFR Parts 122, 125, 133 and 403.
- f. NPDES permit file AR0021717.
- g. Discharge Monitoring Reports (DMRs).
- h. "Arkansas Water Quality Inventory Report 2004 (305B)", ADEQ.
- i. Memo from Mo Shafii to NPDES Engineers dated March 28, 2005
- j. "Identification and Classification of Perennial Streams of Arkansas", Arkansas Geological Commission.
- k. Continuing Planning Process (CPP).
- l. Technical Support Document For Water Quality-based Toxic Control.
- m. Region 6 Implementation Guidance for Arkansas Water Quality Standards promulgated at 40 CFR Part 131.36.
- n. E-mail dated March 29, 2007, from Amy Cotter to Marysia Jastrzebski.
- o. Inspection on June 21, 2007.

## **APPENDIX B**

### **Opinion of Probable Cost: WWTP Improvement Alternatives**

**Flippin Wastewater Treatment Plant Improvements  
Opinion of Probable Cost  
Alternative No. 1 - 0.35 MGD Sequencing Batch Reactor**

<b>Material/Equipment</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Extension</b>
Concrete	610 yd <sup>3</sup>	\$ 460.00 yd <sup>3</sup>	\$ 280,600
Reinforcing Steel	85400 lb	\$ 1.35 lb	\$ 115,290
Crushed Rock	225 tons	\$ 22.00 ton	\$ 4,950
Structural Excavation	530 yd <sup>3</sup>	\$ 11.00 yd <sup>3</sup>	\$ 5,830
Rock Excavation	2105 yd <sup>3</sup>	\$ 70.00 yd <sup>3</sup>	\$ 147,350
SBR Equipment	1	\$ 300,000.00 each	\$ 300,000
Coarse Screen	1	\$ 80,000.00 each	\$ 80,000
Grit Chamber Equipment	1	\$ 120,000.00 each	\$ 120,000
Grit Classifier	1	\$ 25,000.00 each	\$ 25,000
Channel Gates	4	\$ 5,000.00 each	\$ 20,000
Pumps	3	\$ 20,000.00 each	\$ 60,000
Blowers	2	\$ 15,000.00 each	\$ 30,000
Valves	10	\$ 1,500.00 each	\$ 15,000
Aeration Equipment	1	\$ 50,000.00 each	\$ 50,000
Decanter	1	\$ 20,000.00 each	\$ 20,000
Equipment Installation	Lump Sum		\$ 237,600
12" Piping	150 L.F.	\$ 87.00 L.F.	\$ 13,050
10" Piping	100 L.F.	\$ 76.00 L.F.	\$ 7,600
6" Piping	230 L.F.	\$ 54.00 L.F.	\$ 12,420
4" Piping	250 L.F.	\$ 43.00 L.F.	\$ 10,750
Handrail	215 L.F.	\$ 49.00 L.F.	\$ 10,535
Metal Building	1750 ft <sup>2</sup>	\$ 150.00 ft <sup>2</sup>	\$ 262,500
Subtotal			\$ 1,828,475
Electrical & Inst.			\$ 329,126
HVAC & Mechanical			\$ 73,139
General Conditions			\$ 219,417
Subtotal Construction			\$ 2,450,157
Contingencies			\$ 612,539
Total Construction Cost			\$ 3,062,696
Engineering			\$ 551,285
Preliminary Opinion of Probable Cost			\$ 3,613,981
Escalation to Bid			\$ 3,832,988

**Flippin Wastewater Treatment Plant Improvements  
Opinion of Probable Cost  
Alternative No. 2 - 0.35 MGD Membrane Bioreactor**

