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WASHAKIE COUNTY SAFETY
LEVEL II STUDY
EXECUTIVE SUMMARY

SUBMITTED TO:
WYOMING WATER
DEVELOPMENT COMMISSION

SUBMITTED BY:
ENGINEERING ASSOCIATES
Consulting Engineers and Land Surveyors
P.O. Box 1900 + 902 13th Street
Cody, Wyoming 82414
(307) 587-4911
WASHAKIE COUNTY SAFETY
LEVEL II STUDY

EXECUTIVE SUMMARY

FUNDED BY: Wyoming Water Development Commission

MEMBERS:
George Jost, Chairman
Robert E. Yemington, Vice Chairman
Anne MacKinnon, Secretary
William Bensel
Dan S. Budd
Floyd R. Field
Dick Geving
Anne MacKinnon
Mitch Cottenoir, Tribal Rep.
William "Jeb" Steward
A. Lee Arrington

PROJECT MANAGER: Vicki Beckman Winders

CONSULTANT: Engineering Associates
P.O. Box 1900
902 13th Street
Cody, Wyoming 82414
(307) 587-4911

DATE: February 1, 2007

JOB NUMBER: 06049.00
EXECUTIVE SUMMARY
WASHAKIE COUNTY SAFETY
LEVEL II STUDY

SCOPE OF STUDY

Engineering Associates (EA) was retained by Wyoming Water Development Commission (WWDC) to conduct a Level II Study of the Irrigation and Drainage Ditches along Lane 12 in Washakie County. Included within the scope of work are the following items:

- Identify the Service Area
- Review Easement and Right of Ways
- Survey Existing Ground Features
- Rehabilitation of Existing Irrigation System Ditches
- Conceptual Level Design and Cost Estimates
- Economic Analysis and Project Financing
- Prepare Recommendations for Future Development
- County Road Safety Improvements

SERVICE AREA

The map below identifies key elements within the project corridor. The Lower and Upper Ditches currently receive water from the Hanover Irrigation Canal from separate head gates near Lane 12. One head gate is located on the north side of Lane 12 and delivers water to the Upper Ditch. The head gate on the south side of Lane 12 delivers water to the Lower Ditch.

The Upper Ditch currently provides irrigation water at nine specific locations along Lane 12. Delivery water is used to irrigate cash crops, pastures, and a subdivision.

The Upper Ditch does not have a formal system in place for ordering water. Irrigators are to request water from the Hanover Canal’s Ditch Boss, but a majority of the time the irrigators access the head gate themselves and open and close it as necessary. At the downstream end of the Upper Ditch, the ditch is above the existing ground...
line and causes site restrictions at the intersection of Lane 12 and Road 11.

The Lower Ditch currently provides irrigation water to three users located upstream of the concrete chute on Lane 12 and sixteen identified water users located downstream of the concrete chute. Users along Lane 12 are located within platted subdivisions. At the lower end of this ditch, the water is used to irrigate pastures and lawns located north of Lane 12.

The Lower Ditch currently receives waste water at three specific locations along Lane 12. It is possible that the Lower Ditch receives flows from all lands enclosed by Lane 12, Worland city limits, and the Upper Hanover Canal. The mentioned lands enclose approximately 450 acres. The land within this enclosed area uses a combination of sprinkler irrigation for approximately 210 acres and flood irrigation for approximately 240 acres.

Approximately 40 years ago, a waste ditch existed on the south side of Lane 12. As development took place in Worland, the waste ditch was filled in, and the water was diverted to the north side of Lane 12 into the Lower Ditch. The waste water deposits high amounts of sediment into the delivery water in the Lower Ditch and causes maintenance issues for all parties involved with the Lower Ditch.

EASEMENT AND RIGHT OF WAY REVIEW

Title research has been performed by County Title Agency. Since Washakie County was originally part of Big Horn County, Engineering Associates performed additional research in Basin at the Big Horn County Courthouse. Additional research was done to investigate easements specifically related to irrigation features. Lane 12 west of Road 11 was established with a 60-foot right-of-way under the name of Washakie Avenue when Worland was part of Big Horn County in 1968. Lane 12 east of Road 11 was established with a 60-foot right-of-way under the name of Banjo Flats Road after Washakie County was formed in 1983. The current pavement is generally centered within the designated right-of-way east of Road 11. West of Road 11, Lane 12 begins to diverge from being centered within the right-of-way.

The research of the Upper and Lower Ditches and the waste ditch along Lane 12 did not indicate a recorded easement or easement width for any ditches. The lack of recorded easements was expected since these ditches were established in the early 1900's.

