Infrastructure

Infrastructure, often loosely described as "pipes, wires, and roads," is the variety of public utilities and facilities that sustain development. In the context of the Big Horn County Land Use Plan, infrastructure includes:

- The transportation system including the road network, airports, and railroads
- Various potable water supply systems in the county and towns
- Sewage treatment systems
- Electric power service
- Natural gas service
- Telecommunications

Irrigation water for non-agricultural uses is not discussed in detail because it is not as critical for development as the other elements of infrastructure listed above. (Irrigation for agricultural purposes will be covered in a subsequent report.)

The purpose of our review of the county's infrastructure is to assess the capacity of the county and its municipalities to accommodate growth. In addition, we examine the geographic locations of infrastructure to better understand which areas of the county are poised for future development. In sum, this review of infrastructure seeks to identify which areas of the county are best suited for future development.

Transportation System

The transportation system in Big Horn County included highways, roads, and local streets. The system also includes the County's two airports and the Burlington Northern-Santa Fe rail line.

According to county GIS records, Big Horn County maintains 530 miles of county roads and highways, of which 110 miles are asphalt paved. Towns in the county maintain about 76 miles of town streets, most of which are paved. The State of Wyoming is maintains 302 miles of highway, all of which are paved. Some are federally-funded state highways like US 14 and US 20 while others are totally state funded. Federal agencies also maintain public roads, including 246 miles maintained by the BLM and 132 mile maintained by the US Forest Service.

In terms of development suitability, the roads with the greatest capacity to accommodate development are the major state highways. Minor state highways and paved county roads are also accommodating to development although with less traffic-handling capacity as the major state highways. Gravel county roads are less suitable for development as they are not constructed to handle the heavier traffic volumes that paved roads can sustain. Most town streets are paved and well suited to handle additional development of the type that typically occurs in the towns.

Land Use Implications of the Transportation System

State highways can accommodate additional traffic in most locations. Rural development in Big Horn County is more likely to occur in locations that have convenient or direct access to such highways.

Most county roads in Big Horn County are unpaved. Development is more likely to occur in locations on paved county roads as opposed to unpaved roads.

Gravel surfaced county roads have a limited capacity to accommodate additional traffic volumes. Rural development access by graveled county roads will typically need to be of fairly low density to avoid over using these roads. Alternatively, new developments on unpaved roads can be required to upgrade the county road, including paving the road, when traffic from the development will exceed the service capability of the road.

Water Systems

Much of Big Horn County is served by one of the several public drinking water systems. Each incorporated town and the unincorporated towns of Hyattville and Shell each have water systems. There are also several rural water systems that provide service extensive unincorporated areas of the county.

Throughout the West, water service is one of the most important factors influencing the location of development. This has been shown to be true for Big Horn County as well. In the Big Horn County EPA Challenge Grant Study (2004) found that of the 39 platted subdivisions in the county, 31 were located on or near a rural water system line. The study also showed that most home locations tended to be near water lines.

Rural Water Systems

Big Horn County has a number of rural water systems that provide water service to extensive areas outside the incorporated towns. These rural systems are listed in the following table:

Name	Population Served	Source
Airport Bench Water District	28 taps	Town of Greybull
Greybull Heights Water Users	30 taps	Town of Greybull
Hyattville Improvement District	48 taps	1 Madison Aquifer Well
Northwest Rural Water District	270 taps	Shoshone Municipal Pipeline
Shell Valley West Water Association	30 taps	Town of Greybull
Shell Water Users, Inc.	36 taps	Town of Greybull
South Big Horn County Joint Powers Board (includes Basin & Manderson)	2,084 persons	2 Madison/ Bighorn Aquifer Wells
South End Water District	47 taps	Town of Cowley

Airport Bench

The Airport Bench water system is a small extension of the Town of Greybull water system serving 28 customers. The Airport Bench system is fed by a four-inch water line and stores water in two 10,000 gallon tanks located west of the airport.