<b>Material/Equipment</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Extension</b>
Concrete	385 yd <sup>3</sup>	\$ 460.00 yd <sup>3</sup>	\$ 177,100
Reinforcing Steel	53900 lb	\$ 1.35 lb	\$ 72,765
Crushed Rock	170 tons	\$ 22.00 ton	\$ 3,740
Structural Excavation	255 yd <sup>3</sup>	\$ 11.00 yd <sup>3</sup>	\$ 2,805
Rock Excavation	820 yd <sup>3</sup>	\$ 70.00 yd <sup>3</sup>	\$ 57,400
MBR Equipment	1	\$ 1,000,000.00 each	\$ 1,000,000
Coarse Screen	1	\$ 80,000.00 each	\$ 80,000
Fine Screen	1	\$ 100,000.00 each	\$ 100,000
Grit Chamber Equipment	1	\$ 120,000.00 each	\$ 120,000
Grit Classifier	1	\$ 25,000.00 each	\$ 25,000
Channel Gates	4	\$ 5,000.00 each	\$ 20,000
Pumps	3	\$ 20,000.00 each	\$ 60,000
Blowers	2	\$ 15,000.00 each	\$ 30,000
Valves	10	\$ 1,500.00 each	\$ 15,000
Aeration Equipment	1	\$ 50,000.00 each	\$ 50,000
Decanter	1	\$ 20,000.00 each	\$ 20,000
Equipment Installation	Lump Sum		\$ 501,600
10" Piping	150 L.F.	\$ 76.00 L.F.	\$ 11,400
6" Piping	200 L.F.	\$ 54.00 L.F.	\$ 10,800
4" Piping	250 L.F.	\$ 43.00 L.F.	\$ 10,750
Handrail	60 L.F.	\$ 49.00 L.F.	\$ 2,940
Metal Building	2500 ft <sup>2</sup>	\$ 150.00 ft <sup>2</sup>	\$ 375,000
Subtotal			\$ 2,746,300
Electrical & Inst.			\$ 494,334
HVAC & Mechanical			\$ 109,852
General Conditions			\$ 329,556
Subtotal Construction			\$ 3,680,042
Contingencies			\$ 920,011
Total Construction Cost			\$ 4,600,053
Engineering			\$ 828,009
Preliminary Opinion of Probable Cost			\$ 5,428,062
Escalation to Bid			\$ 5,757,003

**Flippin Wastewater Treatment Plant Improvements  
Opinion of Probable Cost  
Alternative No. 3 - Addition of a 0.175 MGD Oxidation Ditch**

<b>Material/Equipment</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Extension</b>
Concrete	635 yd <sup>3</sup>	\$ 460.00 yd <sup>3</sup>	\$ 292,100
Reinforcing Steel	88900 lb	\$ 1.35 lb	\$ 120,015
Crushed Rock	250 tons	\$ 22.00 ton	\$ 5,500
Structural Excavation	610 yd <sup>3</sup>	\$ 11.00 yd <sup>3</sup>	\$ 6,710
Rock Excavation	1150 yd <sup>3</sup>	\$ 70.00 yd <sup>3</sup>	\$ 80,500
Oxidation Ditch Equipment	1	\$ 173,200.00 each	\$ 173,200
Clarifier Equipment	1	\$ 161,200.00 each	\$ 161,200
Coarse Screen	1	\$ 80,000.00 each	\$ 80,000
Grit Chamber Equipment	1	\$ 120,000.00 each	\$ 120,000
Grit Classifier	1	\$ 25,000.00 each	\$ 25,000
Channel Gates	4	\$ 5,000.00 each	\$ 20,000
Pumps	5	\$ 20,000.00 each	\$ 100,000
Blowers	2	\$ 15,000.00 each	\$ 30,000
Valves	10	\$ 1,500.00 each	\$ 15,000
Aeration Equipment	1	\$ 50,000.00 each	\$ 50,000
Decanter	1	\$ 20,000.00 each	\$ 20,000
Equipment Installation	Lump Sum		\$ 262,152
10" Piping	500 L.F.	\$ 76.00 L.F.	\$ 38,000
8" Piping	150 L.F.	\$ 63.00 L.F.	\$ 9,450
6" Piping	200 L.F.	\$ 54.00 L.F.	\$ 10,800
4" Piping	250 L.F.	\$ 43.00 L.F.	\$ 10,750
Handrail	455 L.F.	\$ 49.00 L.F.	\$ 22,295
Metal Building	500 ft <sup>2</sup>	\$ 150.00 ft <sup>2</sup>	\$ 75,000
<b>Subtotal</b>			<b>\$ 1,727,672</b>
Electrical & Inst.			\$ 310,981
HVAC & Mechanical			\$ 69,107
General Conditions			\$ 207,321
<b>Subtotal Construction</b>			<b>\$ 2,315,080</b>
Contingencies			\$ 578,770
<b>Total Construction Cost</b>			<b>\$ 2,893,851</b>
Engineering			\$ 520,893
<b>Preliminary Opinion of Probable Cost</b>			<b>\$ 3,414,744</b>
Escalation to Bid			\$ 3,621,677



