EXECUTIVE SUMMARY
CANYON IMPROVEMENT & SERVICE DISTRICT
LEVEL II STUDY

WYOMING WATER DEVELOPMENT COMMISSION

NOVEMBER 2005

PREPARED BY:
STETSON ENGINEERING, INC.

IN ASSOCIATION WITH:
WESTERN GROUNDWATER SERVICES, LLC.
EXECUTIVE SUMMARY

For

Canyon Improvement and Service District
Level II Water Supply Study

Prepared for:
Canyon Improvement and Service District
Newcastle, Wyoming
Wyoming Water Development Commission
Cheyenne, Wyoming

November 2005

Prepared by:

Stetson Engineering Inc.
P.O. Box 1836
Riverton, WY 82501
307-856-1409

Stetson Engineering Inc.
P.O. Box 457
Gillette, WY 82717
307-682-8936

In Association with:

Western Groundwater Services, LLC
6595 Bear Claw Lane
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PURPOSE

The initial purpose of this study was to perform a Level II, Phase I Reconnaissance Study for the Canyon Improvement and Service District. This included determining all pertinent aspects of required system infrastructure to meet the District’s short-term and long-term needs including sources of supply, storage, transmission, and distribution. This study provides a planning tool to help the Canyon District develop a new rural community water system.

The initial phase of the Level II Study recommended developing a source supply well. The Level II Study was extended and the well was installed during 2004-2005. Construction details for the new well installation are provided in Section 11 of the report.

In the extended Phase of this project, additional work was done with the USDA Rural Utilities Services (RUS) in regards to their involvement. It was determined that because the proposed Canyon System would be a new system, the RUS will not supply funding if the system is sized to provide fire protection. Because of this, we have included additional sections in regards to storage, transmission, distribution, and cost scenarios for systems based on non-RUS and RUS partnership funding.

CONCLUSIONS AND RECOMMENDATIONS

Water Supply

The preferred alternative to provide water supply to the Canyon water system is the construction of a new well facility. The new supply well was recommended because it was determined there were no feasible connections that could be made with existing systems in the area to serve as a supply source. A supply inter-tie with the Salt Creek Water District (SCWD) is not feasible because this water system does not have excess supply. SCWD already purchases part of its water from the City of Newcastle. An inter-tie with the City of Newcastle is not feasible because the City is concerned that growth in the Canyon service area could eventually exhaust available water resources, requiring the City to develop new supply, or limit growth.

Evaluation of new well sites focused on the Minnelusa and Madison aquifers. The results of this investigation have indicated the Minnelusa aquifer is unlikely to produce acceptable water quality in the Canyon service area.

The new well (Canyon No.1) was constructed to produce groundwater from the Madison Formation aquifer. It was constructed at 9-5/8 inch diameter. The actual well entered the Madison at 1,665 ft, and was drilled through the entire formation to 2,156 ft.
Prior to hydraulic testing of Canyon No. 1 in January 2005, the well had an estimated shut-in head of 55 psi, and an open discharge of approximately 100 gpm. After testing, it was determined the well has a maximum estimated pumped rate capacity of 500 gpm. The well has the capacity to be used as a regional well for an expanded area that would include the Salt Creek Water District, east of the Town of Newcastle.

The actual project fee paid to the Drilling Contractor for construction of the well was $408,188.09. This included all acid stimulation, aquifer testing, wireline logging, and video logging, all of which do not have to be cost shared by the sponsor. The total construction fee that is to be shared by the sponsor is $281,508.00. A 50% cost share would require the sponsor to pay a total of $140,754.00 for the purchase of the well.

Completion of the well facility occurs at Level 3. The total estimated Level 3 fees, including finalization of the property access agreements, are about $80,000. The sponsor is responsible for 50% of the estimated Level 3 fees to develop the well into a supply source.

Storage

Modeling of the proposed system and the topography of the surrounding area indicated the best location for a new water storage tank would be in the NE¼, SW¼, Section 23, T45N, R61W, on property currently owned by Jack and Nancy Seeds (Figure 1-1). A tank at this location can be built with a finish floor elevation that will provide adequate system pressures to meet the WDEQ design standards for all but one of the existing homes in the district. The one home outside the design standards will require an additional pressure tank and pump at the home.

- **Non-RUS Funding (fire flow, with a connection to Salt Creek).**

  To meet the District’s current and future (year 2033) storage requirements and provide fire flows, it is recommended that the District install a water tank with at least a 135,000 gallon capacity. The cost of the storage facilities was estimated at about $236,000.00.