Hyattville

Hyattville is an unincorporated town with a water supply provided by the Hyattville Improvement and Service District. Until recently, the District has only one well that has experienced decreasing flows. A new artesian well was completed in 2005 and it produces more than three times than the District's present and anticipated future needs. Because of the water volume the well can produce, no storage tank is required (the District does have a single 25,000 gallon storage tank at the old well). Hyattville is about to begin a project to replace its water lines with new piping.

Northwest Rural Water

Northwest Rural Water District provides water to the rural areas around Deaver and Frannie as well as the rural area around Lovell. In the Frannie-Deaver area, the district serves fewer than 30 customers (each tap is one customer) in Big Horn County. In the Lovell area, the district serves about 240 customers (240 taps). In general, the district's distribution lines were originally sized to allow a 67% increase over existing number of customers at the time the line was designed. This means that there is substantial additional capacity to serve additional development in the district's service areas in Big Horn County.

Northwest Rural Water District's source of supply is the Shoshone Municipal Pipeline. The pipeline takes water from Buffalo Bill Reservoir west of Cody, treats the water at the treatment plant in Cody, and distributes the water to many locations in Park and Big Horn Counties. The pipeline splits at Garland, with a lower pressure branch line running to Frannie along Highway 114. The main line runs through Byron to Lovell. The main line is under much higher pressure and consequently is considered a transmission line only and not a distribution line. This means individual service connections are not permitted on the main line; instead the line is accessed via major distribution access points that were established when the line was originally constructed. This limits the pipeline's ability to serve areas away from the access points.

Shell Valley

The Town of Greybull's water line runs from wells above Shell to Greybull. From this line, the Greybull system provides water service to a number of users in the Shell Valley. In and around the original Shell townsite, the Greybull system serves 36 water customers (36 taps) in the Shell Water Users association. An additional 244 customers (244 taps) are served between Shell and Greybull and are not in a water district or association. The Town of Greybull estimates that the line could accommodate 400-500 additional taps.

Also in the Shell Valley are two additional associations, the Greybull Heights association with 30 taps and the Shell Valley West association also with 30 taps.

South Big Horn County Water Supply Joint Powers Board

The South Big Horn County Water Supply Joint Powers Board (SBHCWSJPB) consists of the towns of Basin and Manderson and the South Big Horn County Water District, a rural water district near these towns. The Board supplies member jurisdictions from a well field and a 100,000 gallon storage tank both located seven miles east of Manderson. The well field's output has been estimated at 800 gallons per minute. Outside of the two towns, the rural district provides service to about 300 water taps.

The SBHCWSJPB 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 District was formed to interconnect separate water systems of Greybull, the SBCWSJPB, and Worland.

One major element of the interconnection in Big Horn County is known as the Northern Supply Pipeline. The pipeline connects the Worland wells located about 14 miles east of Manderson with the SBCWSJPB system. Another new element of the Big Horn Regional system is a new pipeline east of the Big Horn River connecting the Town of Greybull water system with the SBHCWSJPB system. This new line provides emergency backup supplies and provides supplemental water to Greybull, whose own supply was marginally adequate for current usage. This new line, located east of the Big Horn River, also acts as a redundant supply line for the SBHCWSJPB line 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.

Northern Supply Pipeline	
Design Demand Flows (gallons per minute)	
Basin/South Big Horn JPB	149
Greybull	580
Burlington/Otto	191
Basin Gardens	36
TOTAL	956

The water lines in the Big Horn Regional system are of low enough pressure that they are considered both transmission and distribution line and 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 lower. The Big Horn Regional water system will be more than adequate to provide for the area's anticipated population growth.

South End Water Users District

The South End district purchases water from the Town of Cowley and distributes it through its own lines to 47 customers in the county to the east and south of Cowley.

