

**Proposed Project for Application to the Kansas Department of Health and Environment
for the Kansas Water Pollution Control Revolving Loan Fund.**

Applicant: City of Buhler
Wastewater Treatment Plant Upgrade – Feasibility Study
Contact Person: Marlo D. Oltman, Mayor
Address: P.O. Box 187
219 N. Main
Buhler, KS 67522

Sent to the Kansas Geological Survey for environmental review.

Agency Review Comments:

The long-term benefits of the improvements to the wastewater treatment system and the improved quality of the treated effluent that is discharged to the Little Arkansas River should offset any short-term adverse impacts during construction.

Recommended Action:

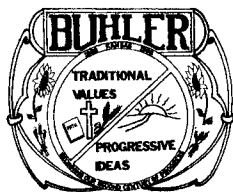
- ☒ Clearance of project should be granted
☐ Clearance of project should not be granted
☐ Clearance of project should be delayed until the issues or questions have been clarified
☐ Clearance of project should not be delayed, but the applicant (in the application) should address or clarify the questions or concerns indicated above

Donald Whittemore
Reviewer's Name

Geohydrology Section, Kansas Geological Survey
Division/Agency

9/9/2005
Date


Reviewer's Signature



THE CITY OF
BUHLER

Office of City Clerk / 219 N. Main / P.O. Box 187 / Buhler, KS 67522 / (620) 543-2253 / (620) 543-6417 FAX

August 15, 2005

Dr. Lee Allison
Kansas Geological Survey
University of Kansas
1930 Constant Ave
Campus West
Lawrence, Kansas 66047

RE: Intergovernmental Review Process/Potential Kansas Water Pollution Control
Revolving Loan Fund Recipients and Interested Parties

Dear Dr. Allison:

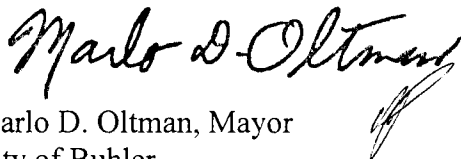
I am contacting you in writing for your clearance and comments in accordance with K. A. R. 28-16-137 as part of the application process for project financing by the Kansas Water Pollution Control Revolving Loan Fund the City of Buhler is seeking to secure. Your input would be appreciated, and I am asking for your assistance in returning such information within twenty-one days from today.

The WASTEWATER TREATMENT PLANT UPGRADE – FEASIBILITY STUDY dated November 24, 2004 compiled by BG Consultants, Inc. is enclosed for your convenience.

Please return your comments to me at the following address: P. O. Box 187, Buhler, Kansas 67522 at your earliest convenience or within twenty-one days.

Thank you very much for your input.

Sincerely,



Marlo D. Oltman, Mayor
City of Buhler

Encl.

Kansas Department of Health and Environment

APPLICATION FOR SRF LOAN ASSISTANCE

Project Number C 20- - 1700 - 01 Application Type

New	Amendment
X	

1. Legal Applicant / Recipient

Applicant Name City of Buhler
 Organization Unit City
 Street / PO Box 219 N. Main, PO Box 187
 City Buhler
 County RENO
 State / Zip code KS 67522
 Contact Person Name Marlo D. Oltman, Mayor
 Telephone Number 620-543-2253

2. Type of Applicant / Recipient

A. City
 B. County
 C. Other (Specify)

Enter Appropriate Letter

A

3. Title of applicants project

Wastewater Treatment Plant Upgrade - 2005

4. Type of Project

Wastewater Treatment Plant & Collection System Improvements

5. Employer Identification Number

48-6016385

6. Area of project impact (Names of cities, counties, etc)

City of Buhler

7a. Congressional District / Applicant

1st

7b. Congressional District / Project

1st

8. Type of change

Increase dollars

\$ -

Decrease dollars

\$ -

9. Proposed Funding

SRF Loan 9a.	\$	866,340	-
Applicant 9b.	\$		-
CDBG 9c.	\$		-
EPA 9d.	\$		-
EDA 9e.	\$		-
Other 9f.	\$		-
Total	\$	866,340	-