**McGoodwin Williams & Yates**  
Engineering Confidence

October 30, 2007

Mayor Mary Jane Erwin  
City of Flippin  
Post Office Box 40  
Flippin, Arkansas 72634

Re: Preliminary Engineering Report  
Sanitary Sewer Service along Highway 412/62 East of the City  
Flippin, Arkansas  
MWY Project No. FI-9

Dear Mayor Erwin:

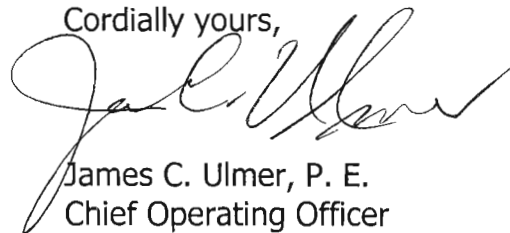
We have completed the Preliminary Engineering Report and necessary engineering studies to determine a cost-effective solution to providing sewer service to the area of east Flippin, generally along Johnson, Central, and Orchard Streets. The total estimated project cost to provide sanitary sewer service for the area is approximately \$650,000.

Please feel free to forward this report to Steven Berg and other decision-makers in the city for their review. Mr. Berg has been very helpful in assisting us in understanding the collection system and the various alternatives for tying onto the system.

We stand ready to make a presentation to the Council regarding this project whenever you may choose to schedule a time.

It has been a pleasure to assist the city with these engineering studies. If you have any questions or comments regarding the study, please feel free to give us a call.

Cordially yours,



James C. Ulmer, P. E.  
Chief Operating Officer

JCU:sc  
Enclosure

PRELIMINARY ENGINEERING REPORT

Sanitary Sewer Service for an  
Area along Highway 412/62  
East of the City

For the  
City of Flippin, Arkansas

MWY Project No. FL-9  
September, 2007



**McGoodwin Williams & Yates**  
Engineering Confidence

Fayetteville, Arkansas

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PRELIMINARY ENGINEERING REPORT  
SANITARY SEWER SERVICE FOR AN AREA ALONG  
HIGHWAY 412/62 EAST OF THE CITY  
FLIPPIN, ARKANSAS

September, 2007

I. Purpose of Study

This preliminary engineering study was conducted in order to determine the most cost-effective means of providing sanitary sewer service to about 50 existing homes within the Flippin city limits, located along Highway 412/62 in the vicinity of Johnson Lane, Central Street, and Orchard Street.

The attached map shows a vicinity map of the project location in eastern Flippin. The detailed portion of the map shows the subject streets, the existing houses, and the existing sanitary sewer collection system for the City of Flippin. Detailed survey information and proposed sewer line construction are shown on this map.

II. Recommended System

After consulting with the Water and Sewer Superintendent, field surveys were conducted to identify the location and grades of the existing sewers in close proximity of the project area. A determination was made of alternative routes in order to evaluate the most cost-effective solution to providing sewer service to the project area.

Part of the project area cannot be served with gravity sewer service without the use of a grinder pump to bring the flow from these isolated areas to the gravity sewer system. One grinder pump located at the east end of Orchard Street will serve about 20 homes and will discharge into the proposed gravity sewer which is planned to provide service to a total of 35 homes. This grinder pump on Orchard Street will discharge into an existing sewer on Park Street.