Town Water Systems

The nine incorporated towns of Big Horn County provide water service within their town boundaries and in some cases, beyond the town boundaries. These town systems are listed below:

Name	Population Served (#'s of people)	Source
Town of Basin	1,200	South Big Horn County JPB
Town of Burlington	274	2 Willwood Aquifer Wells
Town of Byron	600	Shoshone Municipal Pipeline
Town of Cowley	700	1 Madison Aquifer Well
Town of Deaver	340	Shoshone Municipal Pipeline
Town of Frannie	207	Shoshone Municipal Pipeline
Town of Greybull	3,200	3 Madison/ Bighorn Aquifer Wells
Town of Lovell	2,250	Shoshone Municipal Pipeline
Town of Manderson	115	South Big Horn County JPB

Basin

The Town of Basin supplies water to town residents within the town limits. The town population (2006) is 1,241. The town has only grown 0.3% since 2000. The town obtains its supply for the water system from the SBCWSJPB. Because Basin is supplied by the SBCWSJPB system, there is abundant supply available to the town for additional growth.

Burlington

The Town of Burlington supplies water to its 249 residents. The town has not grown since 2000.

The Town's water supply consists of two shallow wells (32 and 35 feet deep), a single 250,000 gallon storage tank, and relatively new PVC pipe distribution system (circa 1988). The Town has been considering a new source—a 22-mile long, transmission line from Greybull via Otto to serve 460 current residents (250 in Burlington, 36 in Otto, and 175 along the line) and future growth (720 people by 2035). Big Horn Regional Joint Powers Board would supply the water. Three separate 150,000 storage tanks and pump stations would be located along the proposed line.

Byron

The Town of Byron provides water service to the 550 people living in the town. The town has actually lost population (-1.3%) since 2000.

Byron's drinking water is provided by the regional water supply system, the Shoshone Municipal Pipeline, which draws water from Buffalo Bill Reservoir west of Cody. The pipeline is designed to provide 625 gallons per minute to the Town. The Town has a 350,000 gallon elevated storage tank. Average water usage in 2007 was 63,013 gallons per day.

Distribution lines run throughout the developed portions of town. The water system does not serve any properties outside of the town. The water system has a lot of capacity for growth and could serve twice as many water customers as it does.

Cowley

The Town of Cowley provides water service to its 592 residents. The town has grown 5.7% since 2000 and is expecting more growth as all District #1 Schools will eventually located there. Cowley's potable water source is a deep, artesian well located six miles north of town. The well can supply 850 gallons per minute. The water is conveyed to the town through a 12-inch main line that runs along the Airport Road. Water is stored in the town's 200,000 gallon water tower located in the town park. Water mains within town are generally in very good condition and are mostly six- and eight-inch diameter lines.

Cowley's potable water system has great capacity to serve additional growth of the town. The well's production rating is greatly in excess of present usage. System pressures are not a problem and actually are mechanically reduced to avoid overly high pressures. The grid system of water mains is well below capacity. The water system can be readily expanded in any direction. To facilitate expansion to the east, the Town is planning to extend water mains under the north-south running segment of U.S. Highway 310 during the future reconstruction of the highway.

The Cowley water system serves out-of-town customers on the West End and the South End Water Users District. The South End district purchases water from the town and distributes it through its own lines to 47 customers in the county to the east and south of Cowley. West of town, 64 customers are serviced by the town-owned main that runs to Deaver. Unlike the South End customers, the West End customers do not have their own district and rely on the town for system maintenance and administration.

Deaver

The Town of Deaver provides water service to its 178 residents and 13 out-of-town customers. The town has grown only very slightly (+0.6%) since 2000. The town's water source is the Shoshone Municipal Pipeline. The pipeline is designed to provide 160 gallons per minute to the Town. This flow rate is three times the Town's highest daily water usage and nine times its average daily usage. Average water usage for the Town in 2007 was 30,136 gallons per day.

The Town has a 350,000 gallon tank for storage. The town system connects to the pipeline using the old Cowley-Deaver line that runs from the Deaver Reservoir, through Deaver and on to Cowley.

