

**FEASIBILITY STUDY REPORT  
FOR  
DRY-REDWATER REGIONAL WATER AUTHORITY  
DAWSON, GARFIELD, McCONE,  
PRAIRIE AND RICHLAND COUNTY  
S04-80**

Mike McKeever, Chairman – Garfield County  
Pat Eggebrecht, Vice-Chairman – McCone County  
Roger Meyer, Secretary – Richland County Conservation District  
Tod Kasten, Treasurer – McCone County Conservation District  
Mayor John Whiteman – Richey Board Representative  
Marco Unruh – Dawson County Conservation District  
Baan Wille – Jordan  
Dean Rogge – Garfield County Conservation District  
Harry Helegeson – Circle



I, Brian Milne, hereby certify that this Feasibility Report was prepared by me or under my direct supervision. I further certify that I am a Registered Professional Engineer under the laws of the State of Montana.

A handwritten signature in black ink, appearing to read "Brian R. Milne".



Date 7/3/06

# INDEX

	Executive Summary & Conclusion	i to vi
Chapter 1	Introduction	1-1 to 1-12
Chapter 2	Project Area Resources	2-1 to 2-15
Chapter 3	Existing Facilities	3-1 to 3-7
Chapter 4	Need For Project	4-1 to 4-6
Chapter 5	Permit Requirements and Responsibilities	5-1 to 5-3
Chapter 6	Preliminary Design	6-1 to 6-24
Chapter 7	Cultural and Environmental Issues	7-1 to 7-9
Chapter 8	Project Alternative Cost Estimates	8-1 to 8-7
Chapter 9	Plan Selection	9-1 to 9-4
Chapter 10	Public Involvement	10-1 to 10-9
Chapter 11	Project Financial Plan	11-1 to 11-4
Chapter 12	Implementation	12-1 to 12-2
	Appendix (separate document)	

# FIGURE INDEX

i.1	DRWA Study Area	i
i.2	Selected Alternative: Areas Served	v
1.1.1	Study Area's Relative Location	1-1
1.1.2	Original Study Boundary	1-2
1.1.3	Signed Up Users Location Map	1-3
1.4.1	Project Service Area	1-7
1.10.1	Area Roadways	1-12
2.1.1	General Geological Map of Montana	2-1
2.1.2	Land Forms and Groundwater Resources of Montana	2-2
2.1.3	Project Area – Relief Map	2-3
2.2.1	Project Area – Major Surface Water Resources	2-4
2.3.1	Project Area – Land Cover	2-5

## FIGURE INDEX continued

2.4.1	Municipal Water Systems	2-13
3.1.1	Town of Circle	3-1
3.2.1	Town of Jordan	3-3
3.3.1	Town of Richey	3-5
3.4.1	Town of Lambert	3-6
6.1	Dry Redwater Service Area	6-1
6.6.1	Mode Segment Map	6-13
6.6.1.1	Major Modeling Symbols	6-14
6.7.1	Circle WTP Model	6-17
6.7.2	Big Dry Arm WTP Model	6-18
6.7.3	Jordan WTP Model	6-19
6.7.4	Circle – Jordan WTP Model	6-20
6.7.5	Garfield WTP Model	6-21
8.2.1	Alternative A	8-1
8.3.1	Alternative B	8-3
8.4.1	Alternative C	8-5
8.6.1	Circle WTP Model	8-7

