BURLINGTON REGIONAL WATER MASTER PLAN
LEVEL II STUDY
EXECUTIVE SUMMARY

For The:

Wyoming Water Development Commission
# 05SC0292696

Prepared By:

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1. AUTHORIZATION AND PURPOSE

The Burlington Regional Master Plan, Level II project has been completed in accordance with a contract between the Wyoming Water Development Commission (WWDC) and TST, Inc. of Denver dated June 9, 2005. The purpose of the project was to perform a Level II study for the town of Burlington and to explore the potential of a regional water supply connection for the area. This study evaluated the town of Burlington’s current system. It also evaluated the following service options:

- Extending the Big Horn Regional system from Basin to Burlington,
- Extending the Big Horn Regional system from Greybull to Otto,
- Extending the Big Horn Regional system from Greybull to Otto and Burlington
- Creating a system from Burlington to Otto.

Preliminary conceptual designs were then prepared and cost estimates developed for all of the alternative systems. These systems were analyzed to support the anticipated growth in the study area through 2035.

The tasks involved in the Scope of Work include:

1. Project Meetings,
2. Land Use Planning,
3. Identification of Service Area, Demand Projections,
4. Evaluation of Water Supply System Capital Components,
5. Evaluation of System Operations,
6. Identification of Alternatives,
7. Comparison of Identified Alternatives,
8. Conceptual Level Cost Estimates,
9. System Operating Plan,
10. Economic Analysis and Project Financing,
11. Environmental Report,
12. Identification of Permits for Construction,
13. Area Water Supply Master Plan,
14. Draft, Final and Executive Summary Reports.

2. CONCLUSIONS AND RECOMMENDATIONS

The focus of the Burlington Regional Master Plan is to investigate the current water system and explore the possibility of a rural water system from the Greybull or Basin area to service the Burlington and Otto area. In the course of this planning effort, the following conclusions and recommendations have been reached.

Conclusions

Burlington System
**Demand**

- Burlington’s present water system adequately serves its 250 residents.
- Burlington’s population is projected to grow at a rate of 1.5% per year reaching a population of approximately 390 by the year 2035.
- With Burlington’s expected growth over the next 30 years its water demand will be approximately 136,500 gal/day by 2035.

**Water Supply**

- Burlington currently has two shallow alluvial wells for their water supply.
- Burlington’s wells are capable of meeting the projected demands for the next 30 years.
- Burlington’s water supply currently meets the EPA’s drinking water standards.
- Burlington’s wells have the potential of being classified by EPA as “groundwater under the influence of surface water”, triggering a requirement for filtration treatment.
- There is presently no identifiable alternate groundwater source in or near the Burlington area that would provide adequate quantities of acceptable quality potable water.
- The town’s wellhead protection plan was formally adopted by the Town Council in March 2005.

**Water Treatment**

- Currently Burlington’s treatment with chlorination alone meets regulatory requirements.

**Transmission System**

- The town’s well house is located approximately 2 miles south of Burlington.
- The well pumps and tank level are adequately controlled by a radio link telemetry system.
• An 8-inch transmission line originates at the well house and extends to the town’s single storage tank approximately 1 mile north of Burlington. A return transmission line originates at the tank extending to town.

• The transmission lines have adequate capacity to meet both forecast fire suppression and peak hour domestic demands for the coming thirty years.

• Both of Burlington’s transmission lines are PVC, approximately 20 years old and in sound condition.

**Distribution System**

• The town’s distribution system, constructed of adequately sized PVC lines, is less than 20 years old and is in sound condition.

• The hand written method of gathering water readings is labor intensive and can introduce errors.

**Storage System**

• Burlington’s single 250,000 gallon water storage tank has adequate capacity to meet domestic demands, but not fire demands, for the coming thirty years.

• The present storage volume is approximately 150,000 gallons short of the recommended volume to meet the fire flow demand generated largely by the town’s school.

**Rural Service Area including Burlington**

The preferred alternative selected by Burlington and the rural area residents proposes to provide service to the Greybull Valley starting at Greybull and extending to Burlington and would serve Burlington as well. Residents of the area struggle to provide their domestic water needs. Most wells in the area are of marginal quality and many residences have to haul potable water from either Greybull or Basin. Study of this area’s domestic water needs has yielded the following conclusions:

• The cost to provide a piped potable water system to this area will be approximately $130/month/residence.

• Significant additional construction grant assistance will be needed for the project to achieve the Big Horn Regional Joint Power’s Board (BHRJP) goal of offering a user rate of $50/month/residence.
• Minimal environmental issues accompany the implementation of the preferred alternative adopted by both Burlington and the rural representatives on March 14, 2006 and affirmed July 6, 2006 at those respective meetings.

Demand

• The current 2006 service population including Burlington is approximately 460 people, with a water demand of approximately 160,000 gal/day.

