



**Stantec**

**ENGINEERING DESIGN REPORT  
FOR  
TOWN OF BASIN WWTF PHASE II  
UPGRADES**

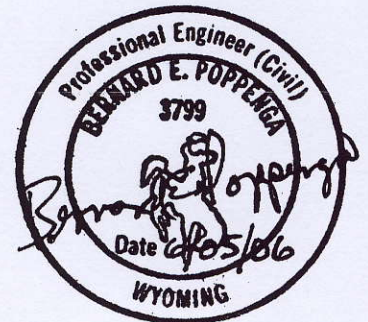
Prepared For:

**TOWN OF BASIN**  
209 South 4<sup>th</sup> Street  
Basin, Wyoming 82410

Prepared By:

**Stantec Consulting Inc**  
209 South Meldrum  
Fort Collins, CO 80521  
Ph: 970-482-5922  
Fax: 970-482-6368  
[www.stantec.com](http://www.stantec.com)

June, 2006



## I. Executive Summary

The Town of Basin owns and operates a 1.0 mgd wastewater treatment facility (WWTF) that consists of a single facultative lagoon cell. Effluent from the WWTF discharges to the Big Horn River, which is a Class 2AB stream. Effluent data shows that the WWTF is currently operated near the permitted hydraulic capacity. The effluent data also indicates that the WWTF has occasional violations in BOD<sub>5</sub>, TSS, pH, and BOD<sub>5</sub> percentage of removal in the recent years. In addition, a stringent fecal coliform effluent limit became effective on February 1, 2004. The Town completed Phase I construction of an ultraviolet (UV) disinfection system earlier this year (2006) for the WWTF for meeting the stringent fecal coliform limit.

Service area of the WWTF is generally the same as the Town's boundary. It was estimated that the present population in the Town is approximately 1,215 people. It was projected that there will be 1,512 people in 20 years (year 2026). Because of the projected slow growth in the Basin area and excessive infiltration and inflow contributions, it was recommended to maintain the current permitted treatment capacity of 1.0 mgd for the proposed upgrades. The following is a summary of the projected populations, flows and organic loading and design conditions for the proposed upgrades:

**Summary of Basin WWTF Design Conditions**

DESIGN DESCRIPTION	PERMIT	CURRENT	2026	DESIGN
Design Population (people)	N/A	1215	1512	1512
Design Average Daily Flows (mgd)	1.0	0.90	1.0	1.0
Design Peak Hourly Flows (mgd)	N/A	2.2	2.2	2.2
Design Organic Loading (lbs BOD <sub>5</sub> /d)	N/A	362	449	449

The existing facultative lagoon covers an area of 26.2 acres with 5 feet operating water depth. The lagoon system has been in operation since 1967 without any sludge removal. The existing lagoon system does not meet current hydraulic retention time design criteria. Spring ice-off and high algal growth in the summer appear to be the main causes for effluent permit violations. In light of the stringent fecal coliform limit and poor performance, the Town initiated an engineering study in 2005 to evaluate options for WWTF improvements. The recommendations described in the 2005 study have been revised through subsequent discussions with the Town to include the recommendations described herein.

Recommended upgrades for the WWTF include a new grinder, a new influent flow metering system, a new anaerobic pretreatment system, construction of two aerated cells, and a polishing cell within the existing lagoon. The remaining portion of the existing lagoon will be used for sludge storage and emergency wastewater storage. For constructability and financial reasons, the upgrades will be implemented in phases. Phase II upgrades will include the grinder, the influent flow metering system, and the anaerobic pretreatment cell. Total preliminary opinion of probable construction cost for the Phase II upgrades is \$580,780. Detailed breakdown of the cost opinion is provided in **Appendix I**.