10. Project Start Date

09-05

(Estimated)

11. Project Duration

9

(Months)

12. Date Submitted

07-25-05

(To KDHE)

13. Requested Loan Repayment Period (Must not be over 20 years)

20

14. The applicant certifies that: To the best of my knowledge and belief, data in this pre-application / application is 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 approved

This notice of intent / preapplication / application was made available to the state executive order 12372 process for review on: Date 07-29-05

15. Certifying Representative

Name Marlo D. Oltman

Title Mayor/ City of Buhler

Signature

Marlo D. Oltman

Mail completed application to:

Kansas Department of Health and Environment
 Bureau of Water / Attn: Rod Geisler
 Municipal Programs Section, Suite 420
 1000 SW Jackson Street
 Topeka, KS 66612-1367

If you need assistance please contact:

Bill Mond
 Administrative / Finance Section, Suite 420
 1000 SW Jackson Street
 Topeka, KS 66612-1367
 785-296-4049

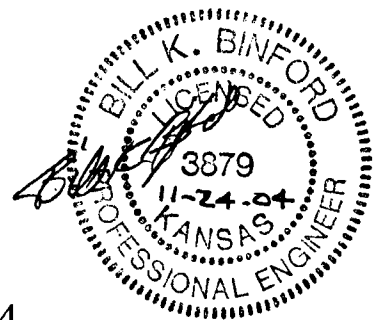
FEASIBILITY STUDY
WASTEWATER TREATMENT PLANT
UPGRADE

PREPARED
for

THE
CITY OF BUHLER, KANSAS

Related To Wastewater Treatment Plant
Biosolids Management
and
EPA and KDHE Permit Requirements

Prepared By
BG Consultants, Inc.



Revised: November 24, 2004
04-203H

BG CONSULTANTS, INC.
Engineers - Architects - Surveyors



Manhattan, Kansas
(913) 537-7448



Hutchinson, Kansas
620 (316) 665-3952



Emporia, Kansas
620 (316) 343-7842

Lawrence, Kansas
(913) 749-4474

CITY OF BUHLER, KANSAS WASTEWATER TREATMENT PLANT UPGRADE

FEASIBILITY STUDY

GENERAL

The original wastewater treatment plant for the City of Buhler, Kansas was constructed in 1950. The facility consisted of a bar screen, Imhoff tank, trickling filter, final clarifier, and sludge drying beds. The design was for an approximate 1200 Population Equivalent (P.E.). This plant was replaced in 1980 with today's existing plant.

The 1980 plant was designed for a P.E. of 2100 and consists of a lift station that includes a bar screen, comminutor and raw sewage lift pumps. The lift station pumps the wastewater to the oxidation channel, which in turn, gravity flows to the final clarifier. From the final clarifier, sludge from the bottom of the clarifier is pumped to the drying beds, or returned to the oxidation channel (thus the term activated sludge). The clear effluent is discharged into the Little Arkansas River.

On October 22, 1998, along with the City of Buhler's wastewater treatment system effluent permit renewal process, the Department of Health and Environment issued a compliance schedule for effluent disinfection. Due to additional and increased State and Federal effluent standards, specifically Kansas Statute KSA-1997, Supp. 65-1, 177, and the Federal Water Pollution Control Act as amended, (33U.S.C. 1251 et seq; the "Act"), the City of Buhler as well as many other cities in Kansas, had to agree to comply with these new regulations by July 1, 1999. The city's facilities were not originally designed to meet these new requirements and additional equipment was installed to reduce the pathogens in the effluent stream in order to meet the new standards.

In August of 2003 K.D.H.E. requested a plan with time schedule to provide adequate sludge storage and disposal capacity throughout the entire year and including all weather

situations. The City of Buhler has since acquired a permit, good for 28 tons of sludge through August 1, 2004, for an alternate and temporary method of dry sludge disposal at the Reno County Landfill. The City of Buhler has also decided to pursue a working agreement with an adjoining landowner for disposal of biosolids by injection into the ground. This method meets the 40 DFR 503 regulations for vector attraction reduction. The total acreage of the property is 80 acres and 10-15 acres should be available at all times. Another concern of K.D.H.E. was the need to increase the sludge storage capacity of the plant to ensure storage in the event of weather conditions preventing disposal of waste. K.D.H.E. recommended increasing the capacity by adding more drying beds, a mechanical biosolids dewatering system, or an aerated sludge storage tank.

