EXECUTIVE SUMMARY

SHERIDAN AREA
RAW WATER SUPPLY
PIPELINE - LEVEL II

SHERIDAN AREA WATER SUPPLY
JOINT POWERS BOARD

OCTOBER 1992

NNIAL
ENGINEERING & RESEARCH, INC.
RING—ARCHITECTURAL—SURVEYING—TESTING
October 30, 1992

Mr. David Engels, Project Manager
Sheridan Area Water Supply Joint Powers Board
224 S. Main, Suite B1W
Sheridan, WY 82801

Gentlemen:

This document summarizes the Raw Water Supply Pipeline Level II Report. The Report presents population and water use projections and recommends a new 30-inch diameter transmission main. This preferred alternative provides raw water conveyance redundancy with an existing 20-inch pipeline, supplies raw water to the expanded Sheridan Water Treatment Plant, and offers a reliable source of raw water to the Kendrick Golf Course and the Veterans Administration Medical Center. The recommended pipeline is intended to satisfy the need for raw water in the Sheridan area during the next 50 years.

The consulting team concluded that a 30-inch diameter was the optimum pipe size considering the projected water use and future maintenance problems expected with the existing 20-inch raw water main. The west half of the new pipeline route parallels other transmission mains in the Big Goose Valley and the east half passes through dry pasture land with minimal conflicts with other buried utilities. A more southern route also appears cost effective and could be selected during Level III design should right-of-way acquisition impact the preferred route.

We thank the Sheridan Area Water Supply Joint Powers Board for the opportunity to participate in this worthwhile project. We are available should questions arise or additional information be needed.

Respectfully Submitted,

Thomas L. Barker, PE
Principal Engineer

TLB/mpd
WHY THE PROJECT IS NEEDED

A new twelve mile raw water pipeline between Sheridan's diversion structure and the City Water Treatment Plant is needed to replace two 8-inch and one 16-inch pipeline. Constructed nearly one hundred years ago, the 8-inch pipelines serving the Kendrick Golf Course and the Veteran's Administration Medical Center (VAMC), have deteriorated beyond repair and are scheduled to be abandoned in 1994. The same year the 16-inch raw water transmission main will be converted to a potable water pipeline when a 4.5 MGD Water Treatment Plant is completed. At that time, the only remaining raw water transmission main will be a 20-inch pipeline having a capacity of 9.5 million gallons per day (MGD).

The new treatment facility will serve rural residents who presently receive raw water in violation of the Federal Clean Water Act and new tap applicants whose interest in treated water helped make the entire Sheridan area water project financially feasible. The Sheridan Area Water Supply Joint Powers Board (JPB) will administer water service to the new customers in a projected water service area in the Big Goose and Little Goose Creek valleys. (Location Map)

The purpose of the proposed 30-inch diameter raw water transmission main is to satisfy the immediate peak day demand in 1994 and also provide sufficient conveyance capacity to satisfy future peak day demands until the year 2045.

AUTHORIZATION

The JPB retained Centennial Engineering & Research, Inc. (CER) to prepare a feasibility analysis to determine the need, location, routing, size, and appropriate construction schedule for a new raw water supply pipeline for the Sheridan Area Water Supply System. The Level II Investigation was financed by the Wyoming Water Development Commission (WWDC) through the JPB.

PROJECT DESCRIPTION

Major study tasks included updating population projections to reflect the 1990 census and evaluating the condition of the existing 20-inch diameter raw water transmission main. Based on projected population and peak day water use estimates, a preferred pipeline size, route, and control system was selected. The recommended construction schedule satisfies the peak day volume of raw water needed by the City of Sheridan, the rural JPB service area, the Kendrick Golf Course, and the VAMC between the years 1994 and 2045.
PROJECTED JOINT POWERS BOARD WATER SERVICE AREA

CITY OF SHERIDAN RAW WATER INTAKE

NEW RAW WATER PIPELINE ALTERNATE ROUTES

SHERIDAN WATER TREATMENT PLANT

V.A. MEDICAL CENTER

KENDRICK GOLF COURSE

BIG GOOSE WATER TREATMENT PLANT

BIG HORN

CENTENNIAL ENGINEERING & RESEARCH, INC.
ENGINEERING-ARCHITECTURAL-SURVEYING SERVICES
10/92
RECOMMENDED RAW WATER SUPPLY ALTERNATIVE

A new 30-inch diameter raw water transmission main to supplement the conveyance capacity of the existing 20-inch raw water pipe is the recommended alternative. Although the remaining useful life of the existing 20-inch ductile iron pipe remains questionable, after observing its condition in a variety of soil and ground water conditions, its continued operation is recommended. The pipe's presence in a dual raw water supply system provides valuable redundancy. Until leak repair costs for the 20-inch main become intolerable, the two pipes will provide a desirable margin of safety against a total disruption of raw water delivery.

In addition to serving City of Sheridan residents and rural JPB customers, the new raw water transmission main will supply the Kendrick Golf Course. The 18 hole course currently receives water from an old and deteriorated 8-inch pipe scheduled to be abandoned in 1994. The projected peak irrigation rate is 1.5 MGD.