Frannie

The Town of Frannie provides water service to its 209 residents. The town has grown a modest 1% since 2000.

Like most other northern Big Horn County towns, Frannie gets its water from the Shoshone Municipal Pipeline. A 250,000-gallon water storage tank supports the delivery of water to the Frannie distribution system. All distribution lines were completely replaced in 2003. The Frannie water system is comprised of 6 and 8-inch distribution lines that are buried underground within street right-of-ways. The water system serves the platted portion of the town and no areas outside the town limits.

In terms of capacity, Shoshone Municipal Pipeline was designed to provide a flow rate of 69 gallon per minute to the Town, which is far in excess of normal usage. The pipeline can fill the town's water tank in about 8 hours and barring unusual water usage the stored water can last the town about a month. Average water usage for the Town in 2007 was 27,397 gallons per day.

Greybull

The Town of Greybull serves its 1,825 residents with water service. The town has lost 3.5% of its population since 2000. Until recently, the town's water source was a series of wells located 17 miles east of town near Shell. The Town has 100,000 gallon water storage tanks at one of the Shell wells and also one-mile east of Greybull. A 250,000 storage tank has recently been complete southwest of Greybull.

With the completion of the Big Horn Regional Joint Powers Board's Northern Supply Pipeline, Greybull water system is now interconnected with the other systems to the south. This has provided Greybull with additional water to supplement current usage and an emergency backup supply. The new pipeline has effectively doubled the available water to Greybull from 580 to 1160 gallons per minute. The town water system provides service to rural residents along the transmission line from Shell. In addition, the Town provides water to the Shell Valley, the Greybull Heights, the South Big Horn Airport, and Airport Bench Water District.

The Town is undertaking a phased water main upgrade project. The project is broken down into several phases which are being completed based on funding availability. Ultimately, the upgrade will replace many of the mains in town and provide looping where there is none at the current time.

Lovell

Lovell's original town water system dates back to 1943 when a water treatment plant and distribution lines went into service. Now the town serves is population of 2,281 residents limiting its service to within the town. The town population has remained constant since 2000. The town's water distribution system is old and suffering from considerable leakage and infiltration and is in need of significant repairs. Since 1991 treated water has been supplied by the Shoshone Municipal Pipeline. Currently, the

pipeline provides water to the town's 1,000,000 gallon storage tank. The Town's maximum withdrawal rate (1,208 gallons per minute) from this system does not exceed any projections for water needs to year 2050. Current usage averages 323,287 gallons per day.

Manderson

The Town of Manderson provides water to its population of 104 residents. The town population has dropped by 1.9% since 2000. Manderson's source of water is the SBHCWSJPB wells located seven miles east of town. Because Manderson is supplied by the SBCWSJPB system, there is abundant supply available to the town for additional growth.

Land Use Implications of Water System Infrastructure

All the major water systems in Big Horn County were designed and constructed with generous allowances for future growth. Water supply will not be a limiting factor on growth and development in the current and future service areas of these systems for the foreseeable future.

The areas that can be served by these water systems will be favored locations for future development. Historically in Big Horn County and elsewhere, water systems have been strong facilitators of rural development. This will continue to be the case in the future in Big Horn County.

Towns in Big Horn County also generally have much reserve capacity in their water systems to accommodate growth and expansion. Localized problems such as undersized or antiquated water lines can hamper development in specific locations in the towns. However, overall supplies are very adequate for the future.

Wastewater Systems

Basin

Basin has a one cell lagoon, built in 1967, with a capacity of .98 million gallons per day. In 2006, the municipality added a flow measuring device and added ultraviolet light disinfection. There are plans to add a new cell and reconfigure existing single cell in next few years.

The sanitary wastewater collection system serves the entire town except for a couple of houses at the lower end of town; these are served with individual systems. The entire system is gravity flow; there are no pumps or lift stations. The collection system consists of lines ranging in size from four inches to 12 inches. Age of the system varies and there have been a number of upgrades (e.g., to pvc pipe) throughout the system. There are no planned major improvements to the collection system. Some expansion of the system is needed from time to time; currently there are a couple of new planned subdivisions within the service area that will require extensions.