• By the year 2035, this population is estimated to grow to 720 people with an average demand of 220,000 gal/day.

• The proposed Dorsey Creek subdivision and perhaps other areas may become future subscribers on this system. These demands are discussed in the area water master plan later in this report.

Water Supply

• The BHRJP is the most favorable source of supply for this service area. No other economically feasible source of supply has been identified in the area.

• The BHRJP has expressed reservations as to whether this area’s demands can be accommodated through the regional system’s current wells.

• A study is currently underway to quantify the total supply capacity of all the wells feeding into the BHRJP system. Results of that study were not available as of September 2006.

Treatment

• If supply is obtained from BHRJP no additional treatment will be needed.

Transmission System

• A 22-mile long 12" PVC waterline served by three separate pump stations will be needed to transfer water from Greybull to Burlington and serve the intervening residences.

Distribution System

• Distribution systems off the main transmission line may be desirable at some time in the future. Because there was no clear indication from
groups of residences requesting service away from the main transmission line, no local distribution systems were planned into the system. The single exception is a single loop of distribution line serving Otto.

Storage System

- A series of three separate 150,000 gallon storage tanks, accompanying the three pump stations, will be needed on the system.

Recommendations Burlington

The following recommendations are made to meet Burlington’s potable water demands through the year 2035.

1. Install a rate-of-flow control valve on the feed water line for the lagoon chlorination system that will allow a maximum five (5) gpm flow through the chlorine injector. This will save the town substantial pumping costs by cutting the town’s current water production demand nearly in half during the two month-long lagoon discharge period.

2. Formally adopt the town’s already published Wellhead Protection Plan.

3. Improve the accuracy and automation of the water accounting system by adding automated meter reading technology to all service lines and the pump house master meters. This should increase revenues and allow identification of system water use anomalies and problems.

4. Preserve and extend the ditch water irrigation system in town. This will remove the irrigation load that would otherwise have to be supplied from the potable water system.

5. Develop a contingency plan for construction of a water filtration plant or tying into the Big Horn Regional system in the event that EPA classifies the town’s water supply as being groundwater under the influence of surface water.

6. Add an additional water storage tank of 150,000 gallons to provide recommended fire flow storage or work with the school district to add fire sprinklers to those portions of the school building that do not currently have them.

7. Replace the present well pumps when the town starts to experience water shortages due to lack of pump capacity.
Implementation

Implementation of the above recommendations will enhance Burlington’s capacity to meet potable water demands over the coming 30 years. The prioritized implementation of recommended improvements is given in Chapter 8.

Rural Service Area

To provide potable water supply to the rural area between Greybull and Burlington, the following steps are recommended:

1. Burlington and Big Horn Regional Joint Powers Board come to agreement on granting Burlington a seat on the board by March 2007.

2. The residents along the proposed transmission line must become a legal entity either by forming a separate water district or joining the South Big Horn Water District (SBHWD) with that district’s concurrence. This action will require agreement on a proposed district boundary followed by a vote of those property owners within that boundary. It is recommended that this be accomplished by May 2007.

3. Identify a water supply of approximately 250,000 gallons per day that could be added to the BHRJP supply to augment the Burlington region’s demands.

4. By July 2007, identify and apply for any additional grant funding that could be brought into the project to bring resultant water rates closer to the targeted $50 per month.

5. By August 2007, apply to the Wyoming Water Development Commission and RUS for funding to design and construct the proposed system and develop its water supply.

6. Assuming the Wyoming Legislature appropriates funding to the project, select a design engineering firm by June 2008.

7. February 2008, hold bid opening for the project.

8. November 2008, complete construction and put system into service.
**Total Forecast Population and Water Demand**

Using the 1.5 percent population growth rate, the following service population and demand was projected:

**Table II-1**

**Current and Forecast Year 2035 Potable Water Demand**

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>2005 Maximum Day Demand (Gal.)</th>
<th>2035 Maximum Day Demand (Gal.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greybull to Otto</td>
<td>93</td>
<td>32,600</td>
<td>145</td>
</tr>
<tr>
<td>Basin to Otto</td>
<td>33</td>
<td>11,600</td>
<td>52</td>
</tr>
<tr>
<td>Otto</td>
<td>36</td>
<td>12,600</td>
<td>56</td>
</tr>
<tr>
<td>Otto to Burlington</td>
<td>81</td>
<td>28,400</td>
<td>127</td>
</tr>
<tr>
<td>Burlington</td>
<td>250</td>
<td>87,500</td>
<td>390</td>
</tr>
</tbody>
</table>

The pipeline will not be constructed from both Basin and Greybull; thus, only one of the first two demands listed in the table would be supplied. For planning purposes, the higher demand was used. As a result, the total demand in the year 2035 is forecast to be 251,400 gallons per day serving a total population of 720 people. These forecast populations and their associated potable water demands are used as the demand basis throughout the remainder of this report.

