

EXECUTIVE SUMMARY

A. INTRODUCTION

NACA has committed to planning, designing and constructing regional wastewater conveyance and treatment facilities to serve several municipalities in Northwest Arkansas. Toward this end, NACA has authorized Burns & McDonnell and USI-Arkansas to develop a conceptual plan based upon regulatory, demographic, technical, and economic considerations. This report sets forth a facilities plan for the regional wastewater conveyance and treatment facilities.

B. FINDINGS AND CONCLUSIONS

1. Conveyance System

A system of gravity sewers, pumping stations, and force mains will be constructed in several phases to convey wastewater within NACA's planning area to the site of a regional wastewater treatment plant. The initial conveyance and treatment system will serve Bentonville, Centerton, Highfill, and Tontitown. Gravity interceptors will be constructed from the proposed wastewater treatment plant along Little Osage Creek to provide service to Bentonville and Centerton. The length of the interceptors is approximately 10.5 miles. A force main will be constructed in the Lick Branch watershed to provide service to Highfill. These flows will be discharged to the lower end of the Little Osage Creek Interceptor that also serves Bentonville and Centerton. Two pump stations and force mains will be constructed in the Brush Creek watershed to provide service to Tontitown. The force mains will convey flows directly to the regional wastewater treatment plant. A total of four metering stations are proposed to measure flow from Bentonville, Centerton, Highfill, and Tontitown.

As the planning area continues to grow, the NACA wastewater conveyance system will expand. The cities of Rogers, Cave Springs, Lowell, Bethel Heights and Springdale can be served by gravity interceptors extending upstream from the NACA plant site. The Cities of Highfill, Tontitown and Elm Springs can be served by gravity interceptors and a single pumping station. The Highway 59 Corridor that includes Sulphur Springs, Gravette, Decatur and Gentry will require a total of five pumping stations to convey flows to the NACA plant site. Approximately sixteen metering stations will be required for ultimate build-out of the system.

2. Treatment Plant

a) Forecasted Flow

The initial NACA regional wastewater treatment plant will have an average design flow of 4 MGD. The flow is based upon contributions from Bentonville, Highfill, Centerton, and Tontitown. The treatment plant will require expansion to 6 MGD total capacity by 2015. In approximately 20 years, Springdale and Rogers may begin contributing flow to the NACA facility. If this occurs, a treatment plant capable of treating an average design flow of approximately 30 MGD or more may become necessary. If fully developed, the planning area has the potential to generate an average design flow of approximately 80 MGD. The date when this would occur cannot be predicted; however, it would probably be multiple decades into the future.

b) Effluent Requirements

The Arkansas Department of Environmental Quality (ADEQ) provided proposed permit limits for the treatment plant. A summary of the ADEQ proposed effluent limits is presented below in Table ES-1 Anticipated Wastewater Treatment Plant Effluent Limits. These limits are not final as of the date of this Report, and are subject to review and acceptance by the Environmental Protection Agency (EPA).

ES - 1 Anticipated Wastewater Treatment Plant Effluent Limits

Parameter	Effluent Limit	
	May to October	November to April
Carbonaceous BOD5	10 mg/L	15 mg/L
Total Suspended Solids	15 mg/L	20 mg/L
Ammonia	2 mg/L	4 mg/L
Dissolved Oxygen	7 mg/L	7 mg/L
Total Phosphorous	1 mg/L	1 mg/L
pH (1)	6 to 9 SU	6 to 9 SU
Fecal Coliforms	200 col./100 mL	1,000 col./100 mL

(1) Anticipated but not currently provided by ADEQ

The effluent limits are considered typical for the Illinois River Basin. Bentonville, Springdale, Rogers, and other NACA member communities currently operate treatment plants that meet the proposed limits. Based upon the anticipated limits, the NACA treatment plant will be required to have (1) biological and chemical phosphorus removal,

(2) biological nitrification/denitrification, (3) tertiary filtration, (4) disinfection, and (5) post-aeration.

c) Biosolids Disposal

Because of the changing regulatory environment, biosolids disposal options that meet both current and anticipated regulations were evaluated. Much of Northwest Arkansas has been declared a "nutrient surplus area" due to the existence of relatively high soil nitrogen and phosphorus concentrations. As a consequence, ADEQ is taking steps to restrict the amount of biosolids that can be land applied annually. Because local land application is being discouraged or prevented, NACA will need to landfill, export, or recycle biosolids generated at the treatment plant. All of these options require the waste volume to be minimized and may require solids stabilization to reduce pathogens, vector attraction, odors, and other undesirable characteristics of unstabilized solids.