# TABLE INDEX

1.7.1	Sign Up Summary	1-8
2.3.1	Water Quality Limits	2-6 to 2-7
2.3.2	Water Quality of Wells Currently Being Used in McCone and Garfield Counties	2-8 to 2-9
2.3.3	Secondary Standards for Inorganic Contaminants (Partial Listing)	2-9
2.5.1	2000 Population by County Subdivision	2-14
2.6.1	Average Median Household Income by County	2-14
2.6.2	Median Household Income by Community	2-15
4.1.1	National Primary Drinking Water Standards	4-3 to 4-4
4.1.2	National Secondary Drinking Water Regulations	4-4 to 4-5
6.1.1	County Populations	6-2
6.1.2	County Housing Units	6-2
6.1.3	Persons/Housing Unit	6-2
6.2.1	Interest Survey Summary	6-3
6.3.1	Estimated Water Use by County	6-4
6.3.2	Estimated Average Water Use by Populated Communities	6-5
6.3.3	Average Water Demand by Populated Communities	6-5
6.3.4	Equivalent Dwelling Units	6-6
6.3.5	Water Demands Summary	6-6
6.4.1	Conventional Water Treatment Processes	6-10
6.6.2.1	Pipe Material, Rating and Roughness	6-15
7.2.1	Land Uses, Cultural Resources and Environmental Resources Affected by the Project	7-2
9.1.1	Average Median Household Income by County	9-1
9.3.1	Economic Evaluation	9-2
9.3.2	Analysis of Alternatives	9-3

# ACRONYMS

A/AUM	ACRES / ANIMAL UNIT MONTH
ARM	ADMINISTRATIVE RULES OF MONTANA
AU	ANIMAL UNIT
BOR	BUREAU OF RECLAMATION
CEIC	CENSUS AND ECONOMIC INFORMATION CENTER
CMR-NWR	CHARLES M. RUSSELL NATIONAL WILDLIFE REFUGE
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY
DNRC	DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
DRWA	DRY-REDWATER REGIONAL WATER AUTHORITY
EA	ENVIRONMENTAL ASSESSMENT
EDU	EQUIVALENT DWELLING UNIT
EIS	ENVIRONMENTAL IMPACT STATEMENT
EPA	ENVIRONMENTAL PROTECTION AGENCY
FONSI	FINDINGS OF NO SIGNIFICANT IMPACT
GPM	GALLONS PER MINUTE
GWR	GROUND WATER RULE
HHAs	HALOACETIC ACIDS
MCL	MAXIMUM CONTAMINANT LEVEL
MDT	MONTANA DEPARTMENT OF TRANSPORTATION
MEPA	MONTANA ENVIRONMENTAL POLICY ACT
MG/L	MILLIGRAMS PER LITER
MHI	MEDIAN HOUSEHOLD INCOME
MR&I	MUNICIPAL, RURAL AND INDUSTRIAL WATER SUPPLY PROGRAM
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NSDWR	NATIONAL SECONDARY DRINKING WATER REGULATIONS
O&M	OPERATION AND MAINTENANCE
PACL	POLYALUMINUM CHLORIDE

## **ACRONYMS** continued

PAHS	ALUM-POLYALUMINUM HYDROXYL SULFATE
PEMA	NATIONAL WETLAND INVENTORY SYMBOL FOR A SEASONALLY FLOODED BASIN
PEMC	NATIONAL WETLAND INVENTORY SYMBOL FOR A SHALLOW SLOUGH
PPB	PARTS PER BILLION
RUS	RURAL UTILITY SERVICE
SHPO	STATE HISTORICAL PRESERVATION OFFICE
SWR	SURFACE WATER RULE
TDS	TOTAL DISSOLVED SOLIDS
TSEP	TREASURE STATE ENDOWMENT PROGRAM
TTHMs	TOTAL TRIHALOMETHANES
USACOE	UNITED STATES ARMY CORP OR ENGINEERS
USFWS	UNITED STATES FISH AND WILDLIFE SERVICE
WTP	WATER TREATMENT PLANT

# APPENDIX INDEX

- A** Agreement forming Dry Redwater Regional Water Authority  
By-Laws and Rules
- B** Area Well Quality Information
- C** Existing Water System Information
- D** User Sign-up Sheet Summary
- E** Public Involvement – Newspaper Articles, Public Meeting Rosters,  
Information Meeting / Environmental Presentation
- F** Support Letters / Project Correspondence
- G** Effects of Water Quality and Performance of Growing Steers / EPA Water  
Quality Data
- H** Good Intention Fee Hook-Up Summary (June 8, 2006)
- I** Computer Modeling Information and Cost Estimates
- J** North Richland County / West Glendive Information