In addition, K.D.H.E. strongly recommended that the older of the two clarifiers be put back in service to increase the capacity of the plant and to insure uninterrupted treatment, should there be a failure in the newer clarifier.

PROJECT STUDY AREA

The City of Buhler is located in South Central Kansas, in northeast Reno County. The wastewater treatment plant is located immediately south of the City. (See enclosed site map)(SW ¼, NW ¼, NW ¼, Section 21, Township 22 South, Range 4 West).

The proposed wastewater treatment plant upgrade is projected to be constructed on the existing facilities grounds and will not impact any new land. No archeological or historic conflicts currently exist. The current plant site is above the 100-year flood elevation and any new plant improvements will be designed to meet this requirement as well. The City of Buhler has been reasonably stable as far as population for many years. Last year's population count was 1335 residents. This includes the Sunshine Home residents, but not the 800 high school students or the 300 grade school students. No major population increases or changes related to wastewater flows are anticipated in the near future. The city's population trend has been mainly related to fixed income residents. Therefore this study will be based on current population figures, with modest growth projections of approximately 1.5% per year. This equates to a twenty-year design flow of approximately 250,000 gallons per day of wastewater flow to be treated by the upgraded plant.

Existing Facilities

The history of the existing facilities is included previously in the GENERAL comments. (See the enclosed plant schematic, and site location map in the Appendix of this report). The existing wastewater treatment plant has been operated and maintained very well since its construction in 1980. Due to periodic plant maintenance, the facilities have been able to provide excellent wastewater effluent quality and maintain reasonable NPDES Permit compliance (Kansas Permit No. M-LAO1-0001, Federal Permit No. KS-0027553). The facilities should be able to continue to provide good, reliable treatment with the initiation of the suggested improvements. The plant's current capacity and the daily wastewater flows show that the system is at approximately 85% of the design flow for the past year. Ten (10) to eleven (11) percent of the wastewater flow can be attributed to the Infiltration and Inflow (I&I) in the collection system.

The latest year-round average flow through the treatment plant is 151,000 gallons per day. Current springtime average daily flows are approximately 191,000 gallons per day. Summer time average daily flows are approximately 137,000 gallons per day. Single day flows have reached as high as 276,000 gallons per day.

As government mandates change and regulations increase the need for integrity of the facilities, it is necessary to re-evaluate the present level of treatment. According to the 2000 Census there are 1,356 residents in the city (last year's count was 1,335). There are approximately 462 residential connections, and 80 commercial connections to the sewer system. The average annual flow is about 119 gallons per capita per day. The average monthly bill is \$17.40 for residential customers.

In order to fund the potential project, the city should consider a minimum sewer rate increase for its customers. The amount of increase would be dependant upon the actual cost of these proposed improvements and KDHE or RD loan potentials.

NEED FOR PROJECT

The major needs addressed by this project are the need to upgrade the existing system to meet regulatory requirements. In a 2002 report on biosolids handling at Buhler, Tim Hobson reported four violations of ammonia-nitrogen levels in the effluent. He also reported some Total Suspended Solids level violations.

The report also noted the constant possibility of catastrophic failure in the final clarifier. The danger of catastrophic failure comes from inadequate disposal of biosolids from the facility, which cause the solids levels to reach a high level in the process. The sludge blanket sometimes rises until it is only a few feet from the clarifier surface. When this happens, a rain event of more than ½ inches can cause sludge blanket solids to be pushed out to the receiving stream. Total suspended solid concentration in the effluent can be pushed from under 20 mg/L to over 1000 mg/L, which is much greater than the permitted limit of 30 mg/L. Inadequate disposal can cause other problems such as creating slow settling solids that won't concentrate rapidly or completely in the secondary clarifier. This condition will decrease the efficiency of the plant by making the sludge watery, increasing the drying time and decreasing the amount of waste per load hauled away. Another problem is the low levels of dissolved oxygen. Higher levels are needed for the adequate removal of ammonia-nitrogen. Adequate disposal of waste would allow for more dissolved oxygen and would solve that particular problem.