C. RECOMMENDATIONS

1. Conveyance System

The recommended Phase I conveyance system is illustrated on Figure ES-1. The main interceptor delivering wastewater to the NACA regional wastewater treatment plant will have a peak flow capacity of 20 million gallons per day. The line will be 36 inches in diameter and be approximately 42,000 feet long. Four metering stations are proposed to measure the flow entering the main interceptor.

The gravity line from Bentonville to the main interceptor will have a peak flow capacity of 12 million gallons per day. The line will be 30 inches in diameter and approximately 7,000 feet long.

The gravity line from Centerton to the main interceptor will have a peak flow capacity of 8 million gallons per day. The line will be 24 inches in diameter and approximately 8,500 feet long.

The force main from Highfill to the main interceptor will have a peak flow capacity of 0.5 million gallons per day. The line will be 10 inches in diameter and approximately 16,000 feet long. One pump station is proposed for the force main.

The force main from Tontitown to the main interceptor will have a peak flow capacity of 2 million gallons per day. The line will be 12 inches in diameter and approximately 28,000 feet long. Two pump stations are proposed along the force main.

2. Treatment Plant

A treatment plant with an initial design average flow rate of 4 MGD is proposed as Phase IA of treatment plant construction. This will be followed in Phase IB by an expansion to 6 MGD. The initial development will be limited to approximately nine acres located on the east side of Snavelly Road north of Osage Creek. Rapid expansion of the treatment plant is anticipated over the next two decades as Northwest Arkansas continues to grow. The property owned by NACA is sufficient for an 80 MGD facility when the planning area becomes fully developed. A site plan for the recommended treatment plant along with future expansion phases is shown on Figure ES-2.

Numerous treatment alternatives and unit processes were evaluated on the basis of costs, performance, reliability and other factors. The following unit processes are recommended to meet anticipated ADEQ NPDES Permit requirements.

- Influent Pump Station using Submersible pumps
- Chain-and-Rake Screen
- Vortex Grit Removal
- Biological Nutrient Removal Oxidation Ditch
- Traveling Bridge Sand Filter
- Ultraviolet Disinfection
- Post-Aeration using Oxygen Concentrators
- Direct Dewatering using Centrifuges

Based upon current market conditions and regulatory constraints, landfilling residual solids from the treatment of wastewater is the most favorable option. Alternatives are identified that can be implemented in the future to reduce the volume of solids and increase disposal/recycling options.

D. PROJECT COSTS AND SCHEDULE

1. Opinion of Project Costs

Table ES-2 presents an opinion of cost for the Phase IA treatment and conveyance systems. The costs are based upon 2006 dollars and not escalated to account for inflation. The current ENR Construction Cost Index (Kansas City) is 8,512.

ES - 2 Phase IA Conveyance and Treatment Systems Opinion of Cost

Item				Capital Cost
Land Purchase				\$4,250,000
Treatment Plant				\$28,000,000
Subtotal - Plant				\$32,250,000
Pipeline	Size	Length	Capacity	
Little Osage Creek Interceptor (Bentonville)	30"	7,000'	12 MGD	\$3,230,000
Little Osage Creek Interceptor (Centerton)	24"	9,000'	8MGD	\$2,790,000
Little Osage Creek Interceptor (Bentonville, Centerton, Highfill)	36"	42,000'	20 MGD	\$19,430,000
Highfill Force Main	10"	16,000'	0.5 MGD	\$2,000,000
Tontitown Force Main	12"	28,000'	2 MGD	\$4,550,000
Subtotal - Conveyance				\$32,000,000
Total Project Cost				\$64,250,000

The cost opinion is based upon a 4 MGD treatment facility. The costs presented in Table ES-2 Phase IA Conveyance and Treatment Systems Opinion of Cost do not include financing costs associated with a bond issue.

2. Project Schedule

Start-up of the wastewater treatment plant is scheduled for 2009. Provided below is a milestone schedule for the design and construction of the NACA regional wastewater facilities.

Activity	Milestone Date
1. Complete Pre-Design Report	January 2007
2. Execute Customer City Service Agreements	February 2007
3. Notice to Proceed on Treatment and Conveyance System Design	March 2007
4. Agency Review	October 2007
5. Complete Environmental Permitting, Land Acquisition and Easement Work	December 2007
6. Complete Design of Treatment Plant and Conveyance System	December 2007
7. Bid Treatment Plant and Conveyance System	February 2008
8. Start Construction Treatment Plant and Conveyance System	April 2008
9. Complete Conveyance System	July 2009
10. Start-up Treatment Plant	July 2009

E. PROJECTED PHASE I CUSTOMER SERVICE CHARGES

It is possible to project customer service charges that will be paid by each of the initial customer cities based on the opinions of project costs and operation and maintenance expenses. This projection is based on certain assumptions as set forth below:

- All of the projections are based on current cost levels (2006 dollars) and a current ENR Construction Cost Index for Kansas City of 8,512. Costs will escalate over time due to inflation which is unpredictable and will result in higher service charges. However, these inflated costs will remain equivalent to 2006 dollars as presented in this part of the report.
- The initial average wastewater flow rate at the time of startup of the Phase IA facilities is estimated to be 2.1 MGD, with Bentonville contributing 1.1 MGD, Centerton contributing 0.7 MGD, Tontitown contributing 0.2 MGD and Highfill contributing 0.1 MGD. Total average flows are forecasted to increase to 5.6 MGD by year 2025.
- NACA will likely receive federal grants that will be used to finance a portion of the project costs. One grant of \$433,700 will be matched by Tontitown providing a total of nearly \$789,000 of funds. These funds will be applied toward Tontitown's share of conveyance system cost. A second grant is expected to be \$750,000 and will be proportionally applied to reduce all initial customer cities cost shares. All other project costs are to be financed by revenue bonds having a term of 40 years and an average interest rate of approximately 5%.

- No principal payment will be made on the bonds during the first three years of operation of the system. This will be done to reduce total service charges during the initial years of system operation when flow rates will be relatively low.

1. Initial Year (2009) Service Charges

Service charges for each of the initial customer cities during the first year of operation of the Phase IA facilities are summarized below in Table ES-3. The opinion of service charges is based on the assumptions outlined above.

ES - 3 Initial Year Customer City Service Charges

Item	Bentonville	Centerton	Tontitown	Highfill	Total
Conveyance					
Debt Service	\$885,000	\$628,000	\$225,000	\$129,000	\$1,867,000
O&M	\$46,000	\$33,000	\$14,000	\$7,000	\$100,000
Subtotal	\$931,000	\$661,000	\$239,000	\$136,000	\$1,967,000
Treatment					
Flow Rate (MGD)	1.1	0.7	0.2	0.1	2.1
% of Total	52%	33%	10%	5%	100%
Debt Service	\$987,000	\$628,000	\$179,000	\$90,000	\$1,884,000
O&M	\$576,000	\$367,000	\$105,000	\$52,000	\$1,100,000
Subtotal	\$1,563,000	\$995,000	\$284,000	\$142,000	\$2,984,000
Cost/1,000 gallons (Treatment Only)	\$3.89	\$3.89	\$3.89	\$3.89	\$3.89
Total Service Charge	\$2,494,000	\$1,656,000	\$523,000	\$278,000	\$4,951,000

2. Future Years Forecast of Service Charges

Service charges are forecasted in constant (2006) dollars for each of the initial customer cities through year 2025. Conveyance system costs remain essentially the same for each of the customer cities since these costs are nearly all fixed (debt service). Treatment costs vary depending on each city's share which is based on percentage of the total wastewater flow contributed by each city. In addition, the forecast assumes it will be necessary to expand the 4 MGD Phase IA treatment plant capacity to 6 MGD (Phase IB) by 2015 to keep pace with the forecasted increase in wastewater flow. This will increase total debt service costs for treatment in 2015 by approximately \$580,000 (in 2006 dollars) assuming the same method of financing as Phase IA with the same bond interest rate and term. Table ES-4 sets forth the forecast of service charges based on these assumptions.

ES - 4 Future Years Customer Service Charges

Year	Bentonville	Centerton	Tontitown	Highfill	Total
2010					
Flow (MGD)	1.2	0.8	0.2	0.1	2.3
Conveyance	\$931,000	\$661,000	\$239,000	\$136,000	\$1,967,000
Treatment	\$1,609,000	\$1,072,000	\$268,000	\$134,000	\$3,083,000
Total	\$2,540,000	\$1,733,000	\$507,000	\$270,000	\$5,050,000
2015					
Flow (MGD)	1.8	1.1	0.3	0.2	3.4
Conveyance	\$1,121,000	\$795,000	\$287,000	\$163,000	\$2,366,000
Treatment	\$2,524,000	\$1,543,000	\$421,000	\$281,000	\$4,769,000
Total	\$3,645,000	\$2,338,000	\$708,000	\$444,000	\$7,135,000
2020					
Flow (MGD)	2.4	1.5	0.4	0.2	4.5
Conveyance	\$1,121,000	\$795,000	\$287,000	\$163,000	\$2,366,000
Treatment	\$2,756,000	\$1,723,000	\$459,000	\$230,000	\$5,168,000
Total	\$3,877,000	\$2,518,000	\$746,000	\$393,000	\$7,534,000
2025					
Flow (MGD)	2.9	1.9	0.5	0.3	5.6
Conveyance	\$1,121,000	\$795,000	\$287,000	\$163,000	\$2,366,000
Treatment	\$2,780,000	\$1,821,000	\$479,000	\$288,000	\$5,368,000
Total	\$3,901,000	\$2,616,000	\$766,000	\$451,000	\$7,734,000

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