BASIN INFRASTRUCTURE

Introduction

This chapter reviews Basin's infrastructure in terms of its readiness to support growth and development of the town. Infrastructure, including the treat (or drinking) water system, raw water system, wastewater treatment system, drainage system, electrical power, natural gas, telecommunications, streets, and solid waste management are the backbone of the town. When properly maintained and managed, the town infrastructure can provide economical service to town residents and businesses as well as supporting efficient growth and development of the town. Without adequate attention to infrastructure, a community may find itself unprepared to capitalize on a new economic development prospect or may face expensive repairs and rehabilitation to restore infrastructure to serviceable levels.

Treated Water System

Basin's treated water system provides service to about 630 individual water taps in town and 15 taps outside the town limits. (WWDC, 2009). According to the Water Development Commission, the Town's total annual water use is 65 million gallons with the peak day usage of 400,000 gallons and average day usage of 300,000 gallons. [*note: need to double check these figures*]

The Town has a single 955,000 gallon water storage tank located on high ground on the west side of town. The tank was constructed in 2010 at a cost of $1.6 million and replaced two smaller tanks. (WWDC, 2010).

Basin's water mains are mostly of older cast iron lines which the Town is gradually replacing with PVC pipe. While water pressures are generally adequate throughout town, water flows for firefighting purposes are a concern. In various locations, small line sizes (such as 4-inch diameter) and very old fire hydrants together create situations where hydrants cannot provide the standard 1,000 gallon per minute flows for firefighting purposes.

The Town has never conducted a water master plan study to evaluate the system of water mains. However, the Town has recently applied to the Water Development Commission for a grant to fund such a study. Typically, such studies inventory the existing system, identify future water needs, evaluate alternative solutions, and prepare preliminary designs and costs. This study should help the Town better understand what improvements it should make to the system of water mains.

As for its water source, the Town obtains its water from the South Big Horn County Water Supply Joint Powers Board (SBCWSJPB). The SBCWSJPB consists of the towns of Basin and Manderson and the South Big Horn County Water District, a rural water district near these towns. The SBCWSJPB supplies member jurisdictions from a well field located seven miles east of Manderson.

The SBCWSJPB is part of the multi-county Big Horn Regional Joint Powers Board. The Big Horn Regional Joint Powers Board consists of the SBCWSJPB, the towns of Basin, Greybull, and Worland, and two water districts in Washakie County. The Board was formed to interconnect separate water systems of

Greybull, the SBCWSJPB, and Worland. A new element of the Big Horn Regional system is a pipeline connecting the Town of Greybull water system with the SBHCWSJPB system. This new line, located east of the Big Horn River, acts as a redundant supply line for the original SBHCWSJPB line (located west of the river) and provides backup service to Basin and Manderson. Furthermore, the new Big Horn Regional water system is capable of providing water to the proposed Otto-Burlington line. The water lines in the Big Horn Regional system are of low enough pressure that individual service connections can be made at most any location along these lines.

With regard to future growth, the new elements of the Big Horn Regional water system were designed to provide enough water for current demand plus one percent annual growth for fifty years into the future. Actual population growth rates in the area have been much lower. The Big Horn Regional water system will be more than adequate to provide for the area's anticipated population growth.

In summary, Basin's treated water system has a excellent water source from the larger regional system. The Town's new storage tank provides enough storage for Basin's long term needs. In contrast, the system of water mains is old and will need more attention. The proposed water system master plan is necessary and timely to help the Town efficiently maintain and improve the system of water mains.

Raw Water System

Basin owns and maintains a raw, untreated water system for irrigating that serves most of the town's developed areas. The system uses water from the Big Horn Canal, which is collected in a reservoir on the hill above the school on the town's west end. The reservoir is stocked by Wyoming Fish and Game and thus also serves as a fishing pond. In the past, raw water was delivered to town residents via open ditches. Now the entire system has been piped and placed underground. The piping makes use of the raw water system easier to use for residents than the open ditch system. Part of the impetus for piping was that seepage from the raw water ditches was presumed to have been contributing to groundwater infiltration into the town's sewer system.

Waste Water Treatment Facilities

The Town of Basin owns and operates a wastewater treatment system that serves the entire town. The wastewater treatment system consists of over seven miles of sewer lines and the treatment lagoons. The system was originally constructed in 1967. The entire system is has a rated capacity of one million gallons per day. This is a large-capacity system for a town the size of Basin, much larger than the town's population level would suggest is necessary. However, excess infiltration of groundwater into the sewer system adds a large amount of water to the wastewater treatment system, necessitating the larger system.

Basin's wastewater is treated in a two lagoon facility located in the northeast corner of town. Treated wastewater discharges from the lagoons to the Big Horn River. Over time, the main lagoon has lost capacity and lost treatment effectiveness as sludge has built up on the bottom of the lagoon. The treatment system has periodic failures in meeting wastewater discharge standards and these problems will increase as the system further ages.

The original lagoon (the large one) is near the end of its useful life (Stantec, 2005). In 2008, the Town made improvements to the system to help improve its treatment performance. These improvements included:

- New grinder pump and flow metering system;
- Construction a new anaerobic pretreatment lagoon to the northwest of and adjoining the main lagoon; and
- Installation of ultra-violet light disinfection system where the main lagoon discharges to the river.