The current survey information indicates that the Upper Ditch meanders along the north boundary of the County Right-Of-Way. The Aspen Subdivision has platted a "Public Use" area in the vicinity of the Upper Ditch. The current survey information indicates the Lower Ditch is generally located within the County Right-Of-Way.

Title research indicated the presence of utilities easements at specific locations along Lane 12. Many of the utility easements are located directly behind the County Right-Of-Way.
Right-of-Way Summary

Information was found on the Wyoming State Engineer's Office website to give guidance on "Legal Aspects Relating to Ditch Rights and Easements". Based on the information provided by the Wyoming State Engineer's Office, the ditch easements are established under prescriptive easements. A prescribed easement is defined by the State of Wyoming as being an established easement in existence for a period of 10 years or more.

According to the Wyoming State Engineer's Office, "Legal Aspects Relating to Ditch Rights and Easements", page 3:

"In short, the fact that a ditch is found to exist in the present location suggests that, at some time in the past, the landowners agreed that it could be constructed there. If it has existed there for a period of ten years or longer, it has probably established its easement and cannot be removed, except by agreement of all affected parties."

The State Engineer's Office also addresses the width of the prescriptive easements. According to the Wyoming State Engineer's Office, "Legal Aspects Relating to Ditch Rights and Easements", page 4:

"In Wyoming, accepted view has been that the holder of a ditch easement has only the right to expect his ditch to remain in its historical physical location, and the right to conduct reasonable maintenance on the ditch. Thus, the easement accompanying a small ditch would allow only small equipment for maintenance of the ditch, while a larger ditch would have a correspondingly larger area allowed for maintenance equipment."

The ditch cross-section of the Upper Ditch overlaps the County Right-Of-Way, and extends beyond the existing County Right-Of-Way 3 feet to 16 feet. The prescriptive easement on the upstream end of the Upper Ditch is affected by the access needed to clean the deep ditch. On the downstream end of the Upper Ditch, the easement is affected by the berm material width and the access restriction caused by the Lower Ditch.

The width of the Lower Ditch channel normally sets within the County Right-Of-Way and varies from 6 feet to 12 feet in width. When the Lower Ditch crosses Lane 12 near the Templin Farms property (Station 19+92) the ditch cross-section is in the County Right-Of-Way. As the Lower Ditch approaches the intersection of Lane 12 and Road 11, the ditch is 4.5 feet deep and 11 feet wide. West of Road 11, the Lower Ditch channel depth increases to 5 feet and widens to 18 feet. The Lower Ditch is approximately 1 foot outside of the County Right-Of-Way, West of Road 11.

The water rights within the service area of the project are permitted under Permit No. 9706 and have a priority of April 2, 1902.
SURVEYING

The existing ground features, ditches and utilities have been surveyed. The maps provided in Appendix A, of the Final Report, clearly show the relationship between the existing ditches and County Right-Of-Way.

The profile of the Upper and Lower ditches were surveyed to provided basic information to estimate the flows in both ditches. Before the design phase begins, we recommend that ramp flumes be installed to accurately measure the flows in both ditches in four specific locations. Ramp flumes offer an economical and effective way to measure flows within the ditches. The ramp flume should be installed before the irrigation season begins in April 2007.

REHABILITATION OF EXISTING IRRIGATION SYSTEM DITCHES

The current irrigation system is located in close proximity to the edge of the pavement. At the upstream end of the Upper Ditch, the centerline is approximately 6 feet deep and 23 feet away from the edge of the pavement. At the intersection of Lane 12 and Road 11, the centerline of the Lower Ditch is approximately 3 feet deep and 5 feet away from the edge of the pavement. Before the Lower Ditch goes underground, it is 6.5 feet deep and 18 feet wide at the top. At this location, the ditch side slope begins 2 to 3 feet from the edge of the pavement.

The vertical profiles of the Upper and Lower Ditch were surveyed and indicate adequate drop is available to put the delivery water of both ditches into a closed pipe system.

No statute was found to state irrigation delivery water has to be kept separate from waste water. The State Engineer's Office does address when a neighbor begins to use an existing delivery lateral or waste ditch, when the ownership of the ditch is documented. Unless the ownership of the ditch is documented, there is no way to establish who can and cannot use a delivery lateral or waste ditch.

For convenience and usability of the system, it is desirable to convey the waste water and delivery water in separate systems.