**Fire Flow Demands**

The Insurance Services Office (ISO) standards, under Wyoming DEQ regulations, are used to determine fire protection demands. Those standards are based on building size and type of construction. For Burlington, the highest demand and highest value building is the school. Its fire demand is approximately 3,000 gpm. This demand affects both water storage requirements and the needed line size from the town’s tank to the school. It does not significantly affect the quantity of water that the town needs to plan to provide on a daily basis.

Firefighting demand for the rural area is approximately 1,500 gpm. This demand is based on the flow needed to fight a typical residential fire. Neither Otto nor the rest of the rural area have structures that are significantly larger than or require greater fire flow capacity than does a private residence.

**Preferred Alternative  – Service from Greybull extending to Otto, and Burlington**

Capital Components

This is the most extensive conceptual system studied in this Master Plan. It services the entire rural population of 175 people along its route as well as the communities of Otto and Burlington with their populations of 36 and 250 respectively giving a total present service population of 460
people. It consists of a 22-mile, 12-inch PVC transmission line that extends from the Town of Greybull storage tank to Otto and on to Burlington. A 12-inch diameter was selected for the transmission line to reduce friction losses and pressures in the system. The total elevation difference between Greybull’s water storage tank and Burlington’s water storage tank is 580 feet. Two pressure stations and two storage tanks have been included in the conceptual system, one being located in Otto on private land, and one located halfway between Greybull and Otto on BLM land.

Conceptually, the elevation difference will be overcome by stepping through three pump stations as shown in the accompanying drawing. The elevation difference between each pressure station is approximately 185 ft. This would give a maximum pressure in each zone of 85 psi, which is an acceptable operating pressure for PVC pipe and for residential service. The pressure stations are planned to be located near each storage tank. Each tank would be above ground, have a height of 32 feet, and have a storage capacity of 150,000 gallons. It is estimated that the system would also require two chlorination-booster stations. The locations of these stations would require further analysis beyond the scope of this project. The system would be controlled with radio telemetry.
## Monthly Water Service Costs

### Number of Taps and Monthly Water Demand

<table>
<thead>
<tr>
<th>Location</th>
<th>Taps</th>
<th>Monthly Water Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burlington</td>
<td>115</td>
<td>5</td>
</tr>
<tr>
<td>Otto</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Rural Area</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Properties</strong></td>
<td><strong>187</strong> properties (taps)</td>
<td></td>
</tr>
<tr>
<td><strong>Monthly Water use (gallons/mo)</strong></td>
<td><strong>1,548,360.00 gallons/month</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Loan

<table>
<thead>
<tr>
<th></th>
<th>Standard Financing</th>
<th>Financing to achieve a $50/mo. maximum charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Cost</td>
<td>$13,163,416.85</td>
<td>$13,163,416.85</td>
</tr>
<tr>
<td>WWDC 66.7% Grant Amount</td>
<td>$8,779,999.04</td>
<td>$8,779,999.04</td>
</tr>
<tr>
<td>RUS 6.6% Grant Amount</td>
<td>$868,785.51</td>
<td>$868,785.51</td>
</tr>
<tr>
<td>Joint Powers Grant Amount</td>
<td>$3,514,632.30</td>
<td>$502,330.69</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>4.5%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Period</td>
<td>30.00 years</td>
<td>30.00 years</td>
</tr>
</tbody>
</table>

### Monthly

<table>
<thead>
<tr>
<th></th>
<th>Monthly System Loan Payment</th>
<th>Monthly Service Loan Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$17,980.72</td>
<td>$96.15</td>
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### O&M

<table>
<thead>
<tr>
<th></th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator w/ Benefits</td>
<td>$50,000.00/year</td>
</tr>
<tr>
<td>Transportation, Office, Equip</td>
<td>$8,000.00/year</td>
</tr>
<tr>
<td>Fuel, etc.</td>
<td>$12,000.00/year</td>
</tr>
<tr>
<td>Electric</td>
<td>$3,000.00/year</td>
</tr>
<tr>
<td>Total System O&amp;M per year</td>
<td>$73,000.00</td>
</tr>
</tbody>
</table>

### Monthly

<table>
<thead>
<tr>
<th></th>
<th>Monthly System O&amp;M</th>
<th>Monthly Service O&amp;M Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$6,083.33/month</td>
<td>$32.53/month</td>
</tr>
</tbody>
</table>

### Monthly Wholesale Water Charge from Joint Powers

<table>
<thead>
<tr>
<th></th>
<th>Monthly System Water Charge</th>
<th>Monthly Water Charge per Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>(based on $.45 per 1,000 gal.)</td>
<td>$696.76/month</td>
<td>$3.73/month</td>
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</table>

**TOTALS**

<table>
<thead>
<tr>
<th></th>
<th>Total Monthly per Service Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$132/month</td>
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</tbody>
</table>