In addition the latest mandated sludge test "C200 Metric Mean of Fecal Coliforms" exceeded levels allowed by KDHE for field application.

Repair and use of the older of the two clarifiers is strongly recommended by K.D.H.E. to insure continuous treatment by critical equipment redundancy.

Another shortcoming in the plant is the sludge capacity of the drying beds. Experience over the years has identified this problem. New beds could be built or some other method

of improving the storage capacity of the system, such as an aerated sludge storage digester tank for holding the sludge until the fecal coliform are reduced to the point where they are acceptable for disposal. The liquid sludge can then be injected into the contracted fields. This is the present primary method of disposing of the sludge from the wastewater treatment plant. A mechanical dewatering system, should also be considered as the liquid sludge disposal system demands almost weekly soil injection by tractor and injection equipment.

Analysis of Components of Existing Plant

Pumps and motors:

Capacity of both the raw sewage pumps (300gpm) and the return/waste activated sludge pumps (150gpm) are adequate for .250 Mgalpd design projections. Piping is such that a third pump can be added on either pumping system.

Oxidation Ditch:

Our calculations show that the design capacity of the oxidation ditch is approximately 85% of capacity. Dissolved oxygen in the bottom of the ditch is nil. Primary treatment capacity will be increased with added aeration. The reduction of I&I will effectively reduce the need for primary treatment volume expansion.

Clarifiers:

With the renovated second clarifier put back into operation, the two clarifiers running in parallel will be capable of handling normal flow design conditions of .250 Mgalpd.

Sludge Drying Bed/sludge Disposal Equipment:

The current drying beds are inadequate in size for sludge reduction and dry disposal. Liquid sludge disposal that does not meet KDHE Regulations is the main problem to be corrected by options in this report. The corrective options later in this report are addressed in the section "Alternatives Considered."

ALTERNATIVES CONSIDERED

There are four main alternatives to be considered:

1. Do Nothing
 - a. This would incur ongoing fines from KDHE.
 - b. Due to the inordinate expenses involved, this alternative is unacceptable.
2. Regionalization. Demolish existing plant and construction lift station and force mains to the City of Hutchinson. Due to the inordinate expense involved, this alternative is unacceptable.
3. Demolish existing plant and construct a new plant.
 - a. This alternative is not feasible because of demolition and new construction costs.
4. Demolish existing plant and build Faculative Lagoon System
 - a. A considerable amount of land would have to be purchased. The funds needed for land purchase are not eligible for loan participation.
 - b. New lagoon regulations will most certainly dictate the use of High Density Polyethylene Liners for the lagoons. Monitoring wells are specified in forthcoming regulations.
 - c. Lagoon discharge limits may become more stringent and new monitoring limitations added that are similar to mechanical plant requirements.
5. Modify the existing plant.
 - a. In our opinion, the existing plant, with modifications, will serve the community well and in compliance with Government Regulations for the near future. Anticipating new requirements for the next 20 years could result in unnecessary costs, as regulations change. See Plant Modification Options (plus basic upgrades) A thru D.

Basic Upgrade Needs

Some basic areas that need upgrading in the current plant are:

1. Final Clarifier
2. Grit Trap
3. Grinder (after pumps) or screen
4. Electrical
5. Oxidation Ditch
6. Sludge Disposal Equipment