Burlington

The Burlington municipal sewer system was constructed in the late 1980s. The collection system serves most developed portions of the town and includes eight inch main lines, lateral lines that are primarily four inches in diameter, and some three inch diameter lines. A duplex lift station pumps wastewater between the east side of Burlington and the treatment facility, which consists of a three-cell oxidation pond. Following disinfection of wastewater from the third cell, effluent is discharged into the Beck Allen Canal. The Burlington Community Development Plan reported considerable excess capacity available to support additional population growth and development.

Byron

The Byron Town Plan (2007) reported that the municipal sewer system serves almost all of the built area of the town. The collection system consists of eight inch, six inch, and four inch lines. The aerated lagoons were treating between 30,000 and 200,000 gallons per day in 2007. With capacity to treat up to one million gallons of wastewater per day, there is abundant room in the system to handle increased loads. The lagoons were built in 2000, according to the Wyoming Department of Environmental Quality, Water Quality Division.

Cowley

An all-gravity flow system with no sewage pumping or lift facilities collects wastewater in Cowley. Sewer mains were installed in the 1970s and are PVC piping with most mains eight inches in diameter and a 10-inch line from 4th Street South to the wastewater treatment lagoons. A three-cell lagoon, built in 1976, is used to treat the wastewater, which is either evaporated or occasionally applied to land near the lagoon. The first cell was cleaned of sludge in 2007. The overall capacity of the treatment system is more than double the usage in 2007. Furthermore, capacity could be readily increased by adding aeration devices to the treatment lagoons.

Deaver

The Deaver sewer collection system was constructed in the 1960s of clay pipe. The entire system is gravity-flow with main lines of eight to ten inches in diameter. . The town is currently looking into a complete rebuild of the collection system. In the past few years, the city constructed three new treatment cells, and all treatment is via these new cells at the current time. The system currently operates at about one-third of its total capacity, so there is plenty of room to accommodate additional population and development.

Frannie

The Frannie sewer system was installed in 2003 and comprised almost entirely of eight inch sewer lines. Collection lines of ten to twelve inches in diameter carry flow from the town to the treatment ponds. Treatment is with non-aerated oxidation ponds. Because of low volumes, the system generates only

occasional discharges into Sage Creek. The system is operating well under capacity and limited flows have generated some buildup of sludge. According to the 2005 Frannie Community Development Plan, periodic removal of sludge is needed to sustain the long-term capacity of the system and to maintain acceptable water quality for the effluent.

Greybull

The wastewater collection system in Greybull consists of lines installed in the early 20th century, and in the 1970s. The municipality is currently in the midst of a several year project to replace the oldest lines and those most in need of repair. Main lines in the system range in size from eight inches in diameter to 18 inches. There is at least one pump station in the system. A very large one-cell lagoon was the treatment method until spring of 2008, when it was divided into two cells. The original one-cell lagoon had plenty of excess capacity to treat the community's wastewater, but was inefficient. There are now plans to further divide one of the cells into additional cells. Discharge is to the Big Horn River.

Lovell

The municipal sewer collection system was constructed in the early 1940s. The entire system is being replaced in a currently ongoing multi-phased, multi-year project. The treatment system is a three-cell lagoon. The first cell is aerated and baffled and was completed in 1989.

Manderson

The municipality built its first public owned treatment works in 2006. Previously all treatment was individual onsite treatment. The system uses new individual septic tanks on each lot and a collection system to convey septic tank effluent to central treatment. The collection system consists of four-, six-, and eight-inch diameter PVC pipe.

Central treatment uses a recirculation tank and AdvanTex treatment pods (attached growth system with textile media) followed by ultraviolet disinfection. The system could handle three times the current volume.

Other Systems in the County

Outside of the municipal areas, most county residents rely on individual septics and drainfields. Much of the county has severe limitations for conventional septic/drainfield systems because of poor percolation rates and/or high groundwater.