By the year 2045, a peak day use of 1.5 MGD is projected at the VAMC. The draft agreement between the JPB and VAMC calls for up to 3 cubic feet per second (CFS) - (1.9 MGD) maximum delivered by a new raw water transmission main. The VAMC has requested that an agreement with the JPB allow for deed ownership of the line at the same percentage that their financial contribution bears to the total capital expenditure. Ownership would be about 16% of the new 30-inch pipeline based on the estimated project cost of $9.3 million.

The VAMC also has funding approved for their own raw water pipeline project for $1.5 million including design and construction. Design funds of $146,000 are available April, 1993.

With a capacity of 31.5 MGD, the 30-inch main will satisfy the projected peak day flow needed by the Sheridan Water Treatment Plant, the JPB water service area, Kendrick Golf Course, and the Veterans Administration Medical Center during its 50 year design life. Thus, even a major break causing shut down of the 20-inch pipe for several days would not curtail delivery of raw water.
COSTS

The estimated total project cost of $9,268,000 for a new 30-inch transmission main is based on the preferred northern route. These estimates include project design, permitting and environmental mitigation studies, construction engineering, and contingency at 15%.

### PROJECT COST ESTIMATE

**30-INCH DIAMETER PIPELINE**

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<thead>
<tr>
<th>Item No</th>
<th>Description</th>
<th>Unit Cost ($)</th>
<th>Quantity</th>
<th>Total ($)</th>
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<tbody>
<tr>
<td>1.</td>
<td>Pipe Segment 1</td>
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<td>28,000 LF</td>
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<td>2.</td>
<td>Pipe Segment 2</td>
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<td>33,200 LF</td>
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<td>3.</td>
<td>Sleeve Control Valve</td>
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<td>LS</td>
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<td>Intake Piping</td>
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<td>Highway Crossing 48&quot; Casing</td>
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<td>6.</td>
<td>Creek Crossing</td>
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<td>50</td>
<td>10,000</td>
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<tr>
<td>7.</td>
<td>20&quot; Pipe - PRV</td>
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<td>LS</td>
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<tr>
<td>8.</td>
<td>Electrical Work</td>
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<td>LS</td>
<td>20,000</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>6,718,000</strong></td>
</tr>
</tbody>
</table>

**Final Plans and Specifications at 10%**

- Cultural Resource Assessment: 7,000
- Environmental Inventory & Assessment: 33,000
- Legal Fees: 20,000
- Right of Way Acquisition @ $1,000/ac: 40,000
- Cost of Project Components: 6,716,000
- Construction Engineering Costs: 672,000
- Contingency @ 15%: 1,108,000

**Total Construction**: 8,496,000
**Total Project Cost**: $9,288,000
CONSTRUCTION SCHEDULE

In 1994 the projected peak day water demand is:

- City of Sheridan = 10.3 MGD
- JPB Service Area
  4,800 residents @ 500 GPC = 2.4 MGD
- Kendrick Golf Course = 1.0 MGD
- VAMC = 1.2 MGD
  TOTAL = 14.9 MGD

Based on an annual population growth rate of 2%, peak day use by the City of Sheridan, the JPB service area, Kendrick Golf Course, and the VAMC in 1994 will total 14.9 MGD. This need will exceed the combined capacity of the 16-inch and 20-inch pipes of 14.0 MGD.

Accordingly, a new 30-inch raw water transmission main is recommended for funding by the Wyoming Legislature in 1993 to provide an adequate water supply the following year. Project construction could start in 1994 with completion expected late that year or early 1995.

Benefits of this proposed schedule are:

- The Sheridan community would have two raw water transmission mains for the Sheridan Water Treatment Plant, creating highly desirable redundancy in its raw water delivery system.

- Design and construction of the proposed pipeline could be managed by Project Administration staff already in place for other components of the Sheridan Area Water Project. Additionally, the JPB has local funds that are available for matching purposes.

- The Sheridan Water Treatment Plant, currently being expanded from 10 to 14 MGD, will have sufficient raw water available to operate at full capacity.

- The 8 and 10-inch cast iron pipes can be abandoned, stopping costly repairs.

- The Kendrick Golf Course, switched from the 8-inch pipe to the 20-inch pipe, will no longer be the site of wasteful spills that are performed to prevent excessive pressure build-up in the 8-inch pipe.

- The VAMC obtains a long awaited reliable raw water delivery system, eliminating the risk of a catastrophic interruption.
RECOMMENDATIONS

In summary it is recommended that:

- A new 30-inch diameter transmission main be authorized for financial assistance by the 1993 Wyoming Legislature.

- The transmission main deliver raw water to the Sheridan Water Treatment Plant, the Kendrick Golf Course, and the Veterans Administration Medical Center.

- The main be routed along pipeline Segments 1 and 2.

- The pipe material be the lowest cost bid alternate among ductile iron, reinforced concrete, and steel.

- One sleeve valve (PRV) be installed near the Sheridan Water Treatment Plant for pressure control.

- A feasibility analysis during final design compare the life cycle cost of installing a hydropower turbine in conjunction with the PRV at the Sheridan Treatment Plant with a second option of relocating the PRV to pipeline Segment 1 to allow the possibility of some lower pressure class pipe.