Future Maintenance Agreement

At the present time, there is not a formal maintenance program for the Upper and Lower Ditch. The information provided in the Wyoming State Engineer's Office offers guidance on maintenance of the Lower Ditch in the "Legal Aspects Relating to Ditch Rights and Easements" document. This document should be utilized to help guide the creation of a maintenance program for the waste water flows.

Referencing the "Legal Aspects relating to Ditch Rights & Easements" located in Appendix C of the Final Report, questions 8, 10, 19 and 20 could be used to generate discussion on maintenance issues.
Question 8 states:

"It is generally agreed that the “owner” or “owners” of a ditch consist of anyone who uses the ditch or water therefrom for any purpose whatever. The proportionate ownership of the ditch among several owners is determined by the “ratio between the water right of each water user to the total water rights adjudicated under such irrigation works” (Wyoming Statue 41-6-303).

Question 10 states:

"Technically, Wyoming Statue 41-5-101 (cited above in answer #8) is the only guidance which speaks to maintenance obligations. However, it is generally agreed that in an instance of this type, reasonable maintenance is all that is required. It is also generally agreed that one who causes his own problems, is not entitled to relief from another party.”

Question 19 states:

"....the ditchowner should take care in depositing the dredged material so as not to cover anymore property than has historically been covered and upon completion of the cleaning, smooth the piles out into a level and slightly berm if requested by the landowner."

Question 20 addresses, “Who determines the necessity and extent of ditch maintenance?”

Review of the Wyoming Water Law, “A Summary”, from May 2003, located in Appendix D, of the Final Report, page 11 states:

“The water right owner is responsible at all times for waste water.”

CONCEPTUAL LEVEL DESIGN AND COST ESTIMATES

All the proposed design alternatives lower the Upper Ditch at the intersection of Road 12 and Lane 11. By placing the Upper Ditch underground, the Upper Ditch berm would be eliminated, and maintenance associated with the ditch would be reduced. In addition, waste water flows were separated from the deliver water in the Lower Ditch. By separating the waste water from the delivery water, problems associated with the high sediment load of the waste water will be eliminated for the users who receive delivery water from the Lower Ditch.
A brief summary of the individual options is listed in the table below.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A</td>
<td>To install a pedestrian walk path, an 18-inch pipe system for the Lower Ditch delivery water, a dual 21-inch pipe system for the Upper Ditch delivery water, and a 30-inch pipe for waste water.</td>
</tr>
<tr>
<td>Option B</td>
<td>To install a concrete waste ditch, a pedestrian walk path, an 18-inch pipe for the Lower Ditch delivery water, and a dual 21-inch pipe system for the Upper Ditch delivery water.</td>
</tr>
<tr>
<td>Option C</td>
<td>To install a pedestrian walk path, a dual 24-inch pipe system to deliver water to both the Lower and Upper Ditch users, and a 30-inch pipe for waste water.</td>
</tr>
<tr>
<td>Option D</td>
<td>To install a pedestrian walk path, an 18-inch pipe system for the Lower Ditch delivery water, an on-demand system for the Upper Ditch delivery water, and a 30-inch pipe for waste water.</td>
</tr>
</tbody>
</table>

The table below summarizes the probable construction dollars for 2007.

<table>
<thead>
<tr>
<th></th>
<th>Washakie County</th>
<th>Town of Worland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A</td>
<td>$ 1,663,472.80</td>
<td>$ 490,981.11</td>
<td>$ 2,154,453.91</td>
</tr>
<tr>
<td>Option B</td>
<td>$ 1,393,063.73</td>
<td>$ 451,798.38</td>
<td>$ 2,243,362.49</td>
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<tr>
<td>Option C</td>
<td>$ 1,359,832.05</td>
<td>$ 387,115.57</td>
<td>$ 1,746,947.62</td>
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<tr>
<td>Option D</td>
<td>$ 1,595,730.52</td>
<td>$ 466,517.69</td>
<td>$ 2,062,248.21</td>
</tr>
</tbody>
</table>

ECONOMIC ANALYSIS AND PROJECT FINANCING

Requirements for Funding Sources

Research of the funding agencies regulations indicate that the project owner must have legal ownership of the improvements and perform maintenance on the improvements for the duration of the period of the funding loan. For the improvements to take place to the irrigation system, the system would need to be placed on County Property and maintained by the County. The County could set up agreements with the land owners to have the legal ownership of the land and improvements expire when the loan is repaid in full by the project owner.

The County will also need to establish an agreement with the Town of Worland for improvements made within the Corporate Limits of Worland.