PLANT MODIFICATION – OPTION C
30/DAY AROBIC DIGESTER WITH BELT PRESS & “DRY” SLUDGE
DISPOSAL

OPINION OF PROBABLE COST

	Description	Quan	Unit	Unit Price	Total Price
1	Aerobic Digester (30 Day Capacity)	1	LS	\$50,000.00	\$50,000.00
2	Yard Piping	1	LS	\$10,000.00	\$10,000.00
3	30'x 30' Metal Building w/Extended Roof & Concrete Floor	1	LS	\$34,000.00	\$34,000.00
4	Equipment in Digester - Including Aeration Blower	1	LS	\$22,000.00	\$22,000.00
5	.50 Meter Belt Press w/Auger and Accessories	1	LS	\$115,000.00	\$115,000.00
6	Electrical & Miscellaneous	1	LS	\$10,000.00	\$10,000.00
7	Aeration of Oxidation Ditch	1	LS	\$22,000.00	\$22,000.00
	Subtotal				\$263,000.00
	Common Basics				\$385,000.00
	Contingencies				\$65,000.00
	Construction Cost				\$713,000.00
	Engineering and Inspection				\$128,340.00
	Legal and Bonding Fees				\$25,000.00
	TOTAL PROJECT COST				\$866,340.00

CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

The basic WWTP can be upgraded to meet immediate and near future (± 5 year) needs with Modification Option C. This will take care of the sludge disposal 503 regulations that are now in violation.

The anticipated performance of ammonia, Nitrogen, and Phosphorus KDHE discharge limits should be satisfied

The Collection system upgrades estimate is based on "worst case scenario."

Cleaning and video pictures of the suspect mains should be performed in order to accurately identify the quantity of pipeline that should be lined.

Recommendations:

- We recommend that KDHE Revolving Loan Funding be investigated for Financing.
- It is possible and probable that the existing loan could be extended at a most favorable rate.
- Should KDHE Revolving Loan Funding not be available, the Rural Development (USDA) can be contacted for a low interest loan.
- A grant is not available due to the Fact that the City of Buhler cannot qualify for a community Development Block Grant. The City of Buhler does not qualify for the grant because their low-to-moderate income rating (LMI) is too high.

We recommend to the City of Buhler that Modified Option C be considered for design and construction of the Waste Water Treatment Plant. We also recommend that the suspect portions of the collection system be videoed and included in the project for lining in order to restrict the Infiltration and Inflow that contributes to the over loading of the WWTP.

PROJECT WORTH COMPARISONS

Item	ALTERNATE NO.4 New Lagoon	PLANT MODIFICATION			
		OPTION A 2-120/day Retention Basins	OPTION B 1-120/day Retention Basins	OPTION C 30/day Aerobic Digester w/Belt Press	OPTION D 30/day Aerobic Digester and New Injector Equipment
Total Estimated OM&R/Yr.	\$5,400/yr.	\$5,432/yr.	\$5,432/yr.	\$272/yr.	\$3,552/yr.
Total Project Cost	\$1,916,500	\$1,140,100	\$1,135,380	\$866,340	\$685,000
Land Purchase	\$200,000	---	---	---	---
Total Estimated Cost	\$2,116,500	\$1,140,100	\$1,135,380	\$866,340	\$685,000
Present Worth OM&R 5% - 20 yrs. (12.462)	\$67,300	\$69,700	\$69,700	\$3,390	\$44,300
20 Year Present Worth	\$2,183,800	\$1,209,800	\$1,205,080	\$869,730	\$729,300

The above mentioned treatment process options have been compared upon the yearly operation, maintenance and replacement costs specific to each treatment total construction costs. The present worth comparison of options represents to the City a present sum of money necessary to build the facility, purchase the equipment and the associated costs of the concrete junction boxes and land facility, purchase the equipment and the associated costs of the concrete junction boxes and land necessary to accommodate the process, as well as the cost to operate, maintain and replace the equipment over a 20 year period. Present worth is used here only to show the most cost effective options.

With the proposed improvements the City of Buhler will see a slight increased cost in OM&R. In Recommendations, the OM&R is figured for Option C. This also includes electrical costs. The cost per year to operate the new system will be approximately \$272.00 and projected to year 2024 at a 4% annual growth rate the new improvements will cost \$596.00 per year.

