EXECUTIVE SUMMARY

For

Sunset Ranch Water Supply
Level II Study

Prepared for:
Sunset Ranch Water District
Newcastle, Wyoming
Wyoming Water Development Commission
Cheyenne, Wyoming

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Prepared by
Stetson Engineering Inc.
P.O. Box 1836
Riverton, WY 82501

In Association with:
Western Groundwater Services, LLC
6595 Bear Claw Lane
Bozeman, MT 59715
PURPOSE

The purpose of this study was to perform a Level II, Feasibility Study for the Sunset Ranch Water 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 Sunset Ranch Water District develop a new rural community water system.

CONCLUSIONS AND RECOMMENDATIONS

Water Supply

The most feasible supply source for the Sunset District will be to connect to the existing City of Newcastle water system.

The City of Newcastle was contacted to assess the feasibility of connecting the Sunset Water District to the City. Preliminary approval for a supply connection was given by the Newcastle City Council as related through the City Engineer. The planned connection will be near the Newcastle Tank No.3. The tank is north of the District near the State of Wyoming Honor Farm. There are no improvements related to the City’s wells in relation to this water supply.

Storage

No additional water storage facilities are recommended for the Sunset District at this time. The Newcastle water system tank No.3 will provide adequate storage to meet the District needs.

Transmission

The proposed water system is being sized to provide drinking and household water only. No fire protection is designed for the system.

To supply water from Newcastle Tank #3 to the District boundary it is recommended that a 6” Class 150 PVC water line be used. The proposed 6” PVC transmission main would be routed approximately as shown on Figure 1. The route would take it across property owned by The State of Wyoming, Michael and Denise McGinty, Kenneth and Joyce Avery, Jerry Varner, and
James Piana. Right-of-way and access easements will be required for the routing of the transmission main. The portion of the proposed system that runs along Musser Road (a County road) within the District would also be considered part of the transmission system. This line should be constructed within the road right-of-way.

**Distribution**

The proposed distribution system would be made up of 4” Class 200 PVC and be routed as shown in Figure 1. The higher rated pipe is used because of the higher pressures in the system. The District can use the higher strength pipe in the system and regulate the pressures at each service connection with a service line pressure-reducing valve. However, for purposes of the cost estimate we included a pressure-reducing valve in the transmission system.

**PREVIOUS WWDC INVOLVEMENT**

There have not been previous engineering evaluations for the Sunset Ranch area. However, two projects have been completed focusing on the adjacent areas, and are directly applicable to Sunset Ranch. 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**

There are currently 37 members in the Sunset Ranch Water and Sewer District (36 members within the Sunset Ranch Subdivision Boundary and one outside) with an estimated population of approximately 93 persons. Based on a growth rate of 1.05% the 2033 population of the District would be about 128 persons or approximately 51 services.

Although this is a probably a good estimate for the area in general, it was estimated that the District’s potential service area has acreage that could be developed to higher density. For estimating the potential future peak that could occur in the proposed system, the private lands that are being crossed with the proposed waterline were broken into 40-acre parcels and then 5-acre lots. There
were also 20 acres south of the District boundary that was included in this estimate (these lands are currently being annexed into the District). Based on this breakdown there is a potential forty-three additional 5-acre lots. Adding the existing 36 lots in the Subdivision gives a total of 79 potential future lots in the District. Based on 2.5 people per dwelling unit this would equate to a population of approximately 200 persons.

**Water Demand**

The Sunset 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>Sunset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
</tr>
<tr>
<td>Average Day Demand (gpm)</td>
<td>8</td>
</tr>
<tr>
<td>Average Day Demand (gpd)</td>
<td>11,566</td>
</tr>
<tr>
<td>Maximum Day Demand (gpm)</td>
<td>20</td>
</tr>
<tr>
<td>Maximum Hour Demand (gpm)</td>
<td>30</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. Because the Sunset system is not being designed to provide fire protection, we decided a conservative means to determine the possible peak rates in the system would be to use the methods described in the American Water Works Association, *Sizing Water Service Lines and Meters – Manual of Water Practices M22*, Second Edition (AWWA-M22).
The following tabulates the AWWA-M22 peak demand data determined for both the year 2033 population and for the estimated full build out of 79 lots. It can be seen by this data that the potential peak in the system is much higher than was determined as the peak hour demand in the previous section.

<table>
<thead>
<tr>
<th>Population</th>
<th>Peak Demand (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2033 estimate of 128 persons</td>
<td>199</td>
</tr>
<tr>
<td>Potential Full Build out of 200 Persons</td>
<td>246</td>
</tr>
</tbody>
</table>

**PREFERRED ALTERNATIVE COST ESTIMATE**

The cost for the preferred alternative is summarized below and is broken down in detail in Tables 6-1, 6-2, and 6-3 in the report.

- Transmission $386,000.00
- Distribution $280,000.00
  TOTAL $666,000.00

**ECONOMIC ANALYSIS AND PROJECT FUNDING**

*Funding Plan*

The District has negotiated the following funding:

- WWDC Grant $212,500.00
- SLIB Grant $139,000.00
- RUS Grant $126,500.00
- RUS Loan $192,000.00
- District Contribution $8,000.00

**TOTAL PROJECT FINANCING $678,000.00**
Fee Impact to Users

As shown above the District has negotiated with the RUS for a loan of $192,000.00. The loan has a rate of 4.5% for a term of 30 years. The following table summarizes the estimated annual and monthly fee impact to users.

<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>$192,000</td>
<td>$11,787</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>$6,000</td>
<td></td>
</tr>
<tr>
<td>Base Water Purchase (36 users @ 10,000 gal/user @ $1.5/1000 Gallon)</td>
<td>$6,480</td>
<td></td>
</tr>
<tr>
<td>Short Lived Assets</td>
<td>$200</td>
<td></td>
</tr>
<tr>
<td>Total Annual Cost to District Members</td>
<td>$24,467</td>
<td></td>
</tr>
</tbody>
</table>

Total Monthly Cost to District Members (based on 36 current taps) $56.64

ENVIRONMENTAL REVIEW

The Environmental Report for the proposed water system is on file with the Wyoming Department of Environmental Quality, Water Quality Division, SRF Coordination Office. (Brian Mark – Supervisor).

A copy of the ER is included in Appendix C of the report.