A grinder pump is also proposed at the end of Johnson Lane which will serve about 10 homes (Sewer Lines 7 and 8) and will discharge into a gravity sewer planned for the west slope of Johnson Lane. This area will serve a total of about 15 homes and will flow into an existing sewer on Marshall Street north of Johnson Lane. The recommended design provides sewer capacity for a full build-out of the area, including empty lots, adjacent to planned gravity sewers.

The north area (Sewer Lines 5, 6, 7 and 8) will discharge into an existing 8-inch sewer having a minimum grade of 0.6 percent which develops a capacity of 420 gallons per minute (gpm). Very few homes now use this existing sewer. A peak of 16 gpm generated from the north slope will have little impact on the available capacity of the existing sewer.

The south and west portions of the area are designed to flow to an existing sewer on Park Street (Sewer Lines 1, 2, 3 and 4). The total flow for this area is calculated to be 37 gpm. (See attached Gravity Sewer Flow projection spreadsheet.) The existing receiving sewer on Park Street is a 6-inch diameter pipe having a minimum grade of 1.60 percent, or a capacity of about 310 gpm. The existing sewer serves a small number of homes along Park Street and has the capacity to receive the projected peak flow of 37 gpm.

Grinder pumps are recommended when very small numbers of customers are to be served. The design set forth will allow most gravity sewers to be built at 5 feet or less in depth from ground surface to pipe flow line.

There appears to be substantial quantities of rock that must be excavated to construct the sewers. Therefore, an attempt to install a gravity sewer system (without pumps) would require substantial additional expense due to longer lines, greater depths, and more rock excavation.

The field surveys were conducted to evaluate other options to carry sewage flow from the area to the existing collection system, including the construction of gravity sewers on Industrial Park Road and Crane Street. The construction of gravity sewers from this area needing service is possible and would allow all sewage flow a more direct route to the treatment facility by bypassing older existing sewers. Consequently, this route would add about 1,000 feet of gravity sewers at an estimated cost of \$75,000. However, this option would provide an additional area of sewer service.

Set out below is an Estimate of Probable Cost for the recommended system.

8,100 L.F.	8" PVC Gravity Sewer 0-6' Depth @	\$30.00	=	\$ 243,000
1,500 L.F.	2" PVC Force Main @	8.00	=	12,000
2 Ea.	Grinder Pump Station @	15,000.00	=	30,000
31 Ea.	4' Diameter Manholes @	2,500.00	=	77,500
10 V.F.	Extra Depth Manhole @	150.00	=	1,500
55 Ea.	8" x 4" Sewer Service Wye @	150.00	=	8,250
500 L.F.	4" PVC Sewer Service Line @	8.00	=	4,000
1 Ea.	Connect to Existing Service @	500.00	=	500
1 Ea.	Highway Crossing (bore & casing) @	25,000.00	=	25,000
1,000 C.Y.	Rock Excavation @	100.00	=	100,000
700 L.F.	Extra Depth Trench, 6-8' @	10.00	=	7,000
300 L.F.	Extra Depth Trench, 8-10' @	15.00	=	4,500
Lump Sum	Trench Safety System @	6,750.00	=	<u>6,750</u>
	Construction Cost		=	\$ 520,000
	Contingency		=	<u>30,000</u>
	Construction Budget		=	\$ 550,000

Preliminary Engineering Report	=	\$ 5,700
Design – Plans, Specifications, Bidding	=	40,000
Easement Preparation (Approximately 50 each)	=	10,000
Construction Management	=	<u>44,300</u>
 Total Project Cost	=	 \$ 650,000

Following your review of this report, we will be pleased to make a presentation to the City Council. This project would likely qualify for the Revolving Loan Program that we are presently in the process of developing for the expansion of your wastewater treatment facilities, or in the alternative, it could be developed as a stand-alone project.

Following your review and decision to move forward with the project, we remain ready to proceed with developing detailed plans for the implementation of your selected alternative.



## **APPENDIX C**

### **Preliminary Engineering Report Sanitary Sewer Service for an Area along Highway 412/62 East of the City**

**One Large Map Attached**