Potential Funding Sources

There are funding sources for irrigation and public facilities at the state and federal levels. Different funding sources have different program requirements, as well as various types of funding. Upon examining the funding options available for this project, funding for walk paths are very specific to the intended use and location of the path.
A summary of the potential funding sources is listed below for the projects.

<table>
<thead>
<tr>
<th></th>
<th>WWDC GRANT</th>
<th>TEAL GRANT</th>
<th>LOAN*</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A</td>
<td>$1,037,367.64</td>
<td>$484,915.20</td>
<td>$632,171.07</td>
<td>$2,154,453.91</td>
</tr>
<tr>
<td>Option B</td>
<td>$1,067,422.04</td>
<td>$496,270.82</td>
<td>$659,663.64</td>
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<td>Option C</td>
<td>$807,931.33</td>
<td>$432,863.97</td>
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<td>Option D</td>
<td>$985,453.51</td>
<td>$473,173.66</td>
<td>$603,657.04</td>
<td>$2,062,248.21</td>
</tr>
</tbody>
</table>

*The loan amount is based on the assumption of a 20-year repayment at 4% interest.

Recommended Design Option

Based on the funding availability, construction costs, the ease of operation and maintenance, and useful life, it is recommended to pursue Option C.

**PREPARING WASHAKIE COUNTY FOR FUTURE DEVELOPMENT**

The Big Horn Basin has begun to see an influx of people moving to the area. As growth takes place, many rural agricultural lands are being developed. The development can range from large lots to small half acre residential lots. As future development takes place within Washakie County, Washakie County Commissioners should build on the existing procedures established by other counties that have already experienced residential growth.

A review of the existing Washakie County Subdivision Development Regulations show Washakie County has been very proactive in preparing for subdivisions. Two key elements in the Subdivision Regulations that need to be reviewed are issues related to the responsibilities of the Washakie County Planning Office and issues related to the Irrigation Conveyance Systems.

Responsibilities of the Planning Office

The existing subdivision review procedures require the Planning Office to refer the Sketch Plan to various agencies for review and comment. Based on the potential for development and the existing staffing of the Planning Office, it is recommended that the developer be responsible for obtaining agency approvals of the Sketch Plan and Final Plat. The County Planner would then be responsible for receiving comment letters from the respective agencies. The review comments would be required prior to specific submittals of the development. To assist developers in obtaining the necessary approval, the County Planner could provide them with a contact list for the required agencies. In the event, the planning office continues to be responsible for the existing duties; additional help will be needed as the County continues to develop.

Irrigation Conveyance Systems

A unique aspect of the irrigation systems within Washakie County is the role and responsibility of the canal companies and private ditch owners. The canal companies within Washakie County are responsible for the maintenance and
delivery of the irrigation water in the main canal system. From the main canal system, all the water is released to private ditches. Any ditch that leaves the Canal Company is considered private and is to be maintained and operated by the user(s) receiving water from the Canal Company’s head gate.

Many of the private ditches were not formally recorded when they were created. Private ditch associations were not established to document and preserve the intent of the irrigation conveyance system.

Upon a review of the existing Washakie County Subdivision Development recommendations were made to require the following:

- The developer should be required to protect, plan and document irrigation water.
- The regulations should include the notification and review by the affiliated Irrigation/Canal Company and the approval of the State Board of Control, per state guidelines.
- Irrigation Easements should be established and recorded on new and amended plats.
- A subdivision, regardless of lot size and number, shall document existing private ditches and establish irrigation easements at an appropriate width for maintenance and access for downstream users.
- Proposed modifications to the existing conveyance system shall not restrict the historic use of any water user on the conveyance system.
- Homeowner’s Association By-Laws and Covenants should be reviewed and approved by the Washakie County Commissioners. The By-Laws and Covenants should address the following irrigation related issues:
  1. Designate a Water Master within the owners of the Subdivision to order and deliver water to the subdivision.
  2. The By-Laws and Covenants should designate a watering schedule for the lots.
  3. Describe how the subdivision will distribute irrigation water to lots within the subdivision.
  4. Describe how the subdivision will ensure the conveyance of irrigation water to other water users within the irrigation conveyance systems/private ditches.
  5. The association must be able to adjust assessments as necessary to ensure the proper functionality of the irrigation conveyance system within the subdivision and to downstream users.

COUNTY ROAD SAFETY

To improve the safety along all roads within Washakie County, Washakie County should adopt a standard road cross-section. The standard road cross-section should include the reflector poles, fences along County Right-of-Way and line striping.