- **RUS Funding (With no Fire Flow and no connection to Salt Creek).**

  If the District determines not to provide fire protection we recommend a tank with 75,000 gallons storage capacity to meet the WDEQ storage requirements to the year 2033. The cost of the storage facilities was estimated at about $152,000.
• **RUS Funding (With no Fire Flow and with a connection to Salt Creek).**

If the well is used in a regional system along with Salt Creek District the tank should be sized to store the average day demand for both the Canyon and Salt Creek Districts 2030 populations. This tank would have a storage capacity of 175,000 gallons. The cost of the storage facilities was estimated at about $315,000.00.

**Transmission**

Most of the main lines in the proposed Canyon system are transmission lines. The proposed routing for the transmission lines are shown on Figure 1-1 through 1-3 respectively in the report (Figure 1-1 is attached to this summary for reference purposes). The proposed transmission mains will have an estimated combined length of about 30,000 lineal feet (LF). Construction of the proposed transmission mains are planned to be in the existing road right-of-ways.

Sizing of the water mains for the **non-fire flow** designs was based on the 5-acre lot size demands as described in section 2.2.2 of the report.

• **Non-RUS Funding (fire flow, with a connection to Salt Creek)**

The mains will consist of approximately 11,700 LF of 8” Class 150 PVC, about 9,800 LF of 8” Class 200 PVC, and about 8,500 LF of 6” Class 150 PVC.

• **RUS Funding (With no Fire Flow and no connection to Salt Creek)**

The mains will consist of approximately 11,700 LF of 6” Class 150 PVC, about 8,500 LF of 4” Class 150 PVC, about 1,600 LF of 6” Class 200 PVC and, about 8,200 LF of 4” Class 200 PVC.

• **RUS Funding (With no Fire Flow and with a connection to Salt Creek).**

The mains will consist of approximately 11,700 LF of 8” Class 150 PVC, about 8,500 LF of 4” Class 150 PVC, and about 9,800 LF of 8” Class 200 PVC.

**Distribution**

The distribution portion of the proposed Canyon System is the loop to the west of Salt Creek Road along Valley View Road as shown on Figure 1-1 through 1-3. Construction of the proposed distribution system is planned to be in the existing access roads and along property lines. Right-of-way and access easements will be required for the proposed routing of the distribution lines.
• Non-RUS Funding (fire flow, with a connection to Salt Creek)

The proposed loop is about 8,100 LF in length and should be constructed of 6" Class 150 PVC.

• RUS Funding (With no or without connection to Salt Creek).

The proposed loop is about 8,100 LF in length and should be constructed of 4" Class 150 PVC.

PREVIOUS WWDC INVOLVEMENT

There have not been previous engineering evaluations for Canyon area. However, two projects have been completed focusing on the adjacent areas, and are directly applicable to Canyon. These include:

• Level 1 Water Supply Project, Salt Creek Water District, Newcastle, Wyoming prepared by R.C.H. Associates and submitted to the Wyoming Water Development Commission, December 1996; and


WATER SUPPLY DEMAND

Service Area and Population

The Canyon service area spans 3,792 acres and presently is developed into 38 lots, with occupation occurring on 35 lots. Average lot size is presently 108 acres, but ranges from about 2 to 1,100 acres. The estimated present population is 88 people based on an average occupancy of 2.5 people per dwelling unit. Based on a growth Rate of 1.05%, the 2033 population of the District would be about 120 persons or about 48 services.

Although this is probably a good estimate for the area in general, the Canyon Service area has substantial acreage that could be developed to a higher density. Breaking down the area into buildable 5-acre lots (as will be discussed in more detail in section 2.2.2 of the report), it is estimated that the area could have up to 380 lots (380 EDUs). Assuming this occurred over the next 30 years, this would be a growth rate of about 8.3%. Although it is unlikely this type of growth would occur in the service area unless there was an extreme increase in the Energy Industry, the system was sized for this potential.
Water Demand

The Canyon service area presently does not include commercial use, or is likely to include significant commercial water use in the future. A water demand of 125 gpm per person average water use rate was used to meet the Wyoming Water Quality Chapter 12, Section 8(a), Rules and Regulations. Maximum day demand and maximum hour demands are estimated from the average day demand by applying peaking factors.

- Maximum Day Demand = 2.5 x Average Day Demand
- Maximum Hour Demand = 1.5 x Maximum Day Demand

The following Table summarizes the estimated water use rates for Sunset under present conditions and for selected future years (based on the 1.05% Growth Rate).