PLANT MODIFICATION COMPARISONS

OPERATION, MAINTENANCE & REPLACEMENT COST COMPARISONS

ALTERNATE		PLANT MODIFICATION			
	NO.4	OPTION A	OPTION B	OPTION C	OPTION D
Item	Demolish Existing Plant and Construct New Lagoon System	2-120/day Retention Basins	1-120/day Retention Basin	30/day Aerobic Digester w/Belt press (Dry Sludge Disposal)	30/day Aerobic Digester and New Injector Equipment
Pumps/air Compressor and Blowers	20-HP Duplex Pumps	2-10 HP Air Compressor and Blowers	2-10 HP Compressors and Blowers	2-5 HP Compressors and Blowers	2-5 HP Compressors and Blowers
Electrical Cost/Year @ \$0.10/KW hr.	\$2,470/yr	\$1,360/yr	\$1,360/yr.	\$680/yr.	\$680/yr.
Labor & Miscellaneous Costs per year increases over present expenses	Labor – 10 hrs./wk. @ \$18/hr. = \$9,360/yr. Mowing - \$1500/yr. Weed Control - \$400/yr. Total = \$11,260/yr.	Labor – 2 hrs./wk. @ \$18/hr. = \$1,872/yr. Polymer Usage = \$800/yr.	Labor – 2 hrs./wk. @ \$18/hr. = \$1,872/yr. Polymer Usage = \$800/yr.	Savings of 3 hrs/wk. @ \$18/hr = (-\$2,808/hr.) Polymer Usage = \$800/yr.	Labor – 2 hrs./wk. @ \$18/hr. = \$1,872/yr.
Maintenance & Replacement Cost Per Year	Pump Reserve = \$1,500/yr.	Blower & Pump Reserve = \$1,400/yr.	Blower & Pump Reserve = \$1,400/yr.	Blower, Pump & Press = \$1,600/yr.	\$1000/yr.
Total OM&R Cost/Year	\$5,400/yr.	\$5,432/yr.	\$5,432/yr.	\$272/yr.	\$3,552/yr.

The comparison of operation, maintenance and replacement costs of each option includes the yearly estimated cost of electricity to run motors, blowers, etc., at \$0.10 per kw/hr. and represents only time spent on each treatment process specific to actual operation, not including other plant tasks. Maintenance and replacement costs represent actual time for process maintenance, as well as replacement costs of specific process items amortized over the life of each component.

SEWER USE CHARGES/RECOMMENDATIONS

A. Sewer Use Charges. The current sewer use charges in the City of Buhler based on the water usage by the residents and non-residents. The residents are charged \$0.95 per 1,000 gallons of water based on the January, February and March average. The non-residents pay \$0.95 per 1,000 gallons of water used per each month.

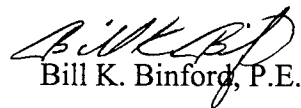
The 2003 amount of income for the sewer fund was \$115,020. This was funded by 466 resident users and 59 non-resident users. This is an average of \$18.26 per user per month.

B) Rate Increase Based on Recommended Improvements. The recommended improvements (Option C) to the existing system will cost approximately \$870,000. This is the amount of money needed for the City of Buhler to have the project designed and constructed.

The OM&R is the necessary ongoing cost of operation of the city sewer system. If the operation and maintenance of the upgrade is projected over the next 20 years at a 4% annual growth rate, the total increase sanitary sewer expenditures will be \$272.00 per year. By the year 2024, with 4% annual growth, the amount will be \$596.00 per year. This does not include any future improvements that will be made to the sewer system nor does it include any existing bond payments of interest.

If a loan is secured for Option C, it is estimated the needed sum is \$870,000 (at 3% interest with 10% reserve) will equate to \$5,310 per month. Therefore, individual sewer charges will increase \$10.11 per household per month. Individual payments would then be increased to an average total of \$28.40 per month. This is the amount of money necessary to service the debt, should the project be constructed.

Respectfully Submitted,


Bill K. Binford, P.E.