The county has very limited information on non-conventional wastewater systems. The county sanitarian Jim Waller has limited data on 20 non-conventional systems (not including pressure dozed systems). These systems include ponds, wetlands and ponds, wetlands and leach field, trench and pond, evaporative ponds, and enhanced sand filters. These systems primarily serve single residential units, but the list includes a system serving a church and hospital. He estimates that there are 20-30 additional systems in the county not included in his lists.

Because of the soil and ground-water constraints on conventional systems, demand for non-conventional systems is likely to grow. In a three-week period in August-September of 2008, the county sanitarian permitted three non-conventional systems and was aware of two in the design stages.

There are a number of privies (outhouses) which serve as the only sanitary waste facility for some residences and other uses (e.g., parks, campgrounds). These must be permitted and must meet design standards (including pit lining). Two permits were issued between 2003 and 2008 for privies, and in September 2008, there were requests for permits for five different systems.

Electric Power, Natural Gas, and Telecommunications

Electrical Power

Electrical power suppliers in Big Horn County include:

- Rocky Mountain Power
  Rocky Mountain Power Company, a division of Pacificorp, operates in Utah, Wyoming, and Idaho. Pacificorp was acquired by MidAmerican Energy Holdings Company in 2006.

- Big Horn Rural Electric Cooperative
  Big Horn Rural Electric, headquartered in Basin, provides electricity in Big Horn, Park, Washakie, Johnson, and Sheridan Counties in Wyoming; and Carbon and Big Horn Counties in Montana.

- Municipalities of Basin and Deaver
  Basin and Deaver own transmission lines in their communities and send electrical bills with other city service bills.

In the unincorporated areas of the county, power is generally supplied by either Rocky Mountain Power or Big Horn Rural Electric Cooperative (although the municipalities do extend some services to limited area outside of city boundaries). Electrical power is virtually available throughout the entire county, although physical and legal impediments can make it more difficult to extend. These impediments include legal easements. Extensions and upgrades across federal land are subject to restrictions, such as those related to habitat protection for sage grouse and requirements for archaeological surveys prior to ground disturbance.

Natural Gas

Natural gas suppliers in Big Horn County include:

- Montana Dakota Utilities (MDU)
  MDU provides natural gas to Montana, North Dakota, South Dakota, Minnesota, and Wyoming. Only the northern portion of Big Horn County is served by MDU.

- Wyoming Gas Company
  The Wyoming Gas Company, located in Worland, provides natural gas to other locations in Big Horn County.

- Frannie-Deaver Utilities
  Frannie-Deaver Utilities, located in Frannie, has more than 200 customers. The company obtains some of its natural gas from nearby Wilson Basin and Frannie Oil Field.

Telecommunications

TCT West provides telephone, television, and internet services in Big Horn County. TCT West does not provide cell phone coverage. TCT West will extend land phone lines anywhere in the county as long as easements are in place for the extension. High speed internet and cable television is available to every community but not to all locations in the unincorporated areas.

There are some areas in the county without capability to transmit or receive cell phone calls.

Land Use Implications of Power and Telecommunications Infrastructure

Wyoming state law requires subdivisions to provide easements for planned utilities. A strict interpretation would mean that only those subdividers that are planning to provide utilities are required to provide easements. Practically, if easements for utilities are not in place at the time land is subdivided, it can be extremely difficult and expensive for lot owners to acquire such easements later. Although there are some individuals who prefer to live "off-the-grid," the majority of Americans prefer traditional sources of power. For many, it would be inconceivable to have a year-round home without electricity and telephone.

There are some safety factors to consider in locations that lack of traditional electricity supplies and land line telephones. Use of wood-burning or other stoves for heating can increase potential for home and wildfires. Areas without land line telephones are unable to participate in "Reverse 911" systems. Areas without land lines and without adequate cell phone coverage are cut off from immediate access to emergency services.