Future planned improvements consist of converting the main lagoon from its current configuration as an anaerobic (or facultative) lagoon system to an aerated lagoon system. The future improvements are projected to cost $2.9 million.

The Town has a system of sewer lines that collect wastewater and deliver it to the treatment lagoons. The entire system operates by gravity flow and so the Town avoids the cost and complexity of sewage pumping stations. About 80 percent of the sewer lines are clay tile lines and 20 percent are newer PVC (polyvinylchloride) pipe. The clay tile lines allow for the easy entry of groundwater into the sewer system. This is a complicating factor in improving the wastewater treatment system.

By collecting groundwater, the clay tile sewers help reduce basement flooding during the irrigation season. However, as the groundwater enters the sewer line, it becomes mixed with sewage and is delivered to the treatment lagoons. This dilution of sewage makes the treatment process less effective. In addition, the excess water requires the construction of larger wastewater facilities (sewers, pumps, lagoon, etc.) than would otherwise be needed.

Upgrading the town sewers with new-style PVC piping would improve the overall function of the wastewater treatment system but would likely lead to higher groundwater in town and new problems of more frequent basement flooding and damp conditions. This groundwater problem needs to be considered in future efforts to improve the wastewater treatment system.

The Town has applied for a grant from the Water Development Commission to study ways of reducing groundwater flows from the Big Horn Canal. Most of town lies below the canal and seepage from the canal is suspected as the main source of shallow groundwater under the town. The results of this study may lead an improvement in the groundwater situation which would in turn benefit the wastewater treatment system.

In summary, Basin's wastewater treatment system needs relatively expensive improvements in order to comply with existing water quality standards. Both the sewage lagoons and the system of sewer mains are old and not functioning very well. Improvement of the wastewater treatment system is complicated by the shallow groundwater problem. The Town has a plan for improving the sewage lagoons but has not yet addressed the aging system of sewer mains or the groundwater problem.

Storm Water Facilities

With the exception of the Montana Street drain, which drains an open ditch above town, the town of Basin does not have a developed storm water drainage system. Storm water flows downhill to the river or infiltrates into the ground. Storm water overflow is not generally a major issue for most residents. The state highway maintains drainage facilities along the highway.

Electrical Power

Electrical power is provided by the town of Basin. Basin has owned and operated its own electric system since 1910. The town purchases electricity on the market, typically with long-term agreements. In 2006, the town entered into a long-term power agreement with the Municipal Energy Agency of Nebraska. This agreement is tied to power supply bonds and will stay in effect until those bonds retire in 2038. The town has an electrician who operates the system and responds to problems and power outages. (Basin Republican Rustler, 2011)

Natural Gas

The town is served with natural gas through Wyoming Gas Company.

Telecommunications

The town of Basin is served with high speed broadband internet access cable. The town is also home to TCT West, a regional telecommunications provider.

Streets, Roads, Sidewalks

There are approximately 17 miles of town-maintained streets in Basin town limits. Most of these streets in the town of Basin are paved. At one time, all streets in Basin were dirt/gravel with the exception of state-maintained highway. The town of Basin upgraded the streets to pavement in an effort that spanned approximately 10 years. The town does not have a current inventory of street condition.

In 2010, Basin completed a sidewalk inventory as part of the federal “Safe Routes to School” program. Sidewalks are not continuous in many parts of town; a block may have several lots with sidewalks but gaps between where there is no sidewalk. The document identifies location of sidewalks but does not include condition assessment. The Basin Public Works Department is planning on using the sidewalk inventory to identify and prioritize sidewalk needs.

Solid Waste Facilities

The town of Basin provides containers and garbage collection for residents. Garbage is hauled to the Big Horn County landfill, approximately six miles north of Basin. Rates were an issue at the time this report was written. The landfill has raised rates over the past three years, but the city has not raised their collection fees.

The town would like to move from the current multi-family containers to single family containers as a means to better monitor and enforce disposal policies. There have been some issues with non-collectible items (such as mattresses and appliances) being placed with the containers. The town is looking into preparing clear policies about what will be collected and what items will need to be the responsibility of the landowner/resident.

The town of Basin also runs a recycling program, under a volunteer recycle committee. Recycle container bins for paper, plastic, glass, and aluminum are located at transfer sites within town. Approximately every two weeks the materials are hauled to Powell, at a cost of approximately $50 per load. Revenues are approximately $13 each trip from the sale of aluminum cans for recycling. The number and frequency of trips could be reduced if the plastics could be compacted. The plastics consume a lot of space, and often the plastics recycle bin in town is overflowing before aluminum or glass bins are full. The town is looking into obtaining a compacter with baler, which could also be used for the other recyclables as well as plastic.

Sources

Basin Republican Rustler, September 29, 2011, "Local Local control main advantage for owning own electric system," By Karla Pomeroy.

Stantec Consulting, Inc., January 13, 2005, "Draft Report -- Basin Lagoon System Evaluation, Town of Basin, Wyoming."

WWDC (Wyoming Water Development Commission), 2009 Water System Survey Report.

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All other information is sourced from Sherman Allred, PE, Donnell & Allred, Worland, WY and Jeff McFrederick, Town of Basin Public Works Director.