82nd Avenue

City of
Buhler

17

16

Victory Road

69th Avenue

20

Buhler Road

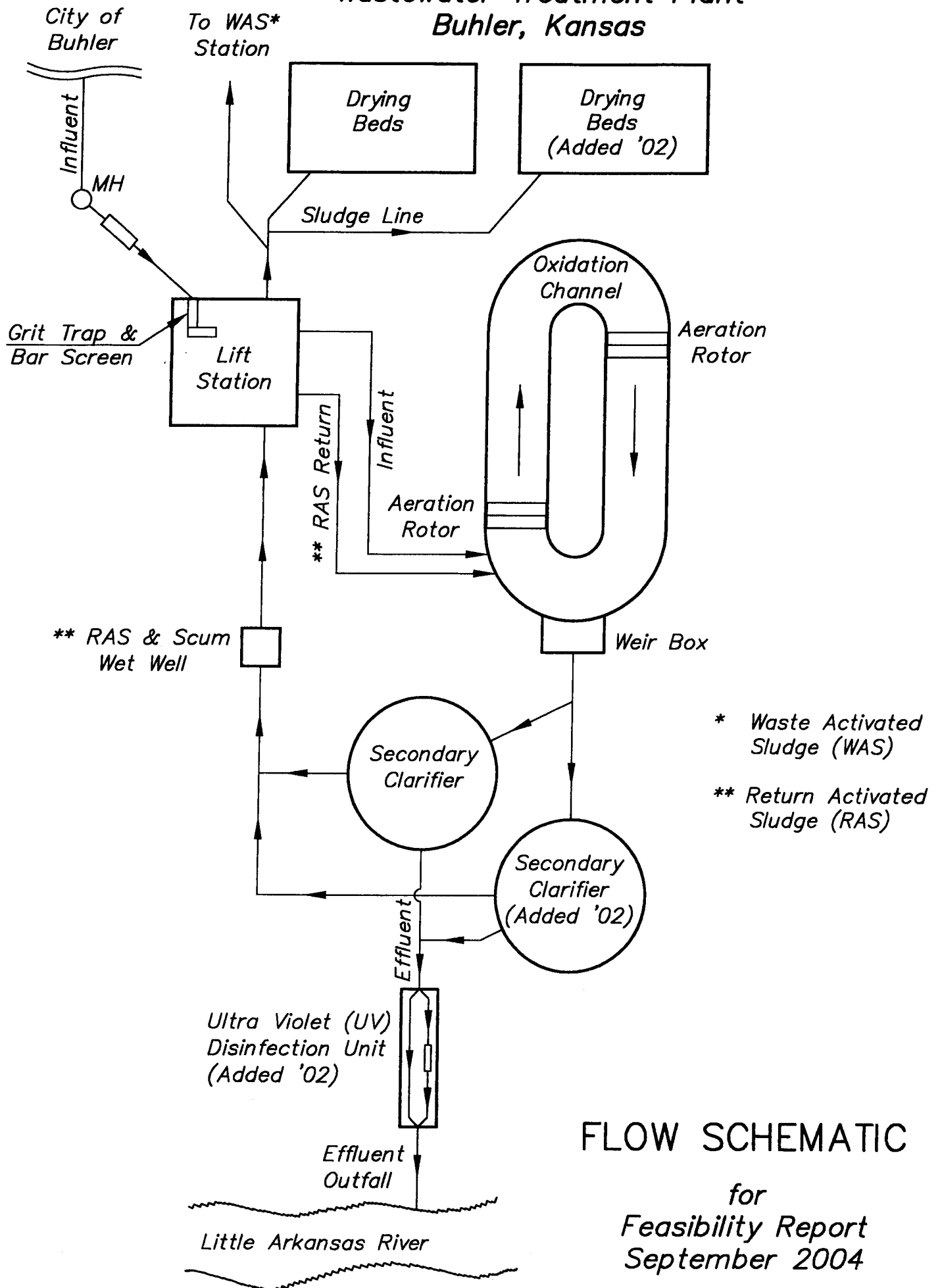


PROJECT LOCATION

Waste Water Treatment Plant
Section 21, T23S, R4W

SCALE: 1"=1000'

Wastewater Treatment Plant Buhler, Kansas



FLOW SCHEMATIC

for
Feasibility Report
September 2004