<table>
<thead>
<tr>
<th>Water Use</th>
<th>2003</th>
<th>2010</th>
<th>2020</th>
<th>2033</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Day Demand (gpm)</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Average Day Demand (gpcd)</td>
<td>10,942</td>
<td>11,772</td>
<td>13,068</td>
<td>14,969</td>
</tr>
<tr>
<td>Maximum Day Demand (gpm)</td>
<td>19</td>
<td>20</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>Maximum Hour Demand (gpm)</td>
<td>28</td>
<td>31</td>
<td>34</td>
<td>39</td>
</tr>
</tbody>
</table>

Rates shown are based on present and projected population in the service area, a per capita average day demand of 125 gallons, and peaking factors described above.

The peak rates as discussed previously are adequate to use in the modeling of a system as long as the system is being designed to provide fire flows. The fire flow sizing more then adequately accounts for the possible peak demands experienced in a water system that are sometimes well beyond the estimated peak hour demands. To determine the possible peak rates experienced in the system, methods described in the American Water Works Association, Sizing Water Service Lines and Meters – Manual of Water Practices M22, Second Edition (AWWA-M22) were used.

The following tabulates the AWWA-M22 peak demand data determined for both the year 2033 population and for the full build out of three hundred and eighty, 5-acre lots. It can be seen by this data that the potential peak in the system is much higher then was determined as the peak hour demand.
<table>
<thead>
<tr>
<th>Population</th>
<th>Peak Demand (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2033 estimate of 120 persons</td>
<td>199</td>
</tr>
<tr>
<td>Potential Full Build out of 950 Persons</td>
<td>679</td>
</tr>
</tbody>
</table>

**PREFERRED ALTERNATIVE COST ESTIMATE**

The cost estimates for the preferred alternatives are summarized below and are broken down in detail in Tables 6-1, 6-2, and 7-1 through 7-11 in the report.

**Water Supply & Delivery System**

Non-RUS Funding (fire flow, with a connection to Salt Creek).

- Canyon Well (Est. cost to Sponsor) $297,000.00
- SCADA Control $27,500.00
- Storage Tank (135,000 gal) $247,000.00
- Transmission $919,000.00
- Distribution $298,000.00

**TOTAL** $1,788,500.00

RUS Funding (With no Fire Flow and no connection to Salt Creek)

- Canyon Well (Est. cost to Sponsor) $297,000.00
- SCADA Control $27,500.00
- Storage Tank (75,000 gal) $152,000.00
- Transmission $773,000.00
- Distribution $276,000.00

**TOTAL** $1,525,500.00
RUS Funding (With no Fire Flow and with a connection to Salt Creek).

- Canyon Well (Est. cost to Sponsor) $297,000.00
- SCADA Control $27,500.00
- Storage Tank (225,000 gal) $315,000.00
- Transmission $889,000.00
- Distribution $276,000.00

**TOTAL** $1,805,000.00

**ECONOMIC ANALYSIS AND PROJECT FUNDING**

During the actual process of trying to obtain funds from the RUS, it was estimated by the RUS that they believe the district at it current size can only pay back a loan of about $200,000.00. This would place the District members’ monthly payments at about $69.00 (based on 35 users). The funding scenarios that included RUS funding have the loan limited to this amount.

**Funding Plan**

The District has negotiated or is in the process of negotiating the following funding:

- WWDC Grant (Approved) $740,000.00
- SLIB Grant (Pending) $138,000.00
- RUS Grant (Pending) $702,000.00
- RUS Loan (Pending) $200,000.00
- District Contribution $8,000.00

**TOTAL PROJECT FINANCING** $1,788,000.00
Fee Impact to Users

The following assumes a Total RUS loan in the amount of $200,000.00 for a rate of 4.5% and a term of 25 years.

<table>
<thead>
<tr>
<th>Item</th>
<th>Loan Amount</th>
<th>Annual Cost to District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission and Distribution System</td>
<td>$ 200,000</td>
<td>$ 13,487</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>$ 15,000</td>
<td></td>
</tr>
<tr>
<td>Short Lived Assets</td>
<td>$ 400</td>
<td></td>
</tr>
<tr>
<td><strong>Total Annual Cost to District Members</strong></td>
<td><strong>$ 28,887</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Monthly Cost to District Members</strong> (based on 35 taps)</td>
<td><strong>$ 68.78</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total cost Monthly Cost per Member (based on Number of taps)

<table>
<thead>
<tr>
<th>Canyon Members</th>
<th>Monthly Payment / Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>$68.78</td>
</tr>
<tr>
<td>48</td>
<td>$50.15</td>
</tr>
<tr>
<td>75</td>
<td>$32.10</td>
</tr>
<tr>
<td>100</td>
<td>$24.07</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL REVIEW

The Environmental Report (ER) shall be a separate document from the study. The Environmental report had been completed for the site of the Canyon #1 Well prior to the drilling of the well. The ER for the areas of the proposed storage facilities, transmission mains, and distribution mains has also been completed